**OPEN-FILE REPORT 00-10**

# History, Geology, and Environmental Setting of the Lower Fair Day Mine, Arapaho/Roosevelt National Forest, Boulder County, Colorado

**By John Neubert and Robert H. Wood II**

Colorado Geological Survey
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# FOREWORD

Open-File Report 00-10 describes the history, geology, and environmental setting of the Fair Day uranium mine in Boulder County. Most of the site lies on U.S. Forest Service-administered land within the James Creek drainage basin. The U.S. Forest Service was interested in this site because of heavy public use in this area and the presence of mine drainage. This information will be used to develop a reclamation plan for the site.

Funding for this project was provided mostly by the U.S. Forest Service (Agreement No. 1102-0007-98-035). Partial funding came through the Water Quality Data program of the Colorado Geological Survey from the Colorado Department of Natural Resources Severance Tax Operational Fund. Severance taxes are derived from the production of gas, oil, coal, and minerals.

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## ABBREVIATIONS AND SYMBOLS

| | |
|---|---|
| ATV | all-terrain vehicle |
| CGS | Colorado Geological Survey |
| CERCLIS | Comprehensive Environmental Response, Compensation, and Liability Information System |
| cps | counts per second |
| CR | County Road |
| ° | degree |
| EE/CA | Engineering Evaluation/Cost Analysis |
| EDR | Environmental Degradation Rating |
| EPA | United States Environmental Protection Agency |
| = | equals |
| FR | Forest Road |
| 4WD | four-wheel drive |
| gpm | gallons per minute |
| < | less than |
| ≤ | less than or equal to |
| µg/L | micrograms per liter |
| µ | microns |
| µS | microSiemens |
| mg/L | milligrams per liter |
| > | more than |
| NPL | National Priorities List |
| n/a | not applicable |
| no. | number |
| # | number |
| p. | page(s) |
| ppm | parts per million |
| % | percent |
| PHR | Physical Hazard Rating |
| pCi | picoCuries |
| lb(s) | pound(s) |
| PBS | Primary Base Series |
| quad | quadrangle (7.5-minute) |
| SH | State Highway |
| x | times (when factoring ion concentrations or radioactivity) |
| trec | total recoverable |
| U.S. | United States |
| USFS | United States Department of Agriculture - Forest Service |
| BLM | United States Department of Interior - Bureau of Land Management |
| v. | volume |

## INTRODUCTION

This site is usually referred to as the Fair Day Mine. Other names cited include Faraday, Coliowa, and Overland Mountain Group (Nelson-Moore and others, 1978, p. 82). The Fair Day Mine is located on Forest Service-administered land on the south side of Overland Mountain and north of James Creek, in Boulder County, Colorado.

The Fair Day Mine encompasses at least two underground workings. The older mine is high on the south slope of Overland Mountain and is not considered an environmental problem. This older opening is an inclined shaft or adit, and it was included in an abandoned mine inventory done by the CGS for the USFS in 1992 (USFS-AMLIP inventory form #463/4440-1). Literature describing the Fair Day Mine mentions a lower adit, about 350 feet below the original inclined shaft. The mine site this report addresses in detail is probably the lower adit of the Fair Day Mine. This lower adit was not included in the inventory completed in 1992. After USFS personnel from the Boulder Ranger District reported the existence of this lower working, the CGS inventoried the site in June 1999 (USFS-AMLIP inventory form #463/4440-2). Because the site was draining a moderate amount of apparently degraded water, it was rated as a potentially significant environmental problem (EDR=3). In late summer of 1999, the USFS requested CGS to provide more information describing the history, geology, and environmental setting of the lower portal.

## SITE LOCATION

The Fair Day Mine is in Boulder County, Colorado. The lower portal that this report addresses in detail is in section 26, Township 2 North, Range 72 West, of the Sixth Principal Meridian, about 2 miles west of Jamestown. This lower portal is accessed by a 4WD road that follows James Creek west from Jamestown. Another 4WD road branches from the James Creek road, follows an unnamed tributary on the north side of James Creek, and leads to the mine. Elevation is about 7,900 feet at the lower portal and 8,300 feet at the upper inclined shaft. (See Figure 1.)

## MINING HISTORY

Uranium was discovered about 0.5 mile north of the Fair Day in 1954. In 1955 uranium minerals were discovered near the upper workings, and R.L. Busby of Silver Plume, Colorado, staked several claims. The upper workings of the Fair Day Mine are near the center of the Fair Day AM lode claim. (See Baker, 1967.)

Coliowa Uranium Corporation leased the claims and drilled three holes in late 1956. Two holes were richly mineralized, and in late 1956 or early 1957 Coliowa subleased to La Salle Mining Company of Grand Junction, Colorado (G.T. Rummel, M.P. Rowe, Roy Eidal, and M.M. Hardin). La Salle drilled eight holes and drove a 200-foot-long inclined shaft. (See Baker, 1967; Operators Annual Report-Fair Day Lode, to Colorado Bureau of Mines, March 30, 1957; Information Report-Fair Day Lode, Colorado Bureau of Mines, November 17, 1956.) La Salle operated the mine for 200 days and employed 4 people in 1957. They shipped one carload of ore and stockpiled about 200 tons. (See Operators Annual Report-La Salle No. 1, to Colorado Bureau of Mines, December 28, 1957.)

The Defense Mineral Exploration Administration approved an exploration loan of about $50,000 for the Fair Day and other nearby properties in 1958, and by 1959 the mine had a 200-foot-long inclined shaft, about 1,100 feet of drifts and crosscuts, and four stopes. (See Baker, 1967.) The inclined shaft was only 120 feet long according to Sims and Sheridan (1964, p. 57). In 1958, La Salle operated the mine all year and employed 9 people. The property included a patented claim and nine unpatented claims. (See Operators Annual Report-La Salle No. 1 (Fair Day), to Colorado Bureau of Mines, February 22, 1959.)

La Salle operated the mine for 285 days with eight employees in 1959. Production reported to the State of Colorado was about 1,300 tons worth about $35,000. (See Operators Annual Report-Fair Day, to Colorado Bureau of Mines, January 25, 1960.)

In 1960, uranium ore produced at the Fair Day Mine by La Salle Mining Company was shipped to Salt Lake City for processing (Howes, 1961, p. 234). In April 1960 a lower adit about 1,850 feet long and about 350 feet below the upper workings was completed and began producing (Sims and Sheridan, 1964, p. 57-58; Baker, 1967). The workings of the Fair Day are described in detail by Norman Blake (inspector for Colorado Bureau of Mines) in an Information Report dated December 30, 1960. The lower crosscut was about 1,800 feet long, with a raise to the upper level about 1,700 feet from the portal. About 400 feet of the lower adit required timbers for support. The mine employed 23 people and produced 4,000 tons of ore worth about $50/ton and containing about 0.62% $U_3O_8$. The Operators Annual Report to the Colorado Bureau of Mines for 1960 reports production of about 3,250 tons worth about $265,000. This lower adit is almost certainly the mining feature of concern in this report.

La Salle employed 23 people and produced about 12,200 tons of ore worth about $300,000 in 1961 (Operators Annual Report-Fair Day, to Colorado Bureau of Mines, March 12, 1962). The property went to litigation because La Salle Mining Company had shipped more than $800,000 worth of ore over the last few years, but Coliowa had received no payments. In court, efforts by Coliowa to collect payments from La Salle were rebuffed because Coliowa could not show that La Salle had earned a profit from operating the mine. La Salle's ties with the Fair Day were cut by November 1961, and most of their equipment was removed, with the exception of a vent line and rail. (See Baker, 1967; Information Report-Fair Day Mine, Colorado Bureau of Mines, June 5, 1963.)

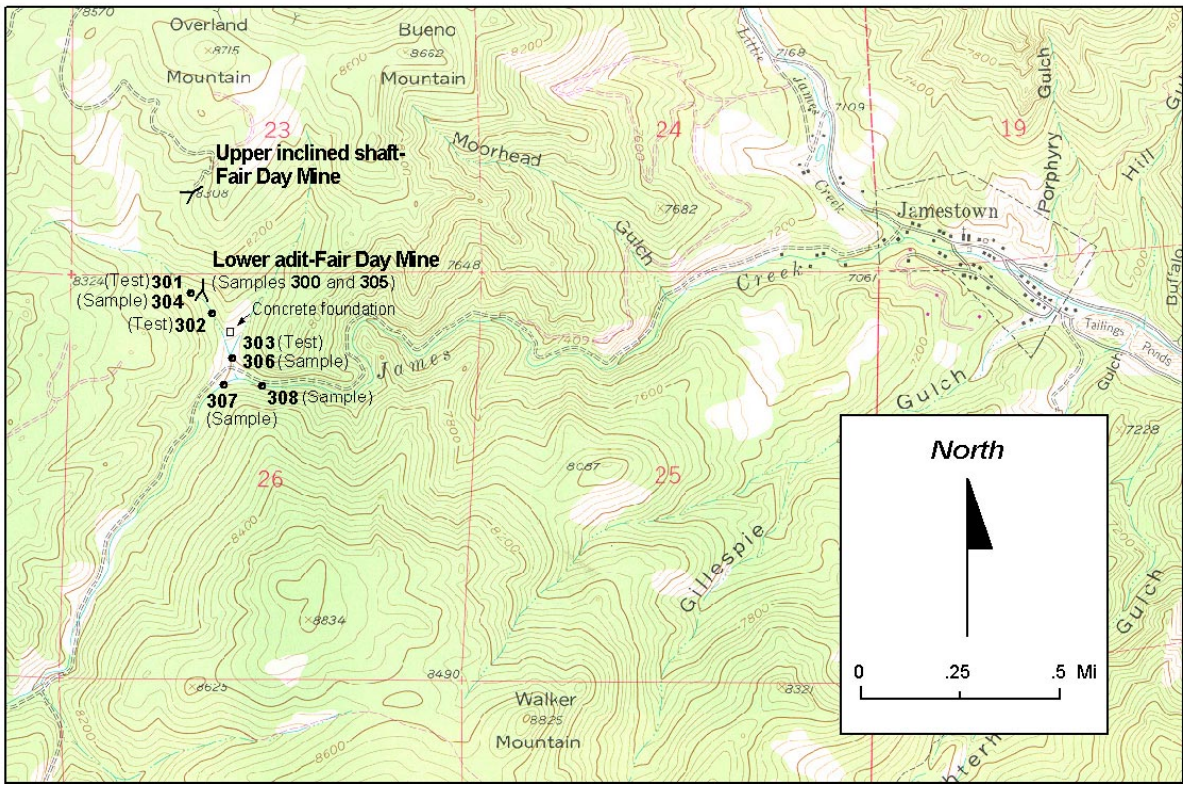



**Figure 1. Location map of the Fair Day Mine, showing the upper and lower workings and localities for tests and samples.**

Ray Bennett operated the mine for a few weeks in late 1961 and shipped about $35,000 worth of ore. Climax Uranium of Grand Junction rehabilitated the mine, but produced nothing. R.L. Busby, the original owner, then operated the mine and shipped about $8,500 worth of ore. (See Baker, 1967.) Vitro Chemical Company produced an unspecified quantity of ore and shipped it to Salt Lake City for processing in 1961 (Howes, 1962, p. 241).

In 1962, the Fair Day produced less than 1,000 tons of ore and was operated by Modern Minerals Incorporated and Vitro Chemical Company. This production represented a 93% decrease from the previous year. (See Mullen, 1963, p. 250.) Modern Minerals and Merino Mining Corporation leased the mine from Coliowa and produced about 30 tons of ore from the upper workings. Three people were employed, and the mine operated 45 days. Timber throughout the mine was rotting quickly and needed replacement. (See Information Report-Fair Day Mine, Colorado Bureau of Mines, June 5, 1963.) Coliowa Uranium Corporation had 22 unpatented mining claims in the Fair Day Mine area (Baker, 1967). This claim block probably included the lower adit of the Fair Day Mine.

Production decreased again in 1963, but vanadium and uranium were recovered. Roy Busby and Modern Minerals Incorporated operated the mine. (See Mullen, 1964, p. 253.) According to the Operators Annual Report to Colorado Bureau of Mines for 1963, Buckskin Joe Drilling Company of Arvada, Colorado operated the Fair Day Mine with 5 employees and produced 250 tons of ore worth $16,000.

Roy Busby and Climax Uranium Company mined at the Fair Day in 1964. At least some of the ore was shipped to the Climax uranium mill in Grand Junction, and vanadium oxide was recovered. (See Bieniewski and Harstead, 1965, p. 241-242.)

In 1967 Ray Bennett of Denver was the lessee. No production is reported. As of 1967 the lower adit was caved, and the raise between the upper and lower levels was considered hazardous and inaccessible. (See Baker, 1967.)

In August of 1976 Harrison Western Corporation attempted to reopen the lower adit, which was caved about 300 feet from the portal (Information Report-Fair Day, Colorado Bureau of Mines, September 24, 1976). No production is reported from these efforts.

The Fair Day was by far the largest uranium producer in Boulder County through 1971 (Nelson-Moore and others, 1978, p. 80). Production from the Fair Day for 1958 to 1961 (Table 1) is slightly modified from Baker (1967). The total at the bottom is from Nelson-Moore and others (1978, p. 80). Some of the figures have been rounded off. Although Baker estimates a net profit for 1958 to 1961, the results of litigation in 1961 failed to show any profits for the years the mine was operated by La Salle Mining Company (1958 through most of 1961). About 95% of the value of the ore produced from the Fair Day Mine was during operations by La Salle Mining Company. La Salle reportedly produced about 4,044 tons from the upper level and 15,565 tons from the lower level, through the lower adit. (See Baker, 1967.) Production figures reported by Sims and Sheridan (1964, p. 58) for the years of 1958 to 1960 are 7,247 tons of ore and 80,720 pounds of $U_3O_8$, differing somewhat from the figures reported by Baker (1967). Figures reported in unpublished documents from the Colorado Bureau of Mines also differ to some extent.

**Table 1. Production from the Fair Day Mine.**

| Year | Gross ($) | Dry tons | $U_3O_8$ (lbs) | Grade (%) | Estimated costs ($) | Estimated net before taxes ($) |
|---|---|---|---|---|---|---|
| 1958 | 127,000 | 2,760 | 24,641 | 0.47 | 75,000 | 52,000 |
| 1959 | 51,000 | 1,284 | 9,802 | 0.42 | 31,000 | 20,000 |
| 1960 | 265,000 | 4,131 | 52,362 | 0.63 | 112,000 | 153,000 |
| 1961 | 429,000 | 11,434 | 82,011 | 0.36 | 278,000 | 151,000 |
| 1958-1961 | 872,000 | 19,609 | 168,816 | 0.44 | 496,000 | 376,000 |
| **Total to 1971** | **unknown** | **20,954** | **182,679** | **0.44** | **unknown** | **unknown** |

The mining claims that included the Fair Day had reported assessment work until 1985, and were declared void in 1987 (BLM records). Unfortunately the BLM has destroyed the files pertaining to that claim block; therefore additional information is not available.

In the early 1980s, Resources International Corporation of Englewood, Colorado staked a block of at least 81 unpatented lode claims (the RIP claims) that covered the Fair Day Mine and the surrounding area. The RIP 26/13 claim, located in April 1980, probably covered the portal of the lower Fair Day Mine. Correspondence between the claim owners and BLM indicates that Resources International apparently had ties to Moritz Mining Company Incorporated of Englewood. (See BLM lode claim files, lead file #157850 and #194820.)

Resources International (M.J. Wendell, vice-president; D.L. Rife, exploration manager) completed the assessment work from 1981 to 1983 (BLM lode claim files, lead file #194820).

Assessment work in 1984 was done by David Rife, whose title was vice-president of Jamestown Mining Company. Moritz Mining Company was the return address, suggesting a relationship between Jamestown Mining and Moritz Mining. Venture Minerals Incorporated of Denver also apparently had ties to Resources International and the RIP claims in 1984. (See BLM lode claim files, lead file #194820.)

In 1985 and 1986, A.J. Seastone, vice-president of Moritz Mining Company, completed assessment work (BLM lode claim files, lead file #194820).

J.W. Osborn and Energetics Incorporated fulfilled the annual labor requirements and were listed as the owners/operators of the claims from 1987 to 1991. Chester and Linda Fuqua and Energetics owned the claim blocks in 1992. Kennecott Exploration Company provided at least some of the funds for the work from 1989 to 1992. Apparently no work was done at the lower Fair Day portal, but mapping and geochemical and geophysical surveys were completed on parts of the claim block that included the Fair Day. (See BLM lode claim files, lead file #157850 and #194820.)

Claims of the block that included the Fair Day were declared abandoned in November of 1992 (BLM lode claim files, lead file #157850 and #194820).

## GEOLOGY

Precambrian-age weakly foliated Silver Plume Granite, with inclusions of older gneiss, form most of the bedrock at the Fair Day Mine. About 1 mile east of the Fair Day, Laramide-age porphyries of granodiorite and sodic granite intruded these Precambrian-age rocks.

Two fault sets cut the host rock; an obvious and persistent north-trending set of pre-Laramide age, and a northeast-trending set formed after the Laramide intrusive event. The north-trending set includes two nearly vertical fault zones with right-lateral displacement of a few feet. These

fault zones are brecciated and filled with gouge, and the wall rocks are argillized. (See Sims and Sheridan, 1964, p. 54-61.)

The northeast-trending set hosts most of the ore, but is less obvious and more irregular. Most of these faults show little or no displacement, dip steeply northwest, and often terminate against north-trending faults. Ore minerals occur as open-space fillings in fissures and cracks within the northeast-trending fault zones. The richest ore is often near the intersection of the veins with the north-trending faults. (See Sims and Sheridan, 1964, p. 59.)

Uraninite and coffinite, with minor sphalerite, chalcopyrite, galena, and marcasite occur in quartz-pyrite veins of Tertiary age. After exposure to air, secondary blue molybdenum salts precipitate on some of the broken ore. (See Sims and Sheridan, 1964, p. 59; Nelson-Moore and others, 1978, p. 80, 82.)

Ore shoots in the mine were 60 to 90 feet long, up to 25 feet wide, and extend up to 400 feet vertically (Baker, 1967). Gneiss is the most favorable host rock, and fissures within the granite are generally smaller and only weakly mineralized (Sims and Sheridan, 1964, p. 60–61).

As of about 1960, the deposit was oxidized to a depth of about 25 feet below the surface. Oxidized minerals occurring at the surface include autunite and torbernite. (See Sims and Sheridan, 1964, p. 61.)

## SITE DESCRIPTION

The upper workings of the Fair Day were not visited for the present investigation. The site with potential for environmental degradation is a lower adit, probably the lower crosscut that was driven in about 1960. The lower portal is accessed by a 4WD rode branching from the James Creek 4WD road. At this lower site, the portal is on the east side of an unnamed tributary to James Creek (Figure 2). Most of the waste-rock pile is on the west side of the tributary. A collapsed corrugated sheet-metal building lies between the portal and the tributary. A campfire ring and numerous spent 0.22-caliber bullet casings are on a bench south of the adit on the east side of the tributary.

The lower adit has “Devils Den” spray painted in blue on a timber above the portal. The portal is about 7 feet high and 6 feet wide, and the adit is open for at least 20 feet. As of 1967, this lower adit was caved at an unspecified depth (Baker, 1967). Wire mesh on the ceiling just inside the portal helps prevent the roof from caving. Slow-moving water flows from the working.

The 800-cubic-yard waste-rock pile toes into the west side of the unnamed tributary for about 30 feet and lies very close to the creek for another 70 feet. The pile is thickest to the north, gradually thinning to the south. Rills cut the face of the sparsely vegetated dump, and minor sheet wash erosion is evident. ATV and motorcycle tracks are on the bench and face. (See Figure 3.)

A concrete foundation, probably the remains of an ore-transfer facility, lies in the meadow about 500 feet south of the mine (Figure 1).

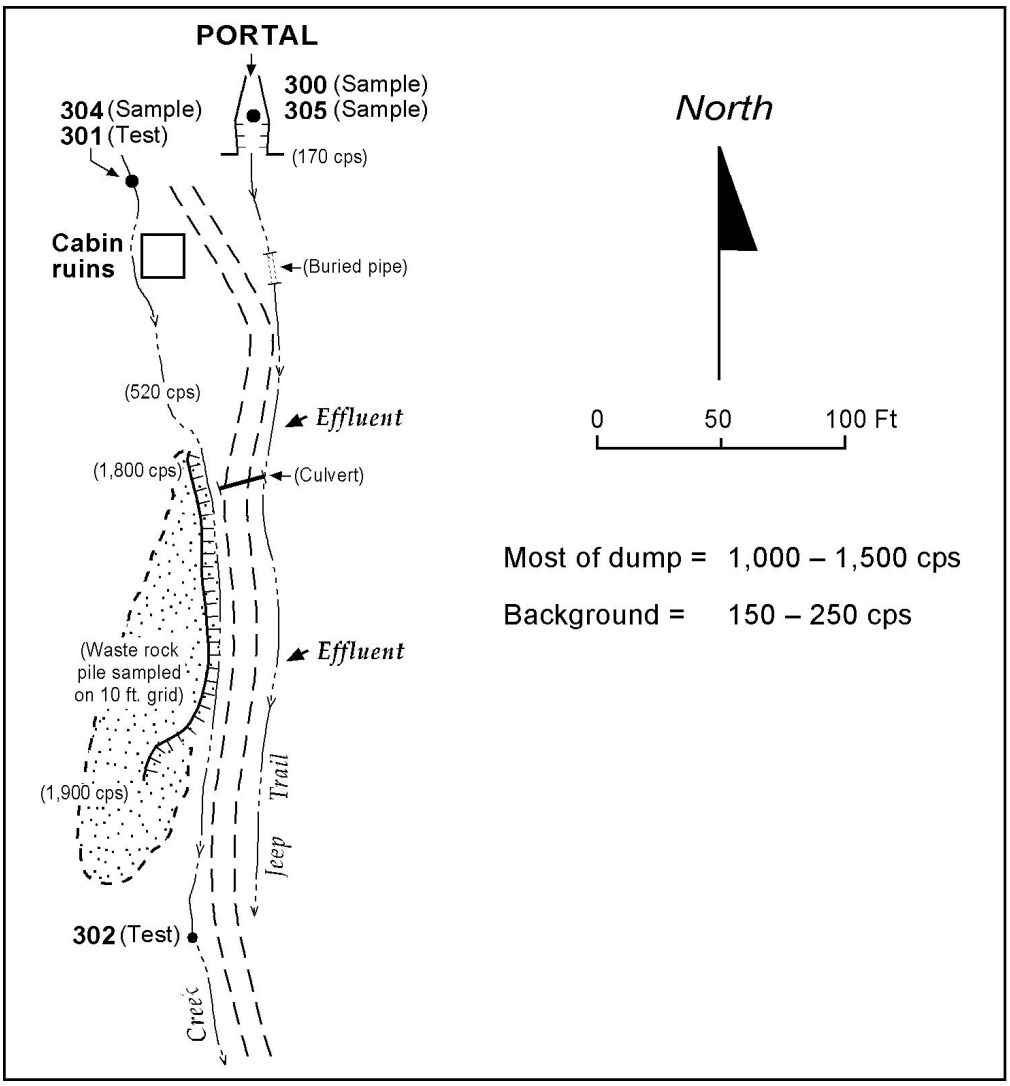



**Figure 2. Sketch map of the lower adit and waste-rock pile at the Fair Day Mine.**

The upper Fair Day working was included in an abandoned mine inventory completed in this area in 1992. In 1992 this inclined shaft or adit was caved about 10 feet below the surface. The waste-rock pile was estimated to contain about 3,000 cubic yards and filled a gully below the shaft. No evidence of erosion was observed, and the pile was moderately vegetated with aspen and pine trees. Tires, presumably empty fuel drums, and other trash lay at the base of the waste-rock pile. Several buildings constructed of metal and wood were in varying states of disrepair at the site. (See USFS-AMLIP inventory form #463/4440-1.)

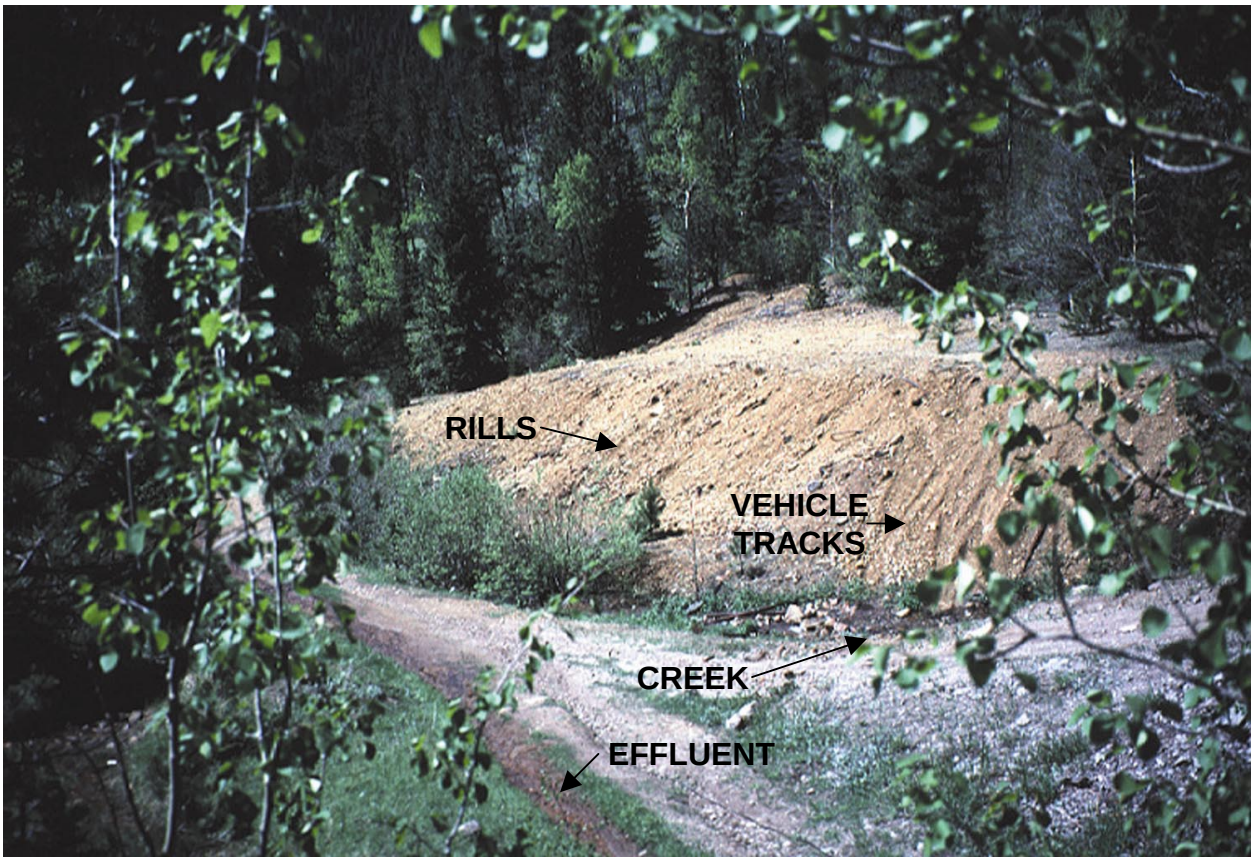



**Figure 3. Photograph showing waste-rock pile for the lower Fair Day adit, looking downstream.**

## WASTE AND HAZARD CHARACTERISTICS

The most important environmental characteristic of the lower adit is the water flowing at about 4 to 8 gpm from the portal. After leaving the portal, effluent flows a short distance south, through a pipe, and down the road ditch, splitting at a mostly collapsed culvert near the north end of the waste-rock pile. Part of the mine discharge flows through the culvert into the unnamed tributary of James Creek. Most of the mine drainage remains in the road ditch on the east side of the road. In the large meadow about 500 feet south of the mine, the effluent merges with an eastern branch of the unnamed tributary, flows into a mudhole, and eventually reaches the main stem of the unnamed tributary.

The effluent channel is lined with moderate amounts of red precipitate at the portal. The precipitate volume diminishes downstream of the portal, and the effluent channel has no precipitate in the meadow south of the mine.

Numerous samples and tests were collected from the effluent and other nearby surface water (Figures 1, 2). Lab and field test results from samples collected in June and August contained similar metal values and show the effluent at the portal contains about 100 times more uranium than the recommended (but not yet enacted) state standard. This water also has about 100 times more manganese than the standard. In addition, the effluent significantly exceeds standards in thallium, aluminum, cadmium, copper, and zinc concentrations. Sulfate concentration is at or near the standard. The pH of the effluent was slightly depressed. (See Table 2, samples #463/4440-2.300 and #463/4440-2.305.)

Above the lower adit of the Fair Day Mine (Figure 2), the unnamed tributary of James Creek was flowing between 45 and 60 gpm in June and August, and test results showed pH of 7.04 and 7.60 and conductivity of 117 µS and 135 µS, respectively. Lab results show the tributary water meets standards in all of the analyzed parameters (Table 2, sample #463/4440-2.304).

Immediately below the waste-rock pile, and downstream of the confluence with the small amount of effluent from the culvert (Figure 2, test #302), water in the unnamed tributary showed pH of 7.66 and conductivity of 135 µS in a June test. No samples were collected.

Below the Fair Day Mine and below its confluence with all of the effluent and the eastern branch of the tributary, the main branch of the unnamed tributary of James Creek was flowing between 70 and 90 gpm in June and August. Tests and a sample were collected immediately upstream of the 4WD road that follows James Creek (Figure 1). Test results showed pH of 7.58 and 7.37 and conductivity of 144 µS and 185 µS, respectively. Lab results show that after the addition of the effluent from the lower Fair Day adit, water in the tributary exceeds standards in manganese, uranium, and zinc concentrations (Table 2, sample #463/4440-2.306). Concentrations of aluminum, cadmium, copper, and sulfate increase measurably in the downstream sample compared to sample #304 upstream of the lower Fair Day adit.

Samples were collected from James Creek, upstream and downstream of the confluence with the unnamed tributary of the Fair Day Mine (Figure 1). James Creek was flowing at almost 12,000 gpm, compared to the 90 gpm of the tributary in August. Most of the analyzed parameters, including uranium and manganese, show no measurable change from upstream to downstream (Table 2, samples #463/4440-2.307 and #463/4440-2.308). Zinc and iron concentrations increase slightly, but remain within standards.

Waste rock comprises biotite schist, hematite-rich schist, sillimanite(?) schist, and granite, although most is broken too small to identify. The pile has a light-red iron stain, with small areas stained yellow. No sulfides were identified, although pyrite and some base-metal sulfides occur in the vein and probably are in the waste rock. A composite sample from the dump produced a paste pH of less than 5 and a net acid-generating capability. Lab results show the pile is weakly to moderately mineralized, with high aluminum and iron concentrations; anomalous arsenic,

**Table 2. Field test and laboratory analyses results for water samples at the lower Fair Day Mine and vicinity. (Field test results for pH and conductivity where no sample was collected are reported only in the text and are not included in this table.)**

| Sample | 463/4440-2.300 (lower Fair Day effluent-6/11/99) | | | | 463/4440-2.304 (gulch above Fair Day-8/30/99) | | | |
|---|---|---|---|---|---|---|---|---|
| Parameter | Concentration/ measurement | Standard | Factor above standard | Load (grams/day) | Concentration/ measurement | Standard | Factor above standard | Load (grams/day) |
| Flow (gpm) | 7.55 | | | | 58.00 | | | |
| pH (standard units) | 5.06 | | | | 7.60 | | | |
| Conductivity (µS/cm) | 599.0 | | | | 135.00 | | | |
| Alkalinity (mg/L $CaCO_3$) | 0.0 | | | | 70.0 | | | |
| Hardness (mg/L $CaCO_3$) | 440.2 | None | N/A | | 107.3 | None | N/A | |
| Aluminum (trec) (µg/L) | 2200.0 | None | N/A | 90.5 | | None | N/A | |
| Antimony (trec) (µg/L) | <1.0 | 6.0 | Below standard | N/A | | 6.0 | N/A | |
| Arsenic (trec) (µg/L) | 1.0 | 50.0 | Below standard | 0.0 | | 50.0 | N/A | |
| Iron (trec) (µg/L) | 370.0 | 1000.0 | Below standard | 15.2 | | 1000.0 | N/A | |
| Thallium (µg/L) | 4.0 | 0.5 | 8.0 | 0.2 | <1.0 | 0.5 | Not detected | N/A |
| Zinc (trec) (µg/L) | 3700.0 | 2000.0 | 1.9 | 152.3 | | 2000.0 | N/A | |
| Aluminum (µg/L) | 2100.0 | 87.0 | 24.1 | 86.4 | <50.0 | 87.0 | Below standard | N/A |
| Cadmium (µg/L) | 16.0 | 3.6 | 4.4 | 0.7 | <0.3 | 1.2 | Below standard | N/A |
| Calcium (mg/L) | 140.0 | None | N/A | 5761.7 | 37.0 | None | N/A | 11697.8 |
| Chloride (mg/L) | <1.0 | 250.0 | Below standard | N/A | | 250.0 | N/A | |
| Chromium (µg/L) | <10.0 | 11.0 | Below standard | N/A | | 11.0 | N/A | |
| Copper (µg/L) | 140.0 | 42.0 | 3.3 | 5.8 | <4.0 | 12.6 | Below standard | N/A |
| Fluoride (mg/L) | 1.4 | 2.0 | Below standard | 57.6 | | 2.0 | N/A | |
| Iron (µg/L) | 250.0 | 300.0 | Below standard | 10.3 | 41.0 | 300.0 | Below standard | 13.0 |
| Lead (µg/L) | <1.0 | 31.8 | Below standard | N/A | | 4.3 | N/A | |
| Magnesium (mg/L) | 22.0 | None | N/A | 905.4 | 3.6 | None | N/A | 1138.2 |
| Manganese (µg/L) | 4900.0 | 50.0 | 98.0 | 201.7 | 9.0 | 50.0 | Below standard | 2.8 |
| Nickel (µg/L) | 250.0 | 294.8 | Below standard | 10.3 | <20.0 | 100.8 | Below standard | N/A |
| Potassium (mg/L) | 2.3 | None | N/A | 94.7 | | None | N/A | |
| Silicon (mg/L) | 13.0 | None | N/A | 535.0 | | None | N/A | |
| Silver (µg/L) | <0.2 | 1.0 | Below standard | N/A | | 0.1 | N/A | |
| Sodium (mg/L) | 6.7 | None | N/A | 275.7 | | None | N/A | |
| Sulfate (mg/L) | 270.0 | 250.0 | 1.1 | 11111.9 | 7.0 | 250.0 | Below standard | 2213.1 |
| Uranium (pCi/L) | 2000.0 | 20.0 | 100.0 | 123.5 | <2.0 | 20.0 | Below standard | N/A |
| Zinc (µg/L) | 3700.0 | 372.1 | 9.9 | 152.3 | 49.0 | 112.5 | Below standard | 15.5 |

**Table 2. Continued.**

| Sample | 463/4440-2.305 (lower Fair Day effluent-8/30/99) | | | | 463/4440-2.306 (gulch below Fair Day-8/30/99) | | | |
|---|---|---|---|---|---|---|---|---|
| Parameter | Concentration/ measurement | Standard | Factor above standard | Load (grams/day) | Concentration/ measurement | Standard | Factor above standard | Load (grams/day) |
| Flow (gpm) | 4.57 | | | | 90.00 | | | |
| pH (standard units) | 4.61 | | | | 7.37 | | | |
| Conductivity (µS/cm) | 667.0 | | | | 185.00 | | | |
| Alkalinity (mg/L $CaCO_3$) | | | | | 40.0 | | | |
| Hardness (mg/L $CaCO_3$) | 477.5 | None | N/A | | 137.1 | None | N/A | |
| Aluminum (trec) (µg/L) | | None | N/A | | | None | N/A | |
| Antimony (trec) (µg/L) | | 6.0 | N/A | | | 6.0 | N/A | |
| Arsenic (trec) (µg/L) | | 50.0 | N/A | | | 50.0 | N/A | |
| Iron (trec) (µg/L) | | 1000.0 | N/A | | | 1000.0 | N/A | |
| Thallium (µg/L) | 4.0 | 0.5 | 8.0 | 0.1 | <1.0 | 0.5 | Not detected | N/A |
| Zinc (trec) (µg/L) | | 2000.0 | N/A | | | 2000.0 | N/A | |
| Aluminum (µg/L) | 3100.0 | 87.0 | 35.6 | 77.2 | 67.0 | 87.0 | Below standard | 32.9 |
| Cadmium (µg/L) | 21.0 | 3.9 | 5.4 | 0.5 | 1.1 | 1.5 | Below standard | 0.5 |
| Calcium (mg/L) | 150.0 | None | N/A | 3736.7 | 46.0 | None | N/A | 22567.1 |
| Chloride (mg/L) | | 250.0 | N/A | | | 250.0 | N/A | |
| Chromium (µg/L) | | 11.0 | N/A | | | 11.0 | N/A | |
| Copper (µg/L) | 190.0 | 45.0 | 4.2 | 4.7 | 7.0 | 15.5 | Below standard | 3.4 |
| Fluoride (mg/L) | | 2.0 | N/A | | | 2.0 | N/A | |
| Iron (µg/L) | 260.0 | 300.0 | Below standard | 6.5 | 41.0 | 300.0 | Below standard | 20.1 |
| Lead (µg/L) | | 35.7 | N/A | | | 6.1 | N/A | |
| Magnesium (mg/L) | 25.0 | None | N/A | 622.8 | 5.4 | None | N/A | 2649.2 |
| Manganese (µg/L) | 5600.0 | 50.0 | 112.0 | 139.5 | 310.0 | 50.0 | 6.2 | 152.1 |
| Nickel (µg/L) | 290.0 | 313.6 | Below standard | 7.2 | <20.0 | 121.5 | Below standard | N/A |
| Potassium (mg/L) | | None | N/A | | | None | N/A | |
| Silicon (mg/L) | | None | N/A | | | None | N/A | |
| Silver (µg/L) | | 1.1 | N/A | | | 0.1 | N/A | |
| Sodium (mg/L) | | None | N/A | | | None | N/A | |
| Sulfate (mg/L) | 260.0 | 250.0 | 1.0 | 6476.9 | 30.0 | 250.0 | Below standard | 14717.7 |
| Uranium (pCi/L) | 2400.0 | 20.0 | 120.0 | 89.7 | 160.0 | 20.0 | 8.0 | 117.7 |
| Zinc (µg/L) | 4400.0 | 398.6 | 11.0 | 109.6 | 260.0 | 138.5 | 1.9 | 127.6 |

**Table 2. Continued.**

| Sample | 463/4440-2.307 (James Creek upstream of Fair Day-8/30/99) | | | | 463/4440-2.308 (James Creek downstream of Fair Day-8/30/99) | | | |
|---|---|---|---|---|---|---|---|---|
| Parameter | Concentration/ measurement | Standard | Factor above standard | Load (grams/day) | Concentration/ measurement | Standard | Factor above standard | Load (grams/day) |
| Flow (gpm) | 11700.00 | | | | 11700.00 | | | |
| pH (standard units) | 7.41 | | | | 7.31 | | | |
| Conductivity (µS/cm) | 26.0 | | | | 19.0 | | | |
| Alkalinity (mg/L $CaCO_3$) | 12.0 | | | | 13.0 | | | |
| Hardness (mg/L $CaCO_3$) | 22.5 | None | N/A | | 22.6 | None | N/A | |
| Aluminum (trec) (µg/L) | | None | N/A | | | None | N/A | |
| Antimony (trec) (µg/L) | | 6.0 | N/A | | | 6.0 | N/A | |
| Arsenic (trec) (µg/L) | | 50.0 | N/A | | | 50.0 | N/A | |
| Iron (trec) (µg/L) | | 1000.0 | N/A | | | 1000.0 | N/A | |
| Thallium (µg/L) | <1.0 | 0.5 | Not detected | N/A | <1.0 | 0.5 | Not detected | N/A |
| Zinc (trec) (µg/L) | | 2000.0 | N/A | | | 2000.0 | N/A | |
| Aluminum (µg/L) | <50.0 | 87.0 | Below standard | N/A | <50.0 | 87.0 | Below standard | N/A |
| Cadmium (µg/L) | <0.3 | 0.4 | Below standard | N/A | <0.3 | 0.4 | Below standard | N/A |
| Calcium (mg/L) | 8.0 | None | N/A | 510213.6 | 8.0 | None | N/A | 510213.6 |
| Chloride (mg/L) | | 250.0 | N/A | | | 250.0 | N/A | |
| Chromium (µg/L) | | 11.0 | N/A | | | 11.0 | N/A | |
| Copper (µg/L) | <4.0 | 3.3 | Not detected | N/A | <4.0 | 3.3 | Not detected | N/A |
| Fluoride (mg/L) | | 2.0 | N/A | | | 2.0 | N/A | |
| Iron (µg/L) | 42.0 | 300.0 | Below standard | 2678.6 | 49.0 | 300.0 | Below standard | 3125.1 |
| Lead (µg/L) | | 0.5 | N/A | | | 0.5 | N/A | |
| Magnesium (mg/L) | 0.6 | None | N/A | 38266.0 | 0.6 | None | N/A | 40179.3 |
| Manganese (µg/L) | <4.0 | 50.0 | Below standard | N/A | <4.0 | 50.0 | Below standard | N/A |
| Nickel (µg/L) | <20.0 | 30.7 | Below standard | N/A | <20.0 | 30.8 | Below standard | N/A |
| Potassium (mg/L) | | None | N/A | | | None | N/A | |
| Silicon (mg/L) | | None | N/A | | | None | N/A | |
| Silver (µg/L) | | 0.0 | N/A | | | 0.0 | N/A | |
| Sodium (mg/L) | | None | N/A | | | None | N/A | |
| Sulfate (mg/L) | <5.0 | 250.0 | Below standard | N/A | <5.0 | 250.0 | Below standard | N/A |
| Uranium (pCi/L) | <2.0 | 20.0 | Below standard | N/A | <2.0 | 20.0 | Below standard | N/A |
| Zinc (µg/L) | <10.0 | 29.9 | Below standard | N/A | 17.0 | 30.0 | Below standard | 1084.2 |

manganese, lead, molybdenum, mercury, phosphorus, and zinc concentrations; and low concentrations of most other analyzed parameters. Uranium value was 60 ppm (0.006%) as $U_3O_8$. (See Table 3.)

Scintillometer readings on the dump were irregular and moderate in value, varying from the highest value of 1,900 cps in the southern end to the lowest value of about 520 cps for a small volume of waste rock on the northeast side of the tributary (Figure 2). In general, most of the waste-rock pile produced 1,000 to 1,500 cps. The portal yielded a reading of 170 cps. Background is 150 to 250 cps in the unmineralized metamorphic rocks surrounding the mine.

## MIGRATION PATHWAYS

### Groundwater Pathway

The Fair Day Mine is underlain by gneissic and granitic rocks. Faults, fractures, and fissures cut these rocks, allowing for infiltration of surface water and migration of groundwater. Some of the fissures are mineralized with sulfides and uranium minerals. Because of the faulted and fractured nature of the bedrock, it is likely that water from the Fair Day Mine and associated mineralized veins eventually reaches James Creek. The moderate volume of discharge from the lower portal of the Fair Day Mine suggests that subsurface flow through the mine is minor, especially in comparison to the large flow volume of James Creek.

The nearest well for domestic or household use is more than 0.5 mile from the lower portal of the Fair Day. An application for a well about 2,000 feet southwest of the lower adit is on file, but the well has not been completed according to records reviewed in late 1999. Both of these locations are on the southwest side of the unnamed tributary that drains the Fair Day Mine site, and both are higher in elevation than the draining adit. The upper and the lower workings of the Fair Day are on the northeast side of this stream, therefore, the stream provides an effective hydrological barrier, preventing potentially contaminated groundwater associated with the Fair Day Mine from reaching these wells. Another well is located about 2,000 feet northwest of the upper Fair Day working. This well is upgradient of the Fair Day, and penetrates to approximately the depth of the collar of the upper working. Groundwater from the Fair Day probably has no effect on this well.

In addition to the wells described in the above paragraph, approximately 55 wells are within about 1 mile west and northwest of the lower portal. Most of these wells are for households in a subdivision on private land. The wells are generally less than 500 feet deep and most of them yield less than 10 gpm. All of these wells are upgradient and topographically higher than the Fair Day Mine workings. It is unlikely groundwater from the Fair Day affects these wells.

**Table 3. Lab results for a composite sample from the waste-rock pile at the lower Fair Day adit. Sample was collected from about 4 to 6 inches deep on an approximate 10-foot grid**.

| ANALYZED PARAMETER | WASTE ROCK |
|---|---|
| pH | 4.27 (paste) |
| Neutralization potential | 0.1 tons $CaCO_3$/1,000 tons |
| Potential acidity | 2.2 tons $CaCO_3$/1,000 tons |
| Net acid-base potential | -2.1 tons $CaCO_3$/1,000 tons |
| Aluminum | 8.46% as ($Al_2O_3$) |
| Antimony | 32 ppm |
| Arsenic | 145 ppm |
| Beryllium | 2 ppm |
| Boron | <1 ppm |
| Cadmium | 0.5 ppm |
| Calcium | 0.26% as (CaO) |
| Cobalt | 8 ppm |
| Copper | 78 ppm |
| Gold | 0.035 ppm |
| Iron | 8.15% as ($Fe_2O_3$) |
| Lead | 211 ppm |
| Lithium | 15 ppm |
| Magnesium | 0.63% as (MgO) |
| Manganese | 911 ppm |
| Mercury | 3.24 ppm |
| Molybdenum | 184 ppm |
| Nickel | 17 ppm |
| Phosphorus | 405 ppm |
| Potassium | 3.29% as ($K_2O$) |
| Silver | 1.5 ppm |
| Sodium | 0.68% as ($Na_2O$) |
| Strontium | 63 ppm |
| Sulfur | 0.50% |
| Uranium | 60 ppm (as $U_3O_8$) |
| Vanadium | 126 ppm |
| Zinc | 284 ppm |

### Surface Water Pathway

Surface flow in the unnamed tributary of James Creek is in contact with the toe of the waste-rock pile at the lower Fair Day, and effluent from the adit flows into this tributary. This tributary merges with James Creek about 0.25 mile downstream of the mine, and about 1.5 miles upstream of Jamestown. The intake for the Jamestown water supply is on James Creek near the west side of town. Sample results from James Creek downstream of the Fair Day Mine and upstream of Jamestown show the water is within state standards for all of the tested parameters. Although a moderate volume of degraded water emerges from the lower Fair Day portal, and the toe of the waste-rock pile is in contact with the tributary, the much larger flow volume of clean water in James Creek is not significantly affected.

### Soil Exposure Pathway

The possibility of ingesting toxic levels of metal is the primary concern regarding this pathway. No one lives or works in the immediate area, but this site is apparently used intermittently by the public for camping, target shooting, and ATV and motorcycle riding. The waste-rock pile is radioactive and moderately mineralized. Metal concentrations in the waste rock are generally low and are not a significant hazard for brief exposures; however, contact by the public with radioactive material is a concern.

### Air Exposure Pathway

No evidence of windblown particulates or wind erosion was observed at the site. Although much of the dump is small fragments, abundant coarse material is intermixed with the finer particles. The larger pieces help to anchor the finer material during high winds that frequently blow through this area. No residences are within 0.5 mile. The air exposure pathway is not considered a significant hazard.

## CONCLUSIONS

The lower adit of the Fair Day Mine discharges moderate volumes of poor quality water. The effluent is diluted by, but detrimentally affects, the unnamed tributary that drains the Fair Day Mine area. This tributary flows at about 10 times the volume of the effluent. The degraded tributary water is thoroughly diluted by James Creek, which flows more than 100 times the volume of the tributary, and more than 1,000 times the volume of the lower Fair Day effluent. Samples collected upstream and downstream of the influence of surface water from the lower Fair Day Mine suggest that water quality of James Creek may be slightly affected by the mine drainage. Sample results for the upstream and downstream samples are quite similar, with iron and zinc concentrations increasing

slightly at the downstream site. Even with these slight increases, water in James Creek is within state standards, and most metals are not detectable.

Water treatment for the effluent before it reaches the unnamed tributary may be difficult. The east side of the tributary is steep and provides little room for construction of passive treatment ponds. A possible site for ponds is on a bench about 75 to 100 feet south-southeast of the portal.

In addition to environmental problems involving mine effluent, the moderately radioactive waste-rock pile is close to and in contact with the unnamed tributary. The stream has eroded some of the dump, and that problem will continue if this issue is not addressed. A possible solution could be as simple as using a backhoe to pull the dump material further from the stream, then covering the waste rock with topsoil and revegetating. At the waste-rock pile, topography on the west side of the stream is gentle and provides abundant space for reworking of the waste rock if that option is pursued.

Although the lower adit is reportedly caved at depth, the portal is accessible and the adit is open to an undetermined depth. The portal should be safeguarded to prevent entry.

## REFERENCES


Unpublished references referring to the Colorado Bureau of Mines are available at the Colorado Division of Minerals and Geology, Denver, Colorado.

Baker, K.G., 1967, Fair Day Mine, geology and engineering report: unpublished report provided by Forest Service, not paginated.

Bieniewski, C.L., and Harstead, J.N., 1965, The mineral industry of Colorado *in* Minerals Yearbook (v. III-area reports: domestic)-1964: U.S. Bureau of Mines publication, p. 215–260.

Howes, M.H., 1961, The mineral industry of Colorado *in* Minerals Yearbook (v. III-area reports: domestic)-1960: U.S. Bureau of Mines publication, p. 213–249.

Howes, M.H., 1962, The mineral industry of Colorado *in* Minerals Yearbook (v. III-area reports: domestic)-1961: U.S. Bureau of Mines publication, p. 217–258.

Mullen, D.H., 1964, The mineral industry of Colorado *in* Minerals Yearbook (v. III-area reports: domestic)-1963: U.S. Bureau of Mines publication, p. 225–270.

Mullen, D.H., 1963, The mineral industry of Colorado *in* Minerals Yearbook (v. III—area reports: domestic)-1962: U.S. Bureau of Mines publication, p. 227–268.

Nelson-Moore, J.L., Collins, D.B., and Hornbaker, A.L., 1978, Radioactive mineral occurrences of Colorado and bibliography: Colorado Geological Survey Bulletin 40, 1054 p.

Sims, P.K., and Sheridan, D.M., 1964, Geology of uranium deposits in the Front Range, Colorado: U.S. Geological Survey Bulletin 1159, 116 p.

## APPENDIX A

**Timeline for the Fair Day Mine**

(See text for details)

- 1955 Fair Day AM lode claim located.
- 1956 Coliowa Uranium Corp. leases claims and conducts exploration drilling. Later in the year, La Salle Mining Co. subleases and sinks a 200-ft-long inclined shaft. La Salle produces 1 carload of ore.
- 1957 La Salle Mining Co. begins significant production.
- 1958 DMEA approves a $50,000 exploration loan for the Fair Day and nearby property.
- 1960 Lower adit completed and production begins.
- 1961 Coliowa terminates La Salle's sublease late in the year. Major production at the Fair Day Mine ceases. Several companies and individuals (Ray Bennett, Climax Uranium, R.L. Busby, Modern Minerals, Vitro Chemical, Merino Mining) report minor production from late 1961-1964.

No known production after 1964

- 1967 Workings of the lower adit are caved 300 ft from portal.
- 1976 Efforts by Harrison Western Corp. to reopen lower adit are short-lived.
- 1980 Resources International stakes the RIP claim block that includes all of the workings of the Fair Day Mine.
- 1993 RIP claims are declared abandoned.

# APPENDIX B

**Abandoned mine inventory forms for the Fair Day Mine (inventory area #10-1-463/4440-1) and the lower Fair Day Mine (inventory area #10-1-463/4440-2)**

## USFS-AMLI FIELD DATA FORM

**LOCATION AND IDENTIFICATION**

(1) **ID#:** 02- 08- 10 - 1 - 463 / 4440 - 1
rgn st fst rd xutm yutm area#

(2) **Sitename:** Southwest Overland / Buena Pass

(3) **Other name/reference:** Fairday Mine (Sims + Sheridan, 1964, USGS B-1159)

5 (4) **Highest priority Environmental Degradation occurring in this area:**
1=extreme; 2=significant; 3=potentially significant; 4=slight; 5=none

5 (5) **Highest priority Mine Hazard noted in this area:**
E=emergency; 1=extreme danger; 2=dangerous; 3=potentially dangerous; 5=no significant hazard

M (6) **Commodity:** C=coal; U=uranium; M=metals; I=industrial material.
(Metal or Indust. material type: Uranium)

(7) **Quad name and date:** Gold Hill, 1987

(8) **County:** Boulder

(9) **2° map:** Greeley

(10) **Water Cataloguing Unit #:**

(11) **Mining district/coal field:** Jamestown

(12) **Land survey location:** NE - NE - SW sec 23 ,T 2 N ,R 72 W

(13) **Receiving stream:** James Creek flowing into Left Hand Creek
nearest named stream next named

(14) **Elevation** (ft): 8,400

2 (15) **General Slope:** 1=0-10°; 2=11-35°; 3=greater than 35°

M (16) **Regional terrain:** R=rolling or flat; F=foothills; T=mesa; H=hogback; M=mountains; S=steep/narrow canyon

J (17) **Type of access:** N=no trail; T=trail; J=jeep road; G=gravel road; M=paved road; P=private/restricted road

P (18) **Quality of access for construction vehicles:** G=good; M=moderate; P=poor; X=very poor

(19) **Nearest town on map:** Jamestown

2.0 (20) **Road distance from nearest town** (#.# miles)

(21) **Nearest road** (name and/or #): CR 102J
FR=forest rd; CR=county rd; SH=state highway; I=interstate

**Distance to following types of public uses** (#.# miles):

0.5 (22) Road
0.9 (23) Dwelling (year-round)
— (24) Campground/picnic area
— (25) Marked trail
— (26) Other public use (explain)

**ENVIRONMENTAL INFORMATION**

M (27) **Vegetation density adjacent to site:** D=dense; M=moderate; S=sparse; B=barren

AP (28) **Vegetation type adjacent to site:** B=barren; W=weeds; G=grass; R=riparian S=sagebrush/oakbrush/brush; J=juniper/piñon; A=aspen; P=pine/spruce/fir; T=tundra

N (29) **Evidence of intentional reclamation:** Y=yes; N=no (if yes, use comments)

3/4 (30) **Size of disturbed area in acres**

~~Y~~ (31) **Potential historical structures in area:** Y=yes; N=no (if yes, use comments)

N (32) **Evidence of bats:** G=guano; I=insect remains; B=bat sighting; O=other(use comments); N=no (use comments to expand on any positive evidence)

✓ (33) **Recorded by/date:** J.R. Lovell, 9/14/92

| ADITS, SHAFTS, AND OPENINGS | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Feature Nos. | | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 |
| Type of Feature | | A | | | | | | | | | | | |
| Opening Size (ft) | H | 4 | | | | | | | | | | | |
| | W | 5 | | | | | | | | | | | |
| Depth (ft) | | 10 | | | | | | | | | | | |
| Condition | | F | | | | | | | | | | | |
| Drainage | | N | | | | | | | | | | | |
| Access Deterents | | N | | | | | | | | | | | |
| Deterent Condition | | – | | | | | | | | | | | |
| Ratings | Env. Deg. | 5 | | | | | | | | | | | |
| | Hazard | 5 | | | | | | | | | | | |
| Photo | Roll No. | 18 | | | | | | | | | | | |
| | Frame No. | 16 | | | | | | | | | | | |
| Comments? | | Y | | | | | | | | | | | |

| DUMPS, TAILINGS, AND SPOIL BANKS | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Feature No. | | 200 | 201 | 202 | 203 | 204 | 205 | 206 | 207 | 208 |
| Type of Feature | | D | | | | | | | | |
| Plan view Dimension (ft.) | L | 129 | | | | | | | | |
| | W | 90 | | | | | | | | |
| Volume (yds) | | 2,907 | | | | | | | | |
| Steepest Slope Angle (dgr) | | 33° | | | | | | | | |
| Steepest Slope Length (ft) | | 25 | | | | | | | | |
| Size of Materials | | SCLB | | | | | | | | |
| Cementation | | M | | | | | | | | |
| Vegetation Type | | AP | | | | | | | | |
| Vegetation Density | | M | | | | | | | | |
| Drainage | | N | | | | | | | | |
| Stability | | S | | | | | | | | |
| Water Erosion | of Feature | N | | | | | | | | |
| | Storm Runoff | N | | | | | | | | |
| Wind Erosion | | N | | | | | | | | |
| Radiation Count | | – | | | | | | | | |
| Access Deterents | | N | | | | | | | | |
| Deterent Condition | | – | | | | | | | | |
| Ratings | Env. Deg. | 5 | | | | | | | | |
| | Hazard | 5 | | | | | | | | |
| Photo | Roll No. | 18 | | | | | | | | |
| | Frame No. | 15 | | | | | | | | |
| Comments? | | Y | | | | | | | | |
| Soil Sample No. | | – | | | | | | | | |

| DRAINAGE/WATER SAMPLES | | | | | | |
|---|---|---|---|---|---|---|
| Item Nos. | 300 | 301 | 302 | 303 | 304 | 305 |
| Adit/Shaft/Dump No./Other=0 (If other location, describe in comments) | | | | | | |
| pH (standard units) | | | | | | |
| Conductivity (uS) | | | | | | |
| Flow (cfs) | | | | | | |
| Method of Flow Measure | | | | | | |
| Date Flow/Sample (m/d/y) | | | | | | |
| Location of Sample/Flow | | | | | | |
| Evidence of Toxicity in Site Drainage | | | | | | |
| Evidence of Toxicity in Receiving Stream | | | | | | |
| Distance from Stream (ft) | | | | | | |
| Comments? | | | | | | |
| Lab Water Sample No. | | | | | | |

| GPS READINGS | |
|---|---|
| Ftr. No. | Location |
| 10D | Lat. N40° 07' 24.3" 2-D<br>Long. W105° 24' 7.5" HDOP 3.6 |
| | Lat.<br>Long. |
| | Lat.<br>Long. |
| | Lat.<br>Long. |
| | Lat.<br>Long. |
| | Lat.<br>Long. |
| | Lat.<br>Long. |
| | Lat.<br>Long. |
| | Lat.<br>Long. |
| | Lat.<br>Long. |

DIAGRAM OF PROBLEM AREA (Locate all adits, shafts, dumps, prospects, etc. on topo map.)

Check off upon completion: ___ north arrow; ___ scale bar or general size noted; ___ direction to nearest trail/road/town noted; ___ significant mine features numbered

Adit shaft prospect hole building dump or tailings collapsed adit and shaft fence

●81. Local person interviewed _____
Name Address

●82. Name and address of person desiring a copy of this form:

_____

●83. Describe the minimum work needed to mitigate any public health, safety, welfare, or environmental problems observed at the site. Note specific reclamation activities along with an estimated cost and time period to implement each activity described. Code costs as: 1= less $10,000; 2= $10,000 to $100,000; 3= $100,000 to $500,000; 4= more than $500,000. Code estimated time to complete the activity as: 1= less than 1 month; 2= 1 to 12 months; 3= 1 to 3 years; 4= over 3 years

| Cost | Time | Recommended reclamation activity |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

●84. Comments relating to health, safety, welfare, environmental, or restoration problems and any general comments. All comments must be keyed to mine feature # or drainage/water sample item #.

100 Adit inclined at about 10°. Machine shed in line with adit, includes engine mounts, and cable, presumably for ore cart. There is a deep wide pit about 100' up the hill from the adit. (20'x20'x15' deep). May be an excavation.
201 The dump fills the gully, and exits at two levels. Width and length were computed for an average height of the dump.
31 → Two tin sheds exists on the site, as well as an old wooden barn. One of the tin sheds remains intact and enclosed. Fuel drums and tires are included with the refuse at the base of the dump

OFFICE/LITERATURE INFORMATION

●41. Owner of surface _____

●42. Last known operator _____

●43. Estimated production _____

●44. Dates of production _____

●45. Literature not cited in comments _____

_____

●46. Citation of any historical register listing _____

_____

## USFS-AMLI FIELD DATA FORM

**LOCATION AND IDENTIFICATION**

(1) **ID#:** 02- 08- 10 - 1 - 463 / 4440 - 2
rgn st fst rd xutm yutm area#

(2) **Sitename:** Devils Den (Lower Fairday?)

(3) **Other name/reference:** USGS Bulletin 1159

3 (4) **Highest priority Environmental Degradation occurring in this area:**
1=extreme; 2=significant; 3=potentially significant; 4=slight; 5=none

2 (5) **Highest priority Mine Hazard noted in this area:**
E=emergency; 1=extreme danger; 2=dangerous; 3=potentially dangerous; 5=no significant hazard

U (6) **Commodity:** C=coal; U=uranium; M=metals; I=industrial material.
(Metal or Indust. material type: U )

(7) **Quad name and date:** Gold Hill 1989

(8) **County:** Boulder

(9) **2° map:** Greeley

(10) **Water Cataloguing Unit #:** 10190005

(11) **Mining district/coal field:** Jamestown?

(12) **Land survey location:** - - NW sec 26 ,T 2N ,R 72W

(13) **Receiving stream:** unnamed flowing into James Creek
nearest named stream next named

(14) **Elevation** (ft): 8300

2 (15) **General Slope:** 1=0-10°; 2=11-35°; 3=greater than 35°

M (16) **Regional terrain:** R=rolling or flat; F=foothills; T=mesa; H=hogback; M=mountains; S=steep/narrow canyon

J (17) **Type of access:** N=no trail; T=trail; J=jeep road; G=gravel road; M=paved road; P=private/restricted road

M (18) **Quality of access for construction vehicles:** G=good; M=moderate; P=poor; X=very poor

(19) **Nearest town on map:** Jamestown

2 (20) **Road distance from nearest town** (#.# miles)

(21) **Nearest road** (name and/or #): James Creek Road
FR=forest rd; CR=county rd; SH=state highway; I=interstate

**Distance to following types of public uses** (#.# miles):

0.2 (22) Road
1.5 (23) Dwelling (year-round)
— (24) Campground/picnic area
— (25) Marked trail
0 (26) Other public use (explain)
target shooters, campers

**ENVIRONMENTAL INFORMATION**

M (27) **Vegetation density adjacent to site:** D=dense; M=moderate; S=sparse; B=barren

PAG (28) **Vegetation type adjacent to site:** B=barren; W=weeds; G=grass; R=riparian S=sagebrush/oakbrush/brush; J=juniper/piñon; A=aspen; P=pine/spruce/fir; T=tundra

N (29) **Evidence of intentional reclamation:** Y=yes; N=no (if yes, use comments)

0.3 (30) **Size of disturbed area in acres**

N (31) **Potential historical structures in area:** Y=yes; N=no (if yes, use comments)

N (32) **Positive evidence of BATS:** G=guano; I=insect remains; B=bat sighting; O=other(use comments); N=no (use comments to expand on any positive evidence;"No" only indicates absence of positive evidence, **not** absence of bats)

6/11/99 (33) **Recorded by/date:** Neubert/Wood

| ADITS, SHAFTS, AND OPENINGS | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Feature Nos. | | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 |
| Type of Feature | | A | | | | | | | | | | | |
| Opening Size (ft) | H | 7 | | | | | | | | | | | |
| | W | 6 | | | | | | | | | | | |
| Depth (ft) | | 20+ | | | | | | | | | | | |
| Condition | | 1 | | | | | | | | | | | |
| Drainage | | W | | | | | | | | | | | |
| Access Deterents | | N | | | | | | | | | | | |
| Deterent Condition | | — | | | | | | | | | | | |
| Ratings | Env. Deg. | 3 | | | | | | | | | | | |
| | Hazard | 2 | | | | | | | | | | | |
| Photo | Roll No. | CC | | | | | | | | | | | |
| | Frame No. | 32 | | | | | | | | | | | |
| Comments? | | 4 | | | | | | | | | | | |

| DUMPS, TAILINGS, AND SPOIL BANKS | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Feature No. | | 200 | 201 | 202 | 203 | 204 | 205 | 206 | 207 | 208 |
| Type of Feature | | D | | | | | | | | |
| Plan view Dimension (ft.) | L | 150 | | | | | | | | |
| | W | 45 | | | | | | | | |
| Volume (yds) | | 800 | | | | | | | | |
| Steepest Slope Angle (dgr) | | 31 | | | | | | | | |
| Steepest Slope Length (ft) | | 18 | | | | | | | | |
| Size of Materials | | FSGL | | | | | | | | |
| Cementation | | U | | | | | | | | |
| Vegetation Type | | P | | | | | | | | |
| Vegetation Density | | S | | | | | | | | |
| Drainage | | N | | | | | | | | |
| Stability | | 5 | | | | | | | | |
| Water Erosion | of Feature | RS | | | | | | | | |
| | Storm Runoff | C | | | | | | | | |
| Wind Erosion | | N | | | | | | | | |
| Radiation Count | | — | | | | | | | | |
| Access Deterents | | N | | | | | | | | |
| Deterent Condition | | — | | | | | | | | |
| Ratings | Env. Deg. | 4 | | | | | | | | |
| | Hazard | 3 | | | | | | | | |
| Photo | Roll No. | CC | | | | | | | | |
| | Frame No. | 31,33 | | | | | | | | |
| Comments? | | 4 | | | | | | | | |
| Soil Sample No. | | 463444D-2, D1 | | | | | | | | |

## DRAINAGE/WATER SAMPLES

| Item Nos. | 300 | 301 | 302 | 303 | 304 | 305 |
|---|---|---|---|---|---|---|
| Adit/Shaft/Dump No./Other=0 (If other location, describe in comments) | 100 | 100 | 200 | 200 | 100 | 100 |
| pH (standard units) | 5.06 | 7.04 | 7.66 | 7.58 | 7.60 | 4.61 |
| Conductivity (uS) | 599 | 117 | 135 | 114 | 135 | 667 |
| Flow (gpm) | 7.55 | 45 | 45 | 70 | 58 | 4.57 |
| Method of Flow Measure | W | E | E | E | W | W |
| Date Flow/Sample (m/d/y) | 6/11/99 | 6/11/99 | 6/11/99 | 6/11/99 | 8/30/99 | 8/30/99 |
| Location of Sample/Flow | A | RU | RD | RD | RU | A |
| Evidence of Toxicity in Site Drainage | P | — | — | — | — | P |
| Evidence of Toxicity in Receiving Stream | N | — | — | — | — | N |
| Distance from Stream (ft) | 500 | — | — | — | — | 500 |
| Comments? | Y | Y | Y | Y | Y | Y |
| Lab Water Sample No. | 463/4440-2.300 | | | | 463/44402.304 | 463/44402.305 |

## GPS READINGS

| Ptr. No. | Location |
|---|---|
| 200 | Lat. 40 06 46.8 (AVG 041) Long. 105 25 22.6 |
| | Lat. Long. |
| | Lat. Long. |
| | Lat. Long. |
| | Lat. Long. |
| | Lat. Long. |
| | Lat. Long. |
| | Lat. Long. |
| | Lat. Long. |
| | Lat. Long. |

**DIAGRAM OF PROBLEM AREA** (Locate all adits, shafts, dumps, prospects, etc. on topo map.)

Check off upon completion: ___ north arrow; ___ scale bar or general size noted; ___ direction to nearest trail/road/town noted; ___ significant mine features numbered

Adit  shaft  X prospect hole  building  dump or tailings  collapsed adit and shaft  fence


Portal - 0.06 mR/hr

170 cps (scint.)

SOUTH OF CABIN - 0.18

520 cps

North-facing dump face - 0.4

1800 cps

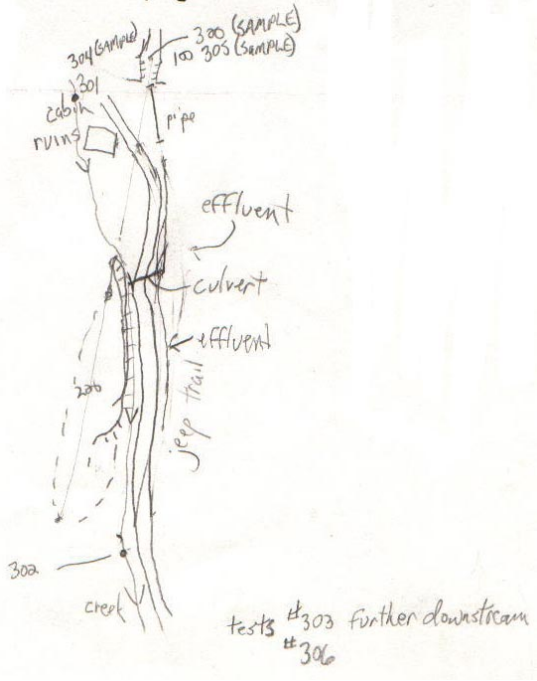
area on bench, near southend - 0.4

1900 cps

MOST OF DUMP - 0.25 to 0.35

- 1000 to 1500 cps.

BACKGROUND = ABOUT 150-250 CPS



| DRAINAGE/WATER SAMPLES | | | | | | |
|---|---|---|---|---|---|---|
| Item Nos. | ~~306~~ 308 | ~~307~~ 307 | ~~308~~ 309 | 303 | 304 | 305 |
| Adit/Shaft/Dump No./Other=0 (If other location, describe in comments) | 100 | 0 | 0 | | | |
| pH (standard units) | 7.37 | 7.41 | 7.31 | | | |
| Conductivity (uS) | 185 | 026 | 019 | | | |
| Flow (gpm) | 90 | 11,700 | 11,700 | | | |
| Method of Flow Measure | W | F | F | | | |
| Date Flow/Sample (m/d/y) | 8/30/99 | 8/30/99 | 8/30/99 | | | |
| Location of Sample/Flow | RD | RU | RD | | | |
| Evidence of Toxicity in Site Drainage | — | — | — | | | |
| Evidence of Toxicity in Receiving Stream | N | N | N | | | |
| Distance from Stream (ft) | — | — | — | | | |
| Comments? | Y | Y | Y | | | |
| Lab Water Sample No. | 463/4440-2 306 | 463/4440-2 307 | 463/4440-2 308 | | | |

| GPS READINGS | |
|---|---|
| Ptr. No. | Location |
| | Lat.<br>Long. |
| | Lat.<br>Long. |
| | Lat.<br>Long. |
| | Lat.<br>Long. |
| | Lat.<br>Long. |
| | Lat.<br>Long. |
| | Lat.<br>Long. |
| | Lat.<br>Long. |
| | Lat.<br>Long. |
| | Lat.<br>Long. |

**DIAGRAM OF PROBLEM AREA** (Locate all adits, shafts, dumps, prospects, etc. on topo map.)

Check off upon completion: ___ north arrow; ___ scale bar or general size noted; ___ direction to nearest trail/road/town noted; ___ significant mine features numbered

Adit  shaft  X prospect hole  building  dump or tailings  c collapsed adit and shaft  fence

●81. Local person interviewed _____
Name Address

●82. Name and address of person desiring a copy of this form: _____

●83. Describe the minimum work needed to mitigate any public health, safety, welfare, or environmental problems observed at the site. Note specific reclamation activities along with an estimated cost and time period to implement each activity described. Code costs as: 1= less $10,000; 2= $10,000 to $100,000; 3= $100,000 to $500,000; 4= more than $500,000. Code estimated time to complete the activity as: 1= less than 1 month; 2= 1 to 12 months; 3= 1 to 3 years; 4= over 3 years

| Cost | Time | Recommended reclamation activity |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

●84. Comments relating to geology, health, safety, welfare, environmental, or restoration problems of a certain feature. All comments must be keyed to mine feature # or drainage/water sample item #.

#100- probably LOWER ADIT MENTIONED IN USGS PROFESSIONAL PAPER REGARDING FAIRDAY MINE, BLUE SPARRY POINT AT PORTAL TIMBER CALLS IT "DEVILS DEN". THIS LOOKS 1960's VINTAGE. RUSTY VENILATION PIPE, AND SLOW MOVING WATER. WIRE MESH ABOVE PORTAL TO PREVENT CAVING. MOSTLY COLLAPSED CORRUGATED SHEET METAL BUILDING ON BENCH. CAMPFIRE RINGS & USED .22 shells INDICATE USE BY THE PUBLIC.

#200- DUMP MOSTLY DEPOSITES ON SW SIDE OF CREEK. SOME OF 200 TOES INTO CREEK, BUT MOST IS SLIGHTLY AWAY. DUMP IS LIGHT RED IN COLOR, WITH SOME YELLOW STAINING. NO VISIBLE SULFIDES. A FEW PIECES OF IRON-RICH (HEMATITE) SCHIST, BIOTITE SCHIST, & SILLIMANITE? SCHIST, GRANITE, BUT MOSTLY TOO BROKEN AND SMALL TO TELL. DUMP BECOMES QUITE THIN TO SOUTH, DUMP SAMPLE TAKEN ON ABOUT 10FT GRID. DUMP MAY BE RADIOACTIVE & HAS ATV & MOTORCYCLE TRACKS ON IT.

#300- TAKEN FROM POOL INSIDE ADIT SLIGHTLY. SOME EFFLUENT IS DIRECTED INTO CULVERT UNDER ROAD AND DISCHARGES INTO CREEK ALONGSIDE DUMP. MOST FLOWS DOWN ROAD. PRECIPITATE DIMINISHES DOWNSTREAM ALONG ROAD.

#301 - upstream of culvert in unnamed creek

#302 - downstream of dump, below where culvert water merges with creek. At this point most of effluent is still running down THE ROAD. EFFLUENT FOLLOWS ROAD TO LARGE MEADOW WITH A CONCRETE FOUNDATION; PROBABLY AN ORE TRANSFER POINT. IN THIS MEADOW, THE EFFLUENT MERGES WITH THE SMALL, PROBABLY INTERMITTENT FLOW FROM THE EAST BRANCH OF THIS UNNAMED DRAINAGE. CHO PRECIPITATE AT THIS POINT. AFTER MERGING WITH EAST FORK, EFFLUENT CONTINUES DOWN ROAD, INTO A MUDHOLE, & INTO THE MAIN UNNAMED STREAM.

_____-if more comments use back of page →

General Comment (on whole inventory area or group of mine features): _____

#303- FROM UNNAMED STREAM BELOW CONVERGENCE WITH EFFLUENT AND EAST FORK, ABOUT 100 FEET UPSTREAM OF CULVERT BENEATH JAMES CREEK ROAD, AND ABOUT 150 FEET UPSTREAM OF CONFLUENCE WITH JAMES CREEK. THIS UNNAMED TRIBUTARY REPRESENTS PROBABLY LESS THAN 5% OF FLOW OF JAMES CREEK.

#304- SAMPLE COLLECTED IN GULCH ABOVE INFLUENCE OF EFFLUENT FROM THIS MINE; AT TEST SITE #301

#305. SAMPLE AT PORTAL; AT SAMPLE SITE #300

_____-if more comments use back of page →

(COVER) →

OFFICE/LITERATURE INFORMATION

●41. Owner of surface _____
●42. Last known operator _____
●43. Estimated production _____
●44. Dates of production _____
●45. Literature not cited in comments _____
●46. Citation of any historical register listing _____

●81. Local person interviewed _____
Name Address

●82. Name and address of person desiring a copy of this form: _____

●83. Describe the minimum work needed to mitigate any public health, safety, welfare, or environmental problems observed at the site. Note specific reclamation activities along with an estimated cost and time period to implement each activity described. Code costs as: 1= less $10,000; 2= $10,000 to $100,000; 3= $100,000 to $500,000; 4= more than $500,000. Code estimated time to complete the activity as: 1= less than 1 month; 2= 1 to 12 months; 3= 1 to 3 years; 4= over 3 years

| Cost | Time | Recommended reclamation activity |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

●84. Comments relating to geology, health, safety, welfare, environmental, or restoration problems of a certain feature. All comments must be keyed to mine feature # or drainage/water sample item #.

#306 - NEAR TEST SITE #303, BELOW CONFLUENCE WITH ANOTHER UNNAMED GULCH. THIS WAS NECESSARY BECAUSE MUCH OF MINE EFFLUENT RUNS DOWN THE ROAD AND MIXES WITH SIDE GULCH WATER BEFORE REACHING THE SURFACE FLOW OF THE FAIRDAY GULCH WATER.

#307 - JAMES CREEK ABOVE CONFLUENCE WITH $H_2O$ FROM FAIRDAY GULCHES.

#308 - JAMES CK BELOW CONFLUENCE, BUT ABOVE WATER-SUPPLY INTAKE FOR JAMESTOWN. WATER SUPPLY MAY NOT BE FROM JAMES CREEK ANYMORE. SOME OF THE PLASTIC PIPES ARE BROKEN.

_____-if more comments use back of page →

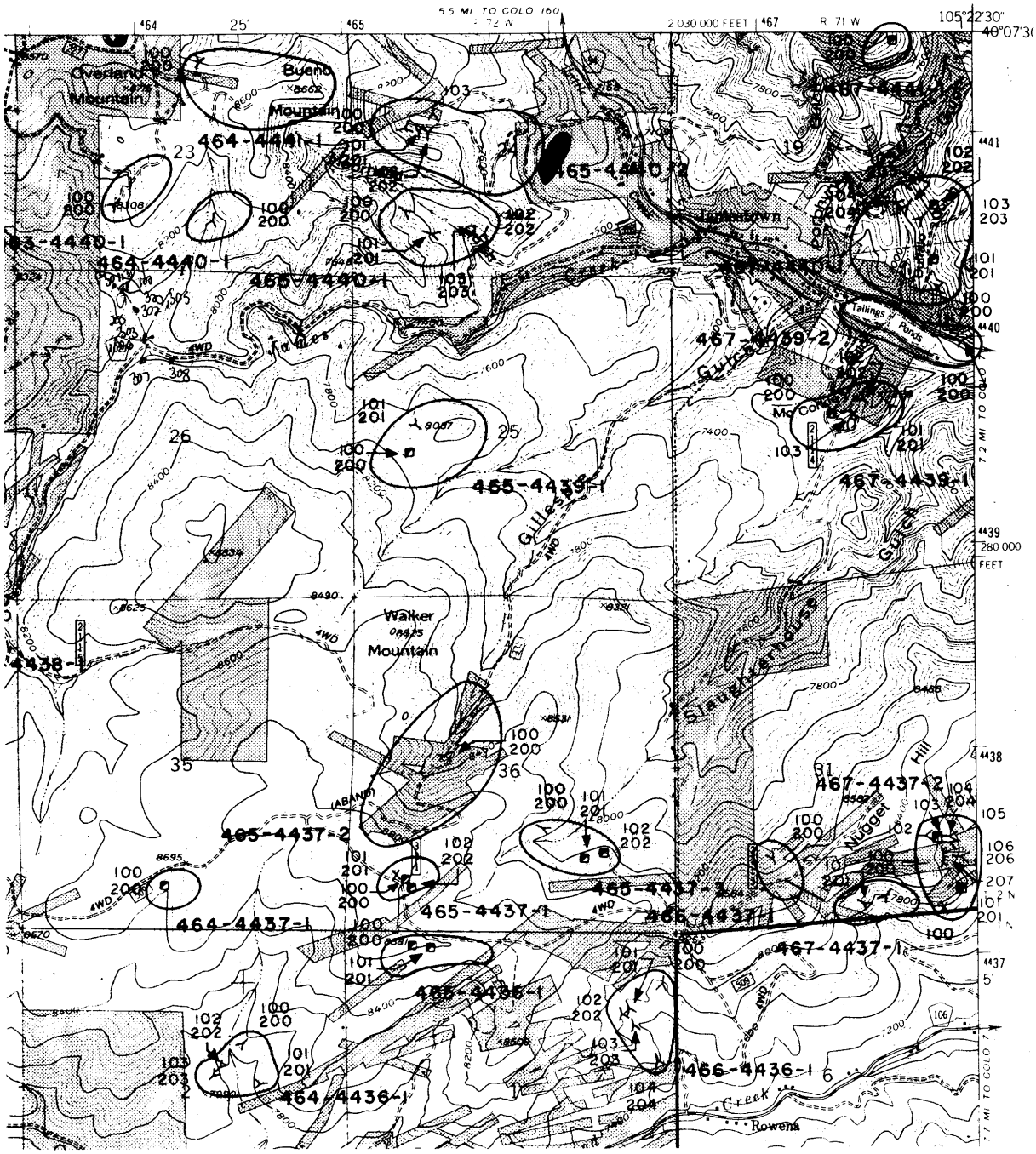
General Comment (on whole inventory area or group of mine features): _____

_____-if more comments use back of page →

OFFICE/LITERATURE INFORMATION

●41. Owner of surface _____
●42. Last known operator _____
●43. Estimated production _____
●44. Dates of production _____
●45. Literature not cited in comments _____
●46. Citation of any historical register listing _____

GOLD HILL QUADRANGLE
COLORADO-BOULDER CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)



## CODES FOR TABULAR INFORMATION

ALL TABLES: If appropriate code is not listed, use: N = none or no; N/A = not applicable; UNK = unknown; O = other, explain in #84

ADITS, SHAFTS, & OPENINGS

- Type of feature: A = adit; S = vertical shaft; I = incline shaft; P = prospect hole; ST = stope; G = glory hole; SU = subsidence feature; PT = open pit; O = other, explain in #84.
- Condition: I = intact; P = partially collapsed or filled; F = filled or collapsed; N = feature searched for but not found (mine symbol on map)
- Drainage: N = no water draining; W = water draining; S = standing water only (note at what depth below grade)
- Access deterents: N = none; S = sign; F = fence; C = sealed or capped; D = open door or hatch; L = locked door or hatch; G = open grill; O = other, explain in #84.
- Deterent condition: P = prevents access; D = discourages access; I = ineffective
- Ratings: Hazard: E = emergency; 1 = extreme danger; 2 = dangerous; 3 = potential danger; 5 = no significant hazard
  Env. Deg.: 1 = extreme; 2 = significant; 3 = potentially significant; 4 = slight; 5 = none
- Comments?: Y = yes; N = no

DUMPS, TAILINGS, AND SPOIL AREAS

- Type of feature: D = mine dump; T = mill tailings; W = coal waste bank; S = overburden or development spoil pile; DS = dredge spoil; HD = placer or hydraulic deposit; H = highwall; P = processing site
- Size of materials: F = fine; S = sand; G = gravel; L = cobbles; B = boulders
- Cementation: W = well cemented; M = moderately cemented; U = uncemented
- Vegetation Type: G = mixed grass; S = sagebrush/oakbrush/brush; J = juniper/piñon; A = aspen; P = pine/spruce/fir; T = tundra; R = riparian; F = tilled crops; B = barren/no vegetation; W = weeds
- Vegetation Density: D = dense; M = moderate; S = sparse; B = barren
- Drainage: N = no water draining; W = water draining across surface; S = standing water only; SP = water seeping from side of feature
- Stability: U = unstable; P = potentially unstable; S = stable
- Water erosion: of Feature: N = none; R = rills; G = gullies; S = sheet wash
  Storm Runoff: C = in contact with normal stream; S = near stream or gully, but only eroded during storm or flood; N = no storm/flood runoff erosion
- Wind erosion: N = none; D = dunes; B = blowouts; A = airborne dust
- Radiation Count: N = none taken; record value of reading if taken
- Access deterents: N = none; S = sign; F = fence; O = other, explain in #84
- Ratings: Hazard: E = emergency; 1 = extreme danger; 2 = dangerous; 3 = potential danger; 5 = no significant hazard
  Env. Deg.: 1 = extreme; 2 = significant; 3 = potentially significant; 4 = slight; 5 = none
- Comments?: Y = yes; N = no

DRAINAGE/WATER SAMPLES

- Adit/Shaft/Dump No./Other: Indicate Feature No. associated with water information; 0 = other, explain in comments
- Flow (cfs): record seeps as 0.01 cfs (Rule of Thumb: a cfs ≈ one full-blast garden hose)
- Method of flow measure: E = estimate; T = bobber/stopwatch/x-section; W = weir; D = catchment; F = flow meter
- Location of sample and flow: A = immediately adjacent to adit/shaft; B = below dump/tailings; C = immediately above confluence with receiving stream; SW = standing water in/on feature; RU = receiving stream upstream of feature; RD = receiving stream dowmstream of feature;
- Evidence of toxicity: N = none; A = absence of benthic organisms; W = opaque water; P = yellow or red precipitate; S = suspended solids; D = salt deposits
- Comments?: Y = yes; N = no