FLAGSTAFF MOUNTAIN RESORT

A PLANNED RESORT COMMUNITY
DEER VALLEY, UTAH

HISTORIC PRESERVATION PLAN

EXHIBIT 6

MAY 2001
REVISED AND APPROVED DECEMBER 2001

PREPARED FOR:
FLAGSTAFF MOUNTAIN PARTNERS
P.O. BOX 1450
PARK CITY, UTAH

HISTORIC PRESERVATION PLAN

Prepared for

FLAGSTAFF MOUNTAIN RESORT

<u>Plan Summary</u>

<u>Exhibit 6</u>

May 2001
Revised and Approved December 2001

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EXECUTIVE SUMMARY

The Historic Preservation Plan dated August 2000 is a 127-page detailed document produced for Flagstaff Mountain by SWCA, Inc., Environmental Consultants. The document describes in great depth the history of the area and the historic sites found within the Flagstaff Mountain Annexation Boundary.

Accompanying this plan summary is a chart that reviews the same information in an abbreviated format. It includes a brief description of every important site within the Boundary, together with a short history, an overview of the existing conditions, and recommendations for preservation work associated with each. Additionally, the chart includes information regarding a proposed phasing timeline for restoration or remediation of the sites together with a proposed signage format.

Figure A is a map depicting the Historic Sites and is intended as an aid to the reader in locating each site within the Flagstaff Mountain Annexation Boundary.

Concurrent with the first CUP authorizing construction of residential units, FMP will submit to Staff a plan detailing the repairs and stabilization of the historic structures and public protection plan for these structures and mining features. The maintenance and ongoing protection efforts for those buildings, which are not part of an ongoing operation, will become the responsibility of the master homeowners association.

FLAGSTAFF MOUNTAIN

Historic Sites and Preservation Plan

CHART – 5 PAGES

NAME	HISTORY	DESCRIPTION	EXISTING CONDITIONS	WORK RECOMMENDATION
Ontario Mine Shaft No.3	The shaft was used to haul ore and waste rock from the workings and to transport miners and equipment in and out of the mine. It also served as an extra exit point and ventilation shaft.	The No.3 shaft is located in the middle Ontario Canyon, west of and adjacent to State Road 224. The associated complex is situated atop a large historic mine waste dump. All of the surface works were replaced in 1970s and consist of a complex of metal buildings that houses offices, a workshop or garage, concentrator equipment, conveyors, the shaft works, and the Silver Mine Adventure museum in the shaft works building. This site is located on 6.19 acres.	The No.3 shaft and the modern surface works appear to be in good overall condition. Despite the end of the mining activities in the area, the shaft is still operational, and still serves the needs of underground work crews who continually maintain several miles of drain tunnels that supply water to the Park City Culinary water system and to the Jordanelle Water Conservancy district.	Revegetation of this mine feature will involve, from time to time, broadcasting mulch from the top and bottom of the mine dump. This will be followed by the addition of a seed mix that will consist of species as close to native as possible but focusing on the ability to have sustainable growth and foster soil stability with minimal maintenance. The steepness of the slope of this feature will restrict and lengthen the revegetation process. With the first phase of Flagstaff development interpretive signage will be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity.
Anchor (Daly-Judge) Drain Tunnel	The tunnel and its portal are associated with ventilation, water drainage, ore haulage, and access for equipment, utilities, and employees.	The drain tunnel is located approximately one mile up Empire Canyon. The portals covered extension is directly adjacent to the east wall of the judge Mining & Smelting Company office building. Access to the tunnel is secured with a hinged steel grating that allows ventilation. A doorway in the changing room in the rear section of the office building connects directly to the tunnel. This opening is covered with steel grating. The portal itself is of concrete construction, and its covered extension is a wood frame structure with galvanized corrugated steel panels.	The portal appears to be in generally good condition. The tunnel is being maintained as part of Park City' culinary water system, and it is assumed that this feature is still structurally sound. However, there are some wooded patches on the east wall of the portal extension that may need to be secured. The condition of the sills and the bottoms of the wooden posts in the east wall is unknown. There are some loose corrugated roofing panels at the northeast corner of the roof of the Judge Mining & Smelting Company Office building, this problem would be addressed by deficiency mitigation work on that structure.	With the first phase of Flagstaff development interpretive signage will be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity.
Judge Mining & Smelting Company Office	The building housed administrative offices for the Judge Mining & Smelting Company operations, which include mining, milling, and smelting operations, and their continued maintenance. It also provided shower and lavatory facilities for mine workers.	The office is located adjacent to the extension of the Anchor (Daly-Judge) Drain tunnel portal. It is a simple, front-gabled, one-story, concrete-walled structure that is divided into two functional areas. The front section was used as an office and is subdivided into six rooms. The rear section consists of a large Changing Room for miners that connects with the Anchor (Daly-Judge) Drain tunnel via a doorway in its east wall. A small shedroofed extension on the west side of the building serves as an entry to the rear section.	All of the building's walls, plus at least one internal wall, are constructed of poured concrete. The exterior walls are finished with stucco, which shows no obvious evidence of paint and retains its natural appearance. The stucco appears to be original and has the logo "J.M. & S. Co. -1920" incised into the front gable above to the original entrance. All of the windows, with the exception of three windows on the east wall of the Changing Room, are wood-framed, double-hung windows, without counterweights or springs. The building appears to be in fair condition, but is in need of some repairs.	The building site will be cleaned of debris in summer 2001. With the first phase of Flagstaff development the restoration of the building will be initiated, iterpretive signage will be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity. After restoration, the building is anticipated to serve as office and recreation uses for the Flagstaff development.

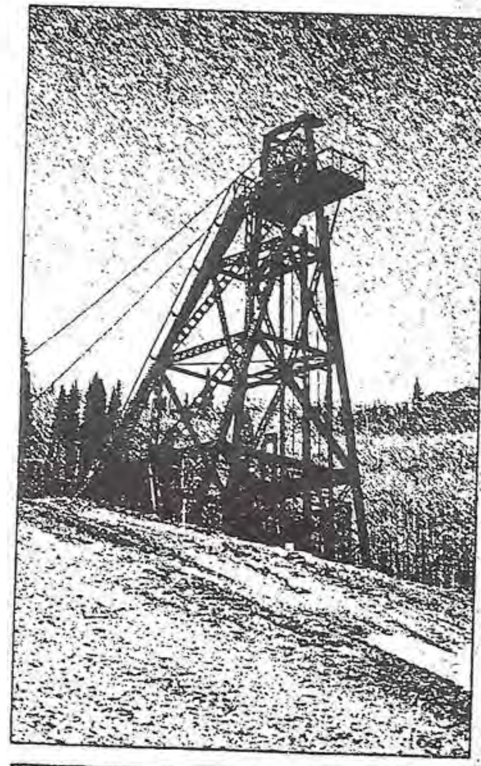
NAME	HISTORY	DESCRIPTION	EXISTING CONDITIONS	WORK RECOMMENDATION
Explosives Bunker	The bunker was used to store explosives, which is clear from the large incised sign on the façade.	This feature is located against a hillside, a few hundred feet north of the Judge Mining & Smelting Company office building. It consists of a concrete explosives bunker that appears to have been used by the Judge Mining & Smelting Company.	This bunker appears to be in excellent condition and unaltered, with the possible exception of some hasps or locking hardware that might be original, but could have been welded to the steel door at a later date. However, the interior of the structure was not available for inspection, so its condition is unknown.	With the first phase of Flagstaff development interpretive signage will be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity.
American Flag Mine Waste Dump	This dump represents the discarded waste rock that was removed from a mine in order to access high-grade ore deposits.	This feature is located one mile up Empire Canyon, on the east side of the canyon and opposite the site of the Daly-Judge Mill. Very little remains of the American Flag Mine itself, although it may have some potential to yield archaeological remains. This site is located on .60 acres.	The basic form of the waste dump has been significantly altered by landslides and other activities in the area. Vegetation has been growing up on portions of the dump.	Revegetation of this mine feature will involve, from time to time, broadcasting mulch from the top and bottom of the mine dump. This will be followed by the addition of a seed mix that will consist of species as close to native as possible but focusing on the ability to have sustainable growth and foster soil stability with minimal maintenance. The steepness of the slope of this feature will restrict and lengthen the revegetation process. Stabilization of some of the mine waste will likely be necessary. With the first phase of Flagstaff development interpretive signage will be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity.
Daly Mine No.1 Waste Dump	This dump represents the discarded waste rock that was removed from a mine in order to access high-grade ore deposits.	The dump is located in upper Empire Canyon, About a half mile further up the canyon than the Anchor (Daly-Judge) Drain Tunnel portal. This site is located on .51 acres.	This basic form of the waste dump remains intact. Some recontouring has taken place in portions of the dump. It is a highly visible feature of a mining land landscape. Vegetation has grown up on portions of the dump, although there is still a small amount of bare material exposed to view.	Revegetation efforts have already begun on this mine site. A mulch has been spread over the dump and a seed mix used that contained species as close to native as possible but focusing on the ability to have sustainable growth and foster soil stability with minimal maintenance. With the first phase of Flagstaff development interpretive signage will be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity.
Daly Mine No.2 Shaft	The shaft was used to haul ore and waste rock from the workings and to transport miners and equipment in and out of the mine. It also served as an extra exit point and ventilation shaft.	The shaft is located in upper Empire Canyon, About a half mile further up the canyon than the Anchor (Daly-Judge) Drain Tunnel portal. Little remains today from these operations, except some scattered rock foundations or retaining walls, composed of coursed and uncoursed rough stone.	The rock walls are in poor condition and the area has been heavily disturbed.	Much of this mine feature has been covered. A thick soil cover will be placed on this mine dump. This will be followed by the addition of a seed mix that will consist of species as close to native as possible but focusing on the ability to have sustainable growth and foster soil stability with minimal maintenance. With the first phase of Flagstaff development interpretive signage will be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity.
Daly - West Mine Headframe, Shaft and Hoist	The headframe, shaft, and hoist was used to haul ore and waste rock from the workings and to transport miners, equipment, and supplies in and out of the mine. It also served as an extra exit point and ventilation shaft.	The headframe, shaft, and hoist are located in upper Empire Canyon, about a quarter of a mile above the Daly No.2 Shaft.	These features are still in operable condition and are maintained as an emergency exit and ventilation source for the drain tunnels.	With the first phase of Flagstaff development interpretive signage will be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity.

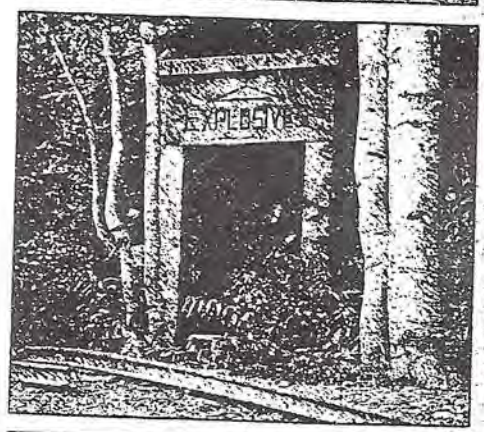
NAME	HISTORY	DESCRIPTION	EXISTING CONDITIONS	WORK RECOMMENDATION
Daly - West Mine Fire Hydrant Shacks	These features provided sources of pressurized water for fire fighting or other purposes.	These three fire hydrant or water connection shacks are located at the Daly-West Mine, just upslope from the headframe. One shack has a fire hydrant inside and the others have smaller water pipes and valves. All are painted red with white trim, perhaps as a requirement to indicate their function as water sources for fire fighting.	Other than some missing galvanizing roofing panels and typical weathering, these sheds are in reasonably good condition and do not appear to have been significantly altered over time.	With the first phase of Flagstaff development interpretive signage will be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity.
Daly - West Mine Waste Dump	The dump represents the discarded waste rock that was removed from a mine in order to access high-grade ore deposits.	This feature is a large wasted dump in the middle part of the Empire Canyon that is associated with the Daly-West mine. This site is located on 14.55 acres.	This basic form of the waste dump remains intact. Some recontouring has taken place in portions of the dump. It is a highly visible feature of a mining land landscape. Vegetation has grown up on portions of the dump, although there is still a large amount of bare material exposed to view.	Revegetation of this mine feature will involve, from time to time, broadcasting mulch from the top and bottom of the mine dump. This will be followed by the addition of a seed mix that will consist of species as close to native as possible but focusing on the ability to have sustainable growth and foster soil stability with minimal maintenance. With the first phase of Flagstaff development interpretive signage will be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity.
Quincy Mine Hoist Plant	The boiler and hoisting engine were used to operate the Quincy Mine shaft equipment, which was used to carry miners, equipment, and supplies in and out of the mine workings, and to haul ore out of the mine.	This feature consists of the remains of the hoist plant for the Quincy Mine Shaft. It is located in middle Empire Canyon, just upslope of the Daly-West Mine. A rectangular area and traces of rock foundations define the area that was occupied by the hoist building.	The hoist building is no longer standing, but some pieces of lumber and roofing material can be seen on the ground within the area defined by the hoist building foundations These items are badly deteriorated and mixed with forest detritus.	With the first phase of Flagstaff development interpretive signage will be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity.
Quincy Mine Shaft and Waste Dump	The shaft was used to haul ore and waste rock from the workings and to transport miners, equipment, and supplies in and out of the mine. It also served as an extra exit point and ventilation shaft. The dump was used to discard waste rock that was removed from a mine in order to access high-garage ore deposits.	These two features are located in the middle Empire Canyon area, directly above the Daly-West Mine site. Little remains of the shaft, since it has been filled in. However, the fill has settled, and a depression clearly shows where the shaft is located. This site is located on 1.92 acres.	The shaft has been filled in and concavity exists over the filled shaft to suggests its location adjacent to the hoist plant. The basic form of the waste dump remains intact.	Revegetation efforts of the top of this mine dump has already started. The upper slopes have also been mulched. There is a good population of pine trees on the slope of the dump and efforts to cover the steep slope of the dump have be en restricted by the trees. A seed mix that consists of species as close to native as possible but focusing on the ability to have sustainable growth and foster soil stability with minimal maintenance was used. With the first phase of Flagstaff development interpretive signage will be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity.
Little Bell Mine Ore Bin	The ore bin was used for short-term storage and redistribution of ore from the Little Bell mine, sometimes called "staging."	The bunker is located in middle Empire Canyon, on the east-facing slope of the Little Bell Mine waste dump and approximately 175 feet east of the Little Bell Mine shaft. The ore bin is constructed of wood, excepting the steel-and-iron loading gate doors, nails, steel bracing rods, and other fasteners. The footprint of the structure measures 12' x 24'.	The overall effect of the damage to the ore bin is that the entire structure is supported only by the central support posts and cross braces at the front and rear of the structure, making its support base effectively much smaller and creating a precarious and dangerous situation.	With the first phase of Flagstaff development the Little Bell Ore bin will be provided permanent shelter in the form of all weather roofing, and interpretive signage will be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity. Additional building stabilization will occur in summer 2001.

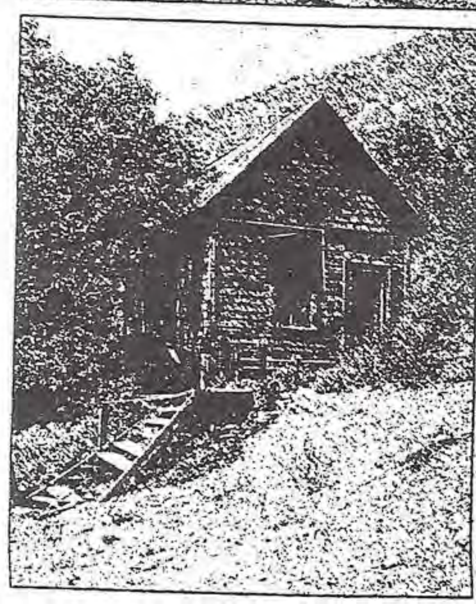
NAME	HISTORY	DESCRIPTION	EXISTING CONDITIONS	WORK RECOMMENDATION
Little Bell Mine Waste Dump	This feature represents the discarded waste rock that was removed from a mine in order to access high-grade ore deposits.	The waste dump is located in middle Empire Canyon adjacent to Little Bell ore bin and shaft and south of the Quincy Mine. The mine shaft has been filled in and very little remains of that feature, but the dump is still visible. This site is located on 2.82 acres.	The dump is essentially unaltered part of a mining landscape. Vegetation has been growing up on portions of the dump, although there is still a considerable area of bare material exposed to view.	This feature has been partially revegetated. Efforts will continue by adding mulch and available soil to the surface. A seed mix that will consist of species as close to native as possible but focusing on the ability to have sustainable growth and foster soil stability with minimal maintenance will be used. With the first phase of Flagstaff development interpretive signage will be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity.
Diamond-Nemrod Mine Waste Dumps	This feature represents the discarded waste rock that was removed from a mine in order to access high-grade ore deposits.	The dump is located high on the steel hillside above the Daly-West Mine, and are clearly visible from a distance.	The basic form of the dump remains relatively intact. Vegetation has been growing up on portions of the dump, although there is still some bare material exposed to view.	These mine dumps will be mulched with a seed mix that will consist of species as close to native as possible but focusing on the ability to have sustainable growth and foster soil stability with minimal maintenance. However, access to these sites is limited and the merits of establishing access for the purpose of revegetating the mine dumps will have to be made prior to any work. With the first phase of Flagstaff development interpretive signage will be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity.
Anchor Mine Waste Dumps	This feature represents the discarded waste rock that was removed from a mine in order to access high-grade ore deposits.	The dump is a massive feature located in upper Empire Canyon. It is clearly visible from a great distance and is one of the largest and best preserved of the dumps in Empire Canyon.	The basic form of the dump remains relatively intact. It is a large waste dump and a highly visible part of a Mining land landscape, although there has been major recontouring of the east side of the dump for a ski run. Vegetation has been growing up on portions of the dump, although there is still a considerable area of bare material exposed to view.	Some revegetation has already taken place on this mine feature. This is one of the largest mine features in the Flagstaff Project. The steep long slopes of the mine dump will make any revegetation efforts difficult. The surface of the dump will be covered with soil as it is available. The top of the steep slopes will be mulched seeded with a mix that will consist of species as close to native as possible but focusing on the ability to have sustainable growth and foster soil stability with minimal maintenance. With the first phase of Flagstaff development interpretive signage will be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity.
White Pine Mine Log Structure	The original purpose of this structure has not been determined. It may have been a residence, or it could have functioned as an administrative building.	The remains of the log structure are located below the White Pine Mine and above the Anchor Mine. The structure consists of a one-room, one story log building, with a footprint of approximately 16' x 22'. The highest point of the remaining structure is the northwest corner, which is about nine feet above the current ground level.	The roof is missing and may have fallen in. The attic or loft has fallen down, and a few of its remaining structural elements are still visible, mixed in among the debris inside the structure. These components are in poor condition, due to normal processes of weathering and decay.	With the first phase of Flagstaff development interpretive signage will be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity.
White Pine Mine Waste Dumps	This feature represents the discarded waste rock that was removed from a mine in order to access high-grade ore deposits.	The Ridge-Line Waste Dump is located on a saddle at the ridge line at the top of Empire Canyon. The Downslope Waste Dump is located a short distance downslope and to the north of the ridge-line waste dump. This site is located on .43 acres.	The ridge-line waste Dump has been altered significantly by recontourinig operations and other work in the area. The downslope waste dump appears to be intact and in stable condition.	This small mine dump will be mulched and a seed mix that will consist of species as close to native as possible but focusing on the ability to have sustainable growth and foster soil stability with minimal maintenance will be used. With the first phase of Flagstaff development interpretive signage will be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity.

NAME	HISTORY	DESCRIPTION	EXISTING CONDITIONS	WORK RECOMMENDATION
Flagstaff Mine Shaft	The shaft was used to haul ore and waste rock from the workings and to transport miners, equipment, and supplies in and out of the mine. It also served as an extra exit point and ventilation shaft.	The shaft is located near the top of the Flagstaff Mountain, which lies between Empire Canyon and Ontario Canyon. The shaft has been capped with a concrete slab and very little remains of the mining operation other than its waste dump and some scattered materials.	The structural integrity of the slab is unknown. Some dilapidated fencing surrounds the concrete slab, but is no longer protecting it.	With the first phase of Flagstaff development interpretive signage will be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity.
Flagstaff Mine Waste Dumps	This feature represents the discarded waste rock that was removed from a mine in order to access high-grade ore deposits.	The dump is located near the top of the Flagstaff Mountain, between Ontario Canyon and Empire Canyon. It is a tall feature, but is spread over fairly wide area around the shaft location. This site is located on 1.07 acres.	The basic form of this waste dump appears to be intact and more or less in its original form. Some vegetation is growing on parts of the waste dump, but there is still a considerable amount of bare material exposed to view.	This mine dump will be mulched and a seed mix that will consist of species as close to native as possible but focusing on the ability to have sustainable growth and foster soil stability with minimal maintenance will be used. With the first phase of Flagstaff development interpretive signage will be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity.
Naildriver Mine Waste Dump	This feature represents the discarded waste rock that was removed from a mine in order to access high-grade ore deposits.	The dump is located in the eastern portion of the Flagstaff Mountain Resort project area. It is the only remaining historic feature of the Nail Driver Mine. This site is located on .43 acres.	The dump has not been significantly altered. Some vegetation is growing on parts of the waste dump, but there is still a considerable amount of bare material exposed to view.	This mine dump will be mulched and a seed mix that will consist of species as close to native as possible but focusing on the ability to have sustainable growth and foster soil stability with minimal maintenance will be used. However access is restricted and an evaluation will need to be completed to assess the merits of establishing access to the mine dump to revegetate it. With the first phase of Flagstaff development interpretive signage will be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity.

HISTORIC PRESERVATION PLAN FOR FLAGSTAFF MOUNTAIN RESORT SUMMIT COUNTY, UTAH







Prepared for

UPK/DMB Associates, LLC

Prepared by

SWCA, Inc.
Environmental Consultants

August, 2000

HISTORIC PRESERVATION PLAN FOR FLAGSTAFF MOUNTAIN RESORT PARK CITY, SUMMIT COUNTY, UTAH

Prepared for

UPK/DMB Associates, LLC

Prepared by

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SWCA Cultural Resources Report No. 00-28

August, 2000

AMERICAN CULTURAL
RESOURCES ASSOCIATION

MEMBER

ABSTRACT

Between August, 1999 and July, 2000, SWCA, Inc. Environmental Consultants (SWCA) conducted research on historic mining-related properties in theFlagstaff Mountain Resort project area in Park City, Summit County, Utah This work was conducted at the request of UPK/DMB, LLC, the developer of the Flagstaff Mountain Resort. At the time of this writing, there were no state or Federal reporting requirements for this HPP, which was written for submission to Park City and to satisfy conditions outlined in a Development Agreement between Park City and UPK/DMB, LLC.

The intent of this research was to create a historic preservation plan (HPP) that would provide information to assist UPK/DMB, LLC and Park City make informed decisions regarding possible treatment plans for these properties. More specifically, this HPP provides:

- General historic context information for mining activities in the Park City area.
- Geological context information for the Park City area.
- Site-specific historic context information for certain mining-related sites in the project area.
- A description of each feature in a site, including physical characteristics, stylistic information, and construction details, as appropriate.
- A brief explanation of each feature's function within a mining system, if known.
- A description of significant problems or deficiencies that threaten a feature's structural integrity or life expectancy. Other problems or deficiencies may exist that were not noted during a preliminary inspection of the features described herein.
- An assessment of the causes or conditions that led to those deficiencies, or that maintain or exacerbate those deficiencies.
- A description of recommended work that might mitigate a feature's deficiencies. This information may be useful if stabilization is selected as a treatment plan for a particular feature.
- Suggestions for interpretive signage. This information may be useful if interpretation is selected as part of a treatment plan for a particular historic feature.
- Some basic information about types of treatment plans and a list of viable and suggested treatment plans for the historic properties in the Flagstaff Mountain Resort area.
- An appendix containing information about the artifacts and exhibit material associated with the Silver Mine Adventure operation.
- An appendix containing general background information on applying National Register of Historic Places (NRHP) criteria for determining historic significance and NRHP eligibility.

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INTRODUCTION

This Historic Preservation Plan (HPP) was prepared by SWCA, Inc. Environmental Consultants (SWCA) for UPK/DMB, LLC (UPK/DMB).

The Flagstaff Mountain Resort project area consists of approximately 1,750 acres of private land in Park City, Summit County, Utah. Flagstaff Mountain Resort developers include UPK/DMB, LLC (a joint venture between United Park City Mines Company and DMB Associates, Inc.) and certain other private property owners. A Development Agreement was negotiated between the developers and Park City Municipal Corporation as a prerequisite to Park City's annexation of the Flagstaff Mountain Resort property, which took place on June 24, 1999.

This HPP was commissioned by UPK/DMB to satisfy Park City's requirements for the creation of a Historic Preservation Plan, as described in the Development Agreement. There were no Federal or state requirements for the HPP at the time of this writing. The content and structure of this HPP was designed to satisfy certain content requirements agreed upon by UPK/DMB and the Park City Preservation Planner, and certain administrative requirements, including review by Park City and representatives of the Summit County Historical Society.

This HPP identifies certain historic mining-related properties in the Flagstaff Mountain Resort project area and provides information that should help UPK/DMB and Park City make informed decisions regarding possible treatment plans for these properties. More specifically, this HPP provides:

- General historic context information for mining activities in the Park City area.
- Geological context information for the Park City area.
- Site-specific historic context information for certain mining-related sites in the project area.
- A description of each feature in a site, including physical characteristics, stylistic information, and construction details, as appropriate.
- A brief explanation of each feature's function within a mining system, if known.
- A description of significant problems or deficiencies that threaten a feature's structural integrity or life expectancy. Other problems or deficiencies may exist that were not noted during a preliminary inspection of the features described herein.
- An assessment of the causes or conditions that led to those deficiencies, or that maintain or exacerbate those deficiencies.
- A description of recommended work that might mitigate a feature's deficiencies. This information may be useful if stabilization is selected as a treatment plan for a particular feature.
- Suggestions for interpretive signage. This information may be useful if interpretation is selected as part of a treatment plan for a particular historic feature.
- Some basic information about types of treatment plans and a list of viable and suggested treatment plans for the historic properties in the Flagstaff Mountain Resort area.
- An appendix containing information about the artifacts and exhibit material associated with the Silver Mine Adventure operation.
- An appendix containing general background information on applying National Register of Historic Places (NRHP) criteria for determining historic significance and NRHP eligibility.

Note: Certain obvious safety hazards pertaining to the features described in this report may be noted. However, SWCA is not a safety engineering firm and recommends that a qualified individual or organization perform on-site inspections to identify potential safety hazards and make specific hazard mitigation recommendations. There may be other hazards associated with these properties in addition to any that are mentioned in this report.

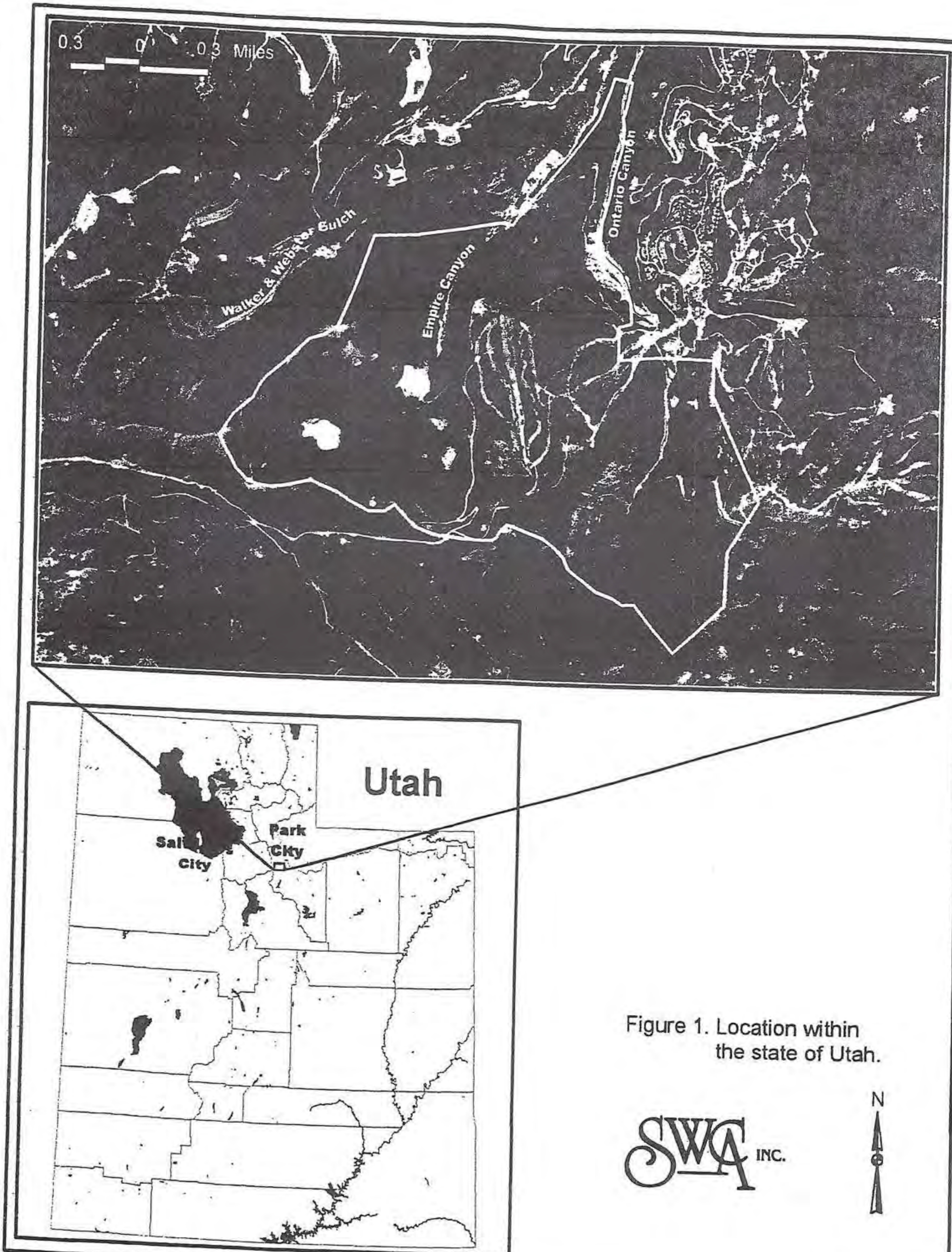

Figure 1. Location within the state of Utah.

d:\deer valley\deer valley apr\State Locator for Flagstaff Mountain Resort Layout (7-27-2000)

Key to item numbers in Figure 2:

1. Ontario Mine No. 3 Shaft site (page 37).
2. Ontario Mine Water Tank A (page 43).
3. Ontario Mine Water Tank E (page 43).
4. Ontario Mine Water Tank B, Tank C, and Tank D (page 43).
5. Ontario Mine No. 2 Shaft site (page 37).
6. Ontario Mine No. 1 Shaft site (page 37).
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8. American Flag Mine site (page 62).
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15. Meears Company shaft site (refer to Daly-West Headframe, page 70).
16. Anchor (Daly-Judge) Mine site (page 99).
17. White Pine Mine shaft (page 102).
18. Log structure (page 105).
19. Mine waste dump, associated with a White Pine Mine adit (page 103).
20. Flagstaff Mine site (page 110).
21. Lucky Bill Mine site (not documented).
22. New York Mine site (not documented).
23. Naildriver Mine site (page 114).

Blue Line – Anchor (Daly-Judge) Drain Tunnel.
Green Line – Ontario Drain Tunnel No. 1.
Dark Blue Line – Ontario Drain Tunnel No. 2 (to Keetley).
Dotted Orange Line – Judge Aerial Tramway.

APPROACH AND LIMITATIONS

More than a century of intensive mining activities within and adjacent to the project area has left an enormous number of mining-related features, ranging from bits of debris and subtle landscape alterations to massive mine waste dumps and intact standing structures. This Historic Preservation Plan concentrates on a subset of better-known mining-related sites within the project area that still have obvious features whose functions could be identified.

Research activities began with an examination of previous research, which included the following reports:

- Hal Compton (N.D.) prepared a preliminary assessment of historic mining-related properties in the project area for United Park City Mines Company.
- In September, 1999, SWCA conducted a Class I Literature Search and a Class III Cultural Resource Inventory of approximately 213 acres (86 ha) within the Flagstaff Mountain Resort property. The surveyed areas represented portions of the property that would be directly impacted by proposed development activities. Cultural resource work was managed by Lisa M. Meyer. Ms. Krislyn Taite acted as Crew Chief and assisted in the report preparation. Crew members included Scott Edmisten, Sandra Galvez, Rachel Orth, and Robert Sinnott. Rick Wessel provided historic context information.
- In August and September, 1999, SWCA conducted a preliminary field reconnaissance of known historic mining properties and related features in the Ontario Canyon and Empire Canyon areas. At UPK/DMB's request, these properties received a preliminary examination by SWCA and were informally documented. This report was intended to provide UPK/DMB with a better understanding of the potential historic significance of these features. This report was prepared by Lisa M. Meyer, Sherri Murray Ellis, and Rick Wessel.

Information from the preliminary research mentioned above was incorporated, as appropriate, into this HPP. Dr. Alan R. Bowes of SWCA served as Project Manager for this effort.

Additional background research was done, including examining a variety of historical records about mining activities in the Park City area and identifying known properties associated with those activities. The research included an examination of mining claim records, historical photos and maps, previous studies in the project area and within one mile of its perimeter, interviews with knowledgeable individuals, and an examination of materials in the Utah State Historical Society and Park City Historical Society archives. The information was compiled to provide a historic context for analyzing mining-related properties in the Park City area, with the object of identifying and describing these historic properties in terms of their function within a mining system and providing background information that would be helpful in evaluating their historical significance.

Further field inventory work was conducted to examine and document these historic properties and their related features in more detail, including standing structures and other architectural remains (such as headframes, mine buildings, storage sheds, etc.), landscape features (such as waste dumps, railroad grades, roads, etc.), and archaeological remains (such as prospects, pits, trash dumps, privy pits, collapsed structures, foundations, etc.). Any historic property in this area has the potential to yield archaeological remains. However, no excavation work was carried out for this report, and SWCA does not recommend excavation work for any of the properties at this time.

HISTORIC CONTEXT

General Historic Mining Context

The mineral resources of the American West have drawn hordes of individuals seeking fortune, adventure, and independence. But as these immigrants transformed the landscape, they too were transformed by the experience. With each major discovery, a new wave of people from every corner of the nation and world would descend upon the place, bringing with them their own traditions and values. Mining districts were true melting pots of race, ethnicity, religion, nationality, and politics, with all of the attendant conflicts and compromises. With such a diverse population thrown suddenly together, tensions ran high and sometimes boiled over, but the rich cultural amalgam of the western mining towns and camps left rich legacies that helped shape American culture as we know it today.

From a monetary standpoint, the effect of these migrations was immense. Billions of dollars in capital investments, profits—and sometimes losses—shaped local, regional, and national economies. The United States may not have ever achieved its standing as a world power were it not for its enormous mineral wealth and the risks and sacrifices that individuals were willing to take to wrest it from the ground.

The mining camp that would become Park City was not a small player in this drama. At various times, it was the world's leading producer of silver and also ranked high in the production of lead, zinc, and gold. The context in which this study examines mining-related properties is concerned primarily with the history of mining in the Park City area, beginning with the initial discovery of ore.

The history of mining camps, towns, and districts tends to fall into periods of discovery, development (boom), production (mature phase), and decline (bust), although each situation is unique to varying degrees. Developmental sequences were shaped by a variety of social, economic, political, and environmental factors, although virtually always with the same basic underlying purpose: to locate, extract, process, and sell the mineral riches of the area for a profit.

For many mines and mining districts, their history cannot be represented by a simple boom-to-bust cycle. Over the years, fluctuations in demand, prices, and production, coupled with changes in ownership, technological innovations, and other environmental, political, and economic factors, would influence the chain of events. Some mines went bust, for a variety of reasons, but new ones often sprang up if the metals market was healthy enough. Other mines extended their useful life—and often their profits as well—by expanding their operations to include adjacent claims. Neighboring claims could often be had for a price or in exchange for interest in the mining operation. Adjacent claims held the prospect of new veins and might provide access to other claims with their own potential lodes. This process is known as "consolidation" or "amalgamation" (not to be confused with the ore refining process of the same name). Another form of consolidation was the combination of claims and other resources to form entirely new mining companies.

As mining operations grew larger and more numerous in a region, scattered mining camps would often give way to the establishment of a sizeable town. Some towns were short-lived, while others would endure multiple cycles of pain and prosperity. In either case, their character was shaped by those who toiled thousands of feet beneath the earth, by their often long-suffering families, and by those who sat behind polished desks.

Park City Mining District Historic Context

As mentioned, it is important to examine mining properties from the perspective of a historic mining context, which is basically a particular theme that is further defined by a chronological period and a geographical area. The theme is mining development in the Park City area, the geographical area is the present-day Park City Mining District, and the chronological period begins at the date of the initial discovery of ore bodies in the Park City area and ends in 1982, when the last mining operations shut down and the economy and culture of Park City were already well established on a new foundation of recreation and land development.

The area that would become the Park City Mining District can be counted among the major mineral development areas of the American West. During the district's heyday, its silver and other metals made an important contribution to the national and regional economy. At one time, the district laid claim to being the world's leading silver producer. Eventually, however, the combination of low metal prices and high operating costs (when compared to competing foreign markets) rendered it unprofitable to continue mining operations. However, there is still metal in the mountains surrounding Park City, and perhaps someday ore cars may again rumble down their tracks, bearing the ore that made Park city an icon in the mineral industry and in the history of the American West.

The information in this section may help determine the function of mining-related properties within a mining system, and could also assist in evaluating the historic significance of those properties. As such, it is primarily a history of mining-related events in the district, including some comments regarding their effects upon certain social, political, cultural, or economic conditions, their relationship to certain historically significant individuals, or their significance from an engineering standpoint. It is not intended as a general history of the Park City area (although certain non-mining-related events are included when germane). Because of the large number of properties in this report, the wide range of dates associated with those properties, and the often complex interrelationships among those properties, it was decided to provide a higher-than-normal level of detail and to present this information in table form for easier reference.

Information in the table was compiled from several sources, including Thompson and Buck (1981), Boutwell (1920), Butler, et al. (1920), Stott (1916), interviews with Hal Compton (N.P., 2000) and Kerry Gee (N.P., 2000), Sanborn fire insurance maps (1889, 1900, 1907), an examination of many historic photographs and maps, and several informal sources.

Table 1 – Park City area mining history.

Date	Mining-Related Events and Other Selected Events	Related Mines or Companies	Notes
1847	Mormon pioneers arrived in the Utah Territory.		Mormons were admonished by their church leaders to avoid involvement in mining activities for about 15 years after their arrival in the Utah Territory
1858	General Johnston's army sets up Camp Floyd, 50 miles south of Salt Lake City.		Mormons were at odds with the Federal government over polygamy and political issues. Federal troops were brought in to "restrain" the Mormons.
1862	Colonel Patrick E. Connor and 300 soldiers organized Fort Douglas in the Salt Lake Valley. Col. Connors' soldiers soon began prospecting in the mountains around Salt Lake City.		
1863	The first mining claim in Utah was the West Jordan claim in Bingham Canyon. Other finds near Stockton in the Tooele District would soon follow.		
1864	The first discovery of silver in the Wasatch Range was made at the head of Little Cottonwood Canyon, which would become the Emma Mine at Alta in just a few years. This discovery is attributed to Colonel P.E. Connor.		
1868	Prospectors began using the community of Snyderville (which had grown up around Snyder's Sawmill) as a base of operations for exploring the Park City area.		
1868	The first mining claim filed in what would later become the Park City Mining District was the Young America lode, soon followed by the Yellow Jacket and Green Monster claims. The Walker and Webster were other early discoveries.	Young America, Yellow Jacket, Green Monster, Walker, Webster.	
1868-1872	Claims staked in McHenry and Glencoe Canyons.	McHenry, Hawkeye, Glen Allen.	Water problems in the mine workings were developing. The flow in the McHenry Mine, for example, was so strong that miners had difficulty maneuvering against the current. This would prove to be an issue for most of the mines in the district.
1868	Col. Connors' soldiers make discovery on ridge overlooking Bonanza Flat, which would become the Flagstaff Mine.	Flagstaff.	
1869	The "Golden Spike" was driven at Promontory Point, Utah, marking the completion of the transcontinental railroad and effectively ending Utah's period of isolation. The railroad carried many prospectors, miners, and equipment into the area, increasing the rate of mineral development in Utah and diluting the Mormon population with "gentiles" (non-Mormons).		Western mines had great difficulties transporting ore to smelters until the transcontinental railroad was built, sometimes even carting the ore to San Francisco for shipment by boat to eastern smelters.
1870	A census showed a population of 164 persons living at Parley's Park, near Snyderville, including nearby prospectors. Park City had not yet been founded.		
1871	The first ore shipment from a mine in the area was made from the Flagstaff Mine.	Flagstaff.	40 tons of galena ore were shipped by wagons to a new railroad line at Echo City.

Date	Mining-Related Events and Other Selected Events	Related Mines or Companies	Notes
1871	The Pinion claim owners found a large ore body and contracted to send the ore to a mill to be built in Ogden. Other claims had also been located in the district. Ore from the Walker and Webster claim was hauled to Godbe's Smelter in Rush Valley, near Tooele.	Pinion, Walker and Webster, Wild Bill, Rocky Bar, Buckeye, etc.	
1872	The Ontario lode claim was filed by Herman Buden, James Kane, Rector Steen, and Augustus Dawell. They sold the claim to George Hearst later that year for $27,000. Hearst had borrowed the capital from James Ben Ali Haggin, a wealthy California lawyer of Turkish ancestry. The Ontario would become the greatest of the Park City mines.	Ontario.	Buden and Steen each claimed to be the discoverer of the Ontario lode. The Ontario mine would eventually produce over $50,000,000 and pay dividends of $15,000,000. Hearst became wealthy from the Ontario and would go on to invest in other mines and found his powerful Hearst newspaper chain, to be continued by his son, William Randolph Hearst.
1872	On July 4th, the name "Park City" was informally given to a mining camp along Silver Creek where it forked at Deer Valley.		George Snyder built the first house in Park City, soon to be followed by W.J. Montgomery's General Store and the Post Office.
1873	R.C. Chambers was installed by Hearst as Superintendent of the Ontario Mine. The Ontario No. 1 shaft had problems with cave-ins, and the No. 2 shaft was started, eventually reaching a depth of 1,500 feet.	Ontario.	Chambers was a key figure in leading the Ontario Mine's development efforts.
1873	Several wealthy investors arrived in Park City, including E.P. Ferry (and later, his brother Col. William Ferry), D.C. McLaughlin, J.W. Mason, and F.A. Nims. E.P. Ferry purchased the Flagstaff Mine for $50,000 from James Kennedy.	Flagstaff.	Kennedy had purchased the Flagstaff Mine from the soldier prospectors who had originally discovered it, for $5,000, then sold it to Ferry in 1873 for $50,000. Soon after these investors arrived, F.A. Nims formed a "townsite company" and applied to the government for a townsite. With help from R.C. Chambers, the townsite company prevailed over the existing residents in the camp, who then had to purchase their property from Nims, who had received title to the townsite.
1873	Ferry began construction of the Marsac Mill, a 20-stamp mill at the foot of Rossie Hill on Silver Creek. The McHenry Company also began a 20-stamp mill in Deer Valley. Park City continued to grow. Col. Ferry started a waterworks company, new cabins and businesses began to spring up, and new streets appeared.	Marsac.	The mills were not running efficiently, primarily because of transportation problems, especially in the winter. The early population of Park City included people of Irish, Cornish, English, Scottish, Chinese, and Scandinavian descent. This was typical of many mining camps in the Great Basin area. The Scots tended to live apart, such as at their settlement in the Lake Flat area. A Chinatown grew up behind Main Street.
1875	The Ontario Mine opened the camp's first school, for the children of Ontario miners.	Ontario.	
1876	The Ontario Silver Mining Company was incorporated with a stock issue of $10,000,000, and preparations for sinking the mine's No. 3 shaft were being made across the canyon.	Ontario.	
1877	The Ontario Mine began an enormous 40-stamp mill below the mine at the mouth of Ontario Canyon. The company also paid its first dividend of $50,000 and began construction of a drain tunnel and its No. 4 shaft.	Ontario.	During the mill's construction, the existing McHenry and Marsac Mills could not handle the huge volume of ore from the Ontario Mine, even when the McHenry Mine was not producing due to its water problems. Water problems were also to plague the Ontario mine, and work began on the Ontario Drain Tunnel No. 1, near the mouth of Ontario Canyon that was to intersect with the No. 3 shaft at the 600-foot level. Work on the drain tunnel also proceeded from the direction of the new No. 4 shaft, at the approximate mid-point of the planned drain tunnel.

Date	Mining-Related Events and Other Selected Events	Related Mines or Companies	Notes
1877	After disputes surrounding ownership of adjacent ore bodies owned by a United States Marshall named Shaughnessy, George Hearst arranged for the Ontario Mine to purchase the claims, adding them to the Ontario's already extensive holdings.	Ontario	Something close to "underground warfare" was waged by miners in the two adjoining operations, helping, perhaps, to coerce Shaughnessy to sell his interests to Hearst.
1879-1885	Five schools were established in the Park City area during this period, including a free school, the St. Mary's Catholic School, the New West School, the Park City Academy, and the Washington School.		By 1887, there were about 500 students enrolled in these schools. There was also a three-room school, called the Jefferson School, that functioned until 1902.
1880s	The decade of the 1880s was a period of rapid growth for Park City, during which it was transformed from a camp of rough shacks and 3,000 miners to a city of 5,000 people, with stone and brick buildings and many genteel homes. It became the third city in Utah to receive telephone service in 1881. In 1884, Park City finally obtained a charter of incorporation from the state, and F.W. Hayt was elected mayor. New businesses sprang up, along with lodges and the Society Hall, sponsored by various lodges, which drew many of the stage stars of that period. Park City gradually became a safer place to live, although it still had its share of notorious crimes.		
1880	The Ontario Mine contracted with J.P. Morris & Company of Philadelphia to install a huge "Cornish pump" in the mine's No. 3 shaft.	Ontario	The "Cornish pump" was intended to pump large quantities of water out of the mine from below the 600-foot level that was served by the drain tunnel. The pump and its components weighed some 500 tons. The pump's engine had a 70-ton flywheel, two 20-inch-diameter pistons, and the pump could remove some 4,000,000 gallons of water per day from the depths of the mine. The fuel needs for the steam boilers for this pump, as well as for the boilers used to power other mine-related equipment in the Park City area, would soon result in serious denuding of the area's forested hillsides and canyons. Sawmills from up to 40 miles away supplied cordwood for the furnaces and boilers.
1880	The *Park Mining Record* was founded, under James Schupback as publisher.		Schupback soon moved to Butte, Montana, and Harry White became publisher in 1881.
1880	Col. Ferry locates seven iron ore claims near Cold Springs.		Ferry developed these claims and began shipping iron ore from them instead of from the Dyer Mine in the Uintah Mountains north of Vernal. This would cut haulage distances by more than half. Iron ore was used for flux in the sampler and smelter plants.
1881	Installation of the Cornish pump in the Ontario workings began, under the supervision of David Keith.	Ontario	David Keith would become one of Park City's most influential citizens.
1881	The Ontario drain tunnel was completed.	Ontario	Water from the drain tunnel was used at the Marsac mill, and the drain tunnel allowed miners to enter the Ontario mine at the mouth of Ontario Canyon, which made it convenient to live in Park City instead of farther up the canyon.
1881	The narrow-gauge Utah Eastern Railroad line was completed from Echo City to Park City and began carrying coal to power the mines, replacing the use of cordwood. The Ontario Mine purchased control of a coal mine at Grass Creek, near Coalville.	Ontario and others.	The Ontario's Cornish pump alone used 100 tons of coal per day. The Ontario Company soon purchased control of the Utah Eastern Railroad, then sold it to the Union Pacific Railroad a few years later.

Date	Mining-Related Events and Other Selected Events	Related Mines or Companies	Notes
1881	The Salt Lake & Eastern Railroad and the Salt Lake & Fort Douglas Railroad began construction of competing railroad lines up Parley's Canyon from Salt Lake City.		Rough terrain and steep grades made this a difficult project, which took about nine years to complete. The Salt Lake & Eastern Railroad was the product of John W. Young, son of Mormon leader Brigham Young. When the railroad fell upon hard times, J.W. Young hatched a plot involving a non-existent city (Gorgoza) in hopes of luring capital from a wealthy Spaniard named Gorgozada, who pumped $1,000,000 into the railroad project and facilitated its completion.
1881	The old Catholic church was built.		The Catholic church had the largest membership of the town's various congregations.
ca. 1881	John Daly began to acquire 24 claims, located to the west of the Ontario Mine, based on his belief that the Ontario's ore bodies extended to the west. He began work on the Central Tunnel in lower Empire Canyon. He soon struck the ore that he predicted was there.	Daly.	Daly deeded a half interest in the mine to R.C. Chambers. Daly tried to convince Chambers to form a corporation with him on 40 additional claims, but Chambers refused, so Daly took his own half interest in the additional claims and incorporated it as his second company, the Daly-West Mining Company, which was enormously successful. Daly continually deposited half of his profits in a special account in the event of a settlement between Daly and the Chambers & Hearst interests regarding the additional claims, in which the property's ownership was to be determined. After ten years of litigation, a settlement gave half of the property to the Chambers & Hearst interests.
ca. 1882	Several mines (Walker, Buckeye, Climax, Rebellion) were involved in litigation over apex rights to determine which mines could claim disputed ore bodies. Ferry managed to consolidate the Pinion Ridge claims as the Crescent Mining Company.	Walker, Buckeye, Climax, Rebellion.	The Crescent almost immediately struck a major ore body, which was believed to lie between the Snowflake tunnel and the Rebellion tunnel on Pinion Ridge.
1882	The Mackintosh Sampler was built to process ore from the Crescent Mine.	Crescent, Mackintosh.	The Crescent Tram (a narrow-gauge rail line) was built to haul ore from the Crescent to the Mackintosh Sampler. The tram depot was located at the bottom of Main Street. The line climbed the mountain front to the west and wound its way around to the west side of Pinion Ridge, which it followed up to the Crescent Mine. It hauled approximately 60 tons of ore per day.
1883	The Crescent Mine purchased the nearby Walker & Webster mine for $50,000.	Crescent, Walker & Webster.	
1883	A drop in silver prices caused a minor depression in Park City.		
1884	Sam Raddon, formerly of the Salt Lake Tribune, joined the Park Record staff.		Raddon was influential in shaping the highly critical nature of many of the newspaper's stories and editorials. The paper's critiques were often racially or ethnically jaundiced and decidedly anti-Mormon, but they also provide a unique window into the day-to-day life and times of Park City. The Park Record was to persevere through it all to become Utah's oldest weekly newspaper, and is still published today.
1884	The Creole Mine was started on Treasure Hill by D.F. Condon, who leased the mine to E.N. Jenkins, Dan Dorey, and Pay Blaney.	Creole.	

Date	Mining-Related Events and Other Selected Events	Related Mines or Companies	Notes
1885	The Utah and White Pine claims were consolidated with a new claim (Anchor?) at the head of Empire Canyon, to form the Anchor Mining Company, with E.P. Ferry as manager.	Utah, White Pine, Anchor.	Serious water problems were encountered at the 600-foot level, where a water source was struck that flooded the mine up to the 100-foot level. Pumps kept the mine operable to the 400-foot level. John Dally was contracted to build a 6,000-foot drain tunnel from near the mouth of Walker & Webster Gulch to the planned 1,200-foot level of the Anchor shaft, which was only 600 feet deep at the time.
1885	In 1885 and 1886 ore was found at what would become the Black Diamond and Nemrod claims.	Farish.	Sometime prior to 1893, the Farish Shaft was sunk at the southeast corner of the Farish and McLaughlin West Ontario Consolidated Mining Group claims, adjacent to the west edge of the Black Diamond claim. A tunnel was also excavated, with its portal in the Nemrod claim (Gorlinski 1893).
1886	Work began on the new Anchor drain tunnel.		
1887	Work began on the new Ontario drain tunnel at a site three miles east of the Ontario, called Camp Florence.	Ontario.	The work was supervised by John Keetley.
1887	The first branch of the Mormon church was organized.		The LDS chapel was not built until 1897, and until then, meetings were held in other facilities.
1888	The unprofitable Sampson Mine was sold at a sheriff's sale. The new owners (controlled by A. Hanauer and N. Trewick) drove the Hanauer drain tunnel to the shaft's 400-foot level. The Hanauer drain tunnel was extended to the Crescent Company's ground to drain that operation as well.	Sampson.	The Sampson Mine had been unprofitable due to high water removal costs.
1888	A smallpox epidemic took many lives in Park City.		
1888	An outcrop of high-grade ore was discovered by James Drake and James Wellman near their diggings in Woodside Gulch, where they had been leasing and working some rather uninteresting claims.		
1889	The Woodside Mining Company was incorporated for $1,000,000 with E.P. Ferry as president, D.C. McLaughlin as vice president, and John J. Daly as one of the directors.	Woodside, Northpole, Mayflower, old Silver King.	This was a rich ore body in "Treasure Hill." Other claims in the area included the Northland (Andy Lundin), Jennie Lind, Northpole, Mayflower (Dodge and McGrath), and the Silver King group owned by them in partnership with John Farrish and Con McLaughlin. Its discovery prompted a rush of prospectors and miners, including Thomas Kearns, a Nevada acquaintance of David Keith, who was then the foreman of the Ontario Mine.
1888	The Comstock Company was organized. Its shaft was located at the head of Thaynes Canyon, near the Crescent Mine.	Comstock.	This was just a small operation. By 1900 its shaft was only down about 100 feet.
1889	Peter Boyce, Con Hunt, William Bennett, Thomas Kearns, and David Keith joined in leasing one of the Mayflower claims (the No. 7) from W.H. Dodge. A rich ore body was soon struck.	Mayflower, Northland.	The mine was soon entangled in litigation. Boyce, Bennett, and Hunt sold their interests to W.V. Rice, John Judge, and Albion Emery. The lawsuit was settled years later in the owner's (Dodge's) favor, but until then, the mine produced many large shipments of high-grade ore. Kearns became a millionaire. Al Emery's wife became a "silver queen." A lawsuit was filed by the owners of the adjoining Northland claim, involving encroachments into adjoining claims. Eventually, that lawsuit was settled in favor of the Mayflower lessees. Yet another lawsuit was brought by the Northland Company, which was settled in favor of Northland. Tempers ran high, prompting a shooting the following year.

Date	Mining-Related Events and Other Selected Events	Related Mines or Companies	Notes
1889	The Anchor Drain Tunnel was completed, making the Anchor Mine a viable operation. By 1892, the Anchor would be ranked along with the Ontario and the Daly as the area's largest producers. Before long, the Anchor would build its own mill and stop using the Union Mill in Empire Canyon.	Anchor (later known as the Daly-Judge), Union Mill.	The Anchor Drain Tunnel reached a point directly below the flooded shaft above it, and a bore hole was drilled, first partway down through the shaft and then up through the end of the tunnel. The remaining link was blasted to complete the hole to drain the shaft.
1889	Hanauer, Trewick, and John Daly began a deeper tunnel, called the Alliance.	Sampson, Alliance.	
1889	The Park City Light, Heat, and Power Company was organized. Service began later that year.		
1889	The Constellation Mine was started in a wooded gulch just above the Ontario Mill.	Constellation.	
1889	A rich ore vein was struck at the Creole Mine on Treasure Hill.	Creole.	The Creole Mine became an important producer in the district and continued so for many years.
1890	The Mayflower's lessees, at Thomas Kearns' direction, leased the adjacent Silver King claims (which didn't seem valuable to their owners) and Kearns followed the ore body into that property, where he had known it would go.	Mayflower, old Silver King.	
1890	The Alliance Drain Tunnel reached its goal and drained the Sampson ground and other nearby claims. The Sampson Mine could now be mined to greater depths and with high profitability. This tunnel is depicted by Gorlinski (1893) as the "Alliance Co. Tunnel," serving the Alliance Mining Company claims.	Sampson, Alliance, and others.	The Alliance Drain Tunnel, by draining the Crescent seam, produced water for Park City's domestic water supply, but in later years the Anchor Mine would take over as the city's water supplier.
1890	The Utah Central Railroad (formerly the Salt Lake & Eastern and the Salt Lake & Fort Douglas Railroads) completed their railroad line from Salt Lake City to Park City.		
1890	The Anchor Mine hoists and shops burned.	Anchor.	There were several other serious fires that year.
1891	The First National Bank was organized in Park City.		
1891	John Daly began to sink a new shaft, using the hoist and other equipment from the Ontario's No. 4 shaft, which was the old ventilation shaft at the mid point of the Ontario's 600-foot-level drain tunnel.	Daly.	The new shaft had works that connected to the Daly No. 1 shaft at the 800-foot level.
1892	Thomas Kearns and his fellow Mayflower lessees purchased the Silver King claims in accordance with the lease terms. Later that year, they purchased the adjoining Park City Mining Company, and the Silver King Mining Company was incorporated for $3,000,000.	Mayflower, Park City Mining Company, Silver King Mining Company.	The Silver King Mining Company had been organized during a period of falling silver prices that forced several mines to close down. The Silver King would follow later that year. When miners accepted a pay cut, the Silver King was able to reopen and earn enough profits to pay dividends.
1893	A national monetary panic struck. Most of the mines temporarily suspended operations. Notably, the Anchor mine kept operating and shipping ore.	Anchor (later known as the Daly-Judge).	
1894	A rich new ore body was struck at the Silver King at the 900-foot level.	Silver King.	Al Emery, one of the Silver King owners, died shortly afterwards, leaving his widow very wealthy. She would come to be known as Utah's "Silver Queen." However, Al Emery was just a poor bookkeeper when he began his involvement in the mine venture, and it was a matter of some speculation as to how he obtained the $8,000 with which he bought his way into the venture. There may have been some mysterious arrangement with R.C. Chambers, which almost came out in court, but Chambers denied any involvement at the last minute.

Date	Mining-Related Events and Other Selected Events	Related Mines or Companies	Notes
1894	The new Ontario Drain Tunnel No. 2 was completed, three miles in length and connecting to the Ontario No. 2 Shaft. This drained the Ontario No. 2 Shaft workings to the 1,500-foot level and allowed the Ontario works to go still deeper in search of silver. The same tunnel would be used to drain the Ontario Shaft No. 3 workings, as well as the Daly, Daly-West, and the American Flag mines.	Ontario, Daly, Daly-West, American Flag.	The Ontario Drain Tunnel No. 2 was also known as the East Drain Tunnel (Gorlinski 1893).
1896	Utah entered the Union on January 4, 1896		At this time, Park City's population was estimated at over 7,000. Thomas Kearns had been selected as a delegate to the Utah State Constitutional Convention and later became a U.S. senator.
1896	The Lincoln School was built in Park City as an elementary school.		
1896	The Daly-West Mining Company completed a new mill and hoisting plant.	Daly-West.	
1896	The Valeo Mine was organized. It was located in a gulch about a mile from the Glencoe and was shipping ore within a year.	Valeo.	
1896	A tremendous flow of water was struck in the Ontario at a 1,500-foot-level working, but the drain tunnel was able to handle the load.	Ontario.	Another flow was struck the following year that filled the flume in the drain tunnel and brought the water level a foot over the tracks.
1897	Silver King dividends exceeded the $1,000,000 mark, and a new mill was begun, including an aerial tramway to haul ore directly to the mill.	Silver King.	
1897	The Utah Central Railroad was purchased by the Rio Grande Western Railroad, which soon began converting the narrow-gauge line up Parley's Canyon to a standard-gauge line.		The first standard-gauge train entered Park City's station in 1900.
1897	The Daly-West mine cut into a major underground water flow, which prevented access to promising ore bodies until better pumps could be obtained. Organizational problems and conflicts of interest associated with R.C. Chambers' involvement in the mine led to the closing of the mine for two years.	Daly-West.	
1898	The Ontario Mine obtained a franchise for a power plant to compete with the city's power plant. It also contracted to build two wash houses in Chinatown.	Ontario Power Company.	
1898	The Spanish-American War began on April 23, 1898.		
1898	The Park City Fire of June 19,1898 burned down most of Park City.		The fire started in Harry Freeman's American Hotel, then was quickly spread by strong south winds. Most of the city's core and several adjoining neighborhoods were completely destroyed. No lives were lost, however, and the town and its residents embarked upon a rapid and massive rebuilding effort. By the end of the year, much of the town had been reconstructed. Most of the new construction was wood at first, but a number of brick or stone buildings would soon follow.
1899	Jacob and Simon Bamberger, of Salt Lake City, agreed to purchase the Hearst interests in the Daly-West Mining Company, and the mine was re-opened.	Daly-West.	
1899	A face of ore at the Naildriver claim was found by Jack Creen, who had taken over the previously barren mine from John Morey.	Naildriver.	

Date	Mining-Related Events and Other Selected Events	Related Mines or Companies	Notes
1899	Eight claims that were being leased by the Putnam Mining Company were incorporated as the Quincy Mining Company, with D.C. McLaughlin as president.	Putnam, Quincy.	The Quincy ground was located just up Empire Canyon from the Daly-West. Hoisting works were erected and a shaft was sunk to 110 feet, striking lead-silver carbonate high grade ore. Shipments by the end of the first year came to $725,000. In its first year, the Quincy took second place in production. The following year, it took the lead in production.
1899	The Ontario Mining Company started the new Aschiem store, with R.C. Chambers as the principal stockholder. That same year, the Ontario Power Company absorbed the Park City Heat, Light, & Power Company.	Ontario Power Company, Park City Heat, Light, & Power Company, Aschiem store.	
1900	John Daly combined his Jones-Bonanza mine in Bonanza Flat with adjoining claims owned by John Judge, forming the Daly-Judge.	Daly-Judge.	
1900	The Little Bell Mining Company was organized in 1900 from 25 claims located south of the Quincy Mine.	Little Bell.	
1900	The California Company was organized, with nine claims adjacent to the Comstock ground.	California.	
1900	A Union Pacific Railroad spur was completed to the Ontario Mill at the mouth of Ontario Canyon. This new loading facility was used by the Ontario Mill for shipping concentrate to smelters and may also have been used by John Daly's mining operations and other mines in the area.	Ontario Mill.	John Daly of the Daly-Judge Mine and R.C. Chambers of the Ontario Silver Mining Company were involved in planning the new spur line. The Union Pacific was soon moving 16 cars of ore per day. That same year, the Ontario's dividends passed the $14,000,000 figure, having shipped some 36,136 bars of silver bullion.
1901	The Thunderer group of claims in Empire Canyon was purchased by William Curtis and John Rhodin and consolidated at the American Flag Company.	Thunderer, American Flag.	High-grade gold and silver ore.
1901	The Silver King's new aerial tramway began hauling ore from the mine.	Silver King.	Under M..J. Daley as assistant manager, the Silver King made important new ore discoveries and the company exceeded $10,000,000 in dividends.
1901	The McHenry and Hawkeye mines in McHenry Canyon were combined as the Hawkeye-McHenry Company. The mines had not been worked for 17 years. Water was at the 323-foot level, near where it had been 17 years earlier.	Hawkeye-McHenry.	
1902	The Daly-West Mining Company purchased the Little Bell Mine, but allowed it to continue to operate as a separate company.	Daly-West, Little Bell.	The Little Bell shaft, which was started in 1901, was excavated to a depth of 753 feet. By this time, the company had been purchased by the Daly-West Mining Company. The shaft produced very little until lateral exploration in 1906 resulted in the striking of a rich body of lead ore. The Little Bell made some significant high-grade ore shipments in 1909-10.
1902	The Daly-Judge Mining Company acquired the Anchor Company, which had been experiencing financial difficulties for some time.	Daly-Judge, Anchor.	The hoist and steam plant at the Jones-Bonanza mine was moved to the Anchor. At this time, Daly's mines, the Daily-Judge (including the newly acquired Anchor), the Daly, and the Daly-West, were the district's richest, with the exception of the Ontario, which was still the leading mine.

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1902	An underground explosion at the Daly-West mine left 25 people dead at the Daly-West. Poisonous gases from the blast killed nine people at the Ontario mine.	Daly-West, Ontario.	The blast was probably caused by improper explosives handling at the Daly-West Mine. The incident led to improved safety regulations.
1902	The Naildriver Mining Company was incorporated by Jack Creen.	Naildriver	
1902	The Star Mining Company, or "Star Group," was organized. It was located just south of the Naildriver and headed by Jimmie Burns.		
1902	The Daly-West Mining Company and the Quincy Mining Company were consolidated. The Daly-West, Quincy, and Little Bell were now all under John J. Daly, although they functioned as separate companies.	Daly-West, Quincy, Little Bell.	The Daly-West Mining Company had brought suit against the Quincy Mining Company for taking ore from the Daly-West, with the Quincy filing a counter suit. Meanwhile, the Daly-West acquired the neighboring Little Bell Mining Company, whose mine connected to the Quincy between its 200 ft and 300 ft levels. A settlement was reached with 30,000 shares of Daly-West exchanged for the Quincy property. The consolidation of the Daly-West and Quincy companies resolved lawsuits between these entities. After the consolidation, the Quincy continued operations as before, until 1904, when it was operated through the Daly-West.
1902	The Ontario shaft was sunk to the 2,000-foot level, a new record for the district.	Ontario.	This depth was thought to be impossible at that time.
1903	The Diamond-Nemrod Company was formed in 1903 as a consolidation of the West Ontario Consolidated Mining Group and the Black Diamond and Nemrod claims.	Diamond-Nemrod.	The mine never produced significant amounts of ore, and very little of the Diamond-Nemrod operation remains today.
1903	The Daly-Judge Mill was constructed in lower Empire Canyon to process ore from the Daly-Judge Mine.	Daly-Judge Mill, Daly-Judge Mine.	The mill operated until 1931. Its machine shop was reopened for a while in 1952 by its owner, United Park City Mines Company.
1903	The Naildriver Mining Company began a new shaft higher on the mountain to connect to its tunnel.	Naildriver.	A new headframe, bunk houses, shops, and other buildings were constructed, and within a year, the mine was sending wagon loads of high-grade silver ore down Ontario Canyon.
1903	The California-Comstock Company was formed as a merger between the California and Comstock companies. It soon began regular shipments of high-grade ore and built a high-quality mill, as well as other substantial buildings and equipment.	California, Comstock.	
1904	The Daly-Judge Mine ordered an electric locomotive to replace horse-drawn ore trains, and the Daly-West began installing compressed-air-driven rock drills.	Daly-Judge, Daly West.	An attempt to introduce oil lamps was rejected by the miners, who staged a short walkout. The miners preferred to stay with their candles, despite certain safety advantages of the new lamps. The walkout was settled by allowing the miners to keep their candles.
1904	The hoist and engine house at the Ontario were destroyed by fire. The hoist and gallows from the Daly Company No. 2 shaft were moved to the Ontario for temporary use.	Ontario, Daly No. 2 shaft.	

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1905	A series of cave-ins blocked the Ontario Drain Tunnel No. 2, and water rose to the 1,200-foot level, 300 feet above the drain tunnel. The last large cave-in was cleared later that year, with one miner drowning in the flood of water. The tunnel was repaired up to the Ontario No. 2 Shaft, but it was still blocked past that point. The Ontario Shaft No. 3, the Daly, Daly-West, and the American Flag mines were still unable to be drained by the tunnel. It would not be opened for three years.	Ontario, Daly, Daly-West, American Flag.	Miners were laid off, and an assessment was made against the Ontario stock.
1905	The American Flag mine's best ore-producing sections that were located below the 600-foot level were flooded as the result of the cave-ins of the Ontario drain tunnel.	American Flag, Ontario drain tunnel.	At this time, the American Flag mine had what was described as the finest hoisting plant in the district. Most of their large amount of underground water was drained by the Ontario drain tunnel. Work continued on the lower-grade upper-level ore while the drain tunnel was being cleared.
1905	John Daly sold a stockpile of zinc to pay off a $300,000 debt owed by the company. This made Park City one of the first producers of zinc.	Daly-Judge Mill.	Zinc was previously thought to be more or less worthless, but John Daly thought that it might be worth something someday and stockpiled it as it was separated by the milling process.
1906	The Silver King Mining Company purchased E.P. Ferry's Woodside Company to make its ownership of Treasure Hill almost complete.	Silver King, Woodside.	
1906	The Creole Mine was consolidated with the Uintah Treasure Hill Mine.	Creole, Uintah Treasure Hill.	
1907	The Silver King Mining Company purchased James McGregor's St. Louis-Magnolia Mining Company, which included 56 claims over 486 acres, including the Pinion and Baltimore claims and associated workings. As a result, a new company was formed: the Silver King Coalition Mines Company (not to be confused with the Silver King Consolidated, known as the "King Con").	Silver King, St. Louis-Magnolia, Pinion, Baltimore, Silver King Company.	Kearns and Keith may have pushed the purchase to settle a lawsuit filed by the St. Louis-Magnolia Mining Company, as well as to increase their holdings. The Silver King Coalition Mines Company was soon producing more ore than the American Smelting and Refining Company could process. The Silver King Company would soon become the best-known mining company in the West.
1907	The Silver King Consolidated was incorporated, with Solon Spiro as president and Samuel Newhouse as vice president. The Silver King Consolidated owned land jointly with the Silver King Company.	Silver King Consolidated (known as the King Con), Silver King Company.	The Silver King Consolidated filed a lawsuit against the Silver King Company for mining ore in jointly owned ground without accounting for it. The suit was finally settled in 1913, when the King Con was awarded $900,000 in damages. Spiro used the money to help finance a drain tunnel he was building to drain his water-plagued King Con workings, but ran out of funds after tunneling 14,000 feet. He was forced to sell to Keith and Kearns of the Silver King Company, who struck a rich ore lode after tunneling only 40 more feet.
1907	Jesse Knight gained control of the Creole Mine and the Uintah Treasure Hill Mine, which had been merged the previous year, and filed a lawsuit against the Silver King Company owners. The Silver King Company settled out of court.	Creole, Uintah Treasure Hill, Silver King Company.	
1907	The Panic of 1907 hit the nation, tolling the death knell for many mining camps, but Park City weathered the crisis, despite other difficulties related to the cave-ins of the Ontario drain tunnel.		One reason that Park City weathered this crisis better than many other mining camps was the refusal of most of the local banks and merchants to accept company scrip. The general policy in the area was to use "hard money" instead of scrip.

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1908	The rest of the Ontario Drain Tunnel No. 2 was cleared, and the Ontario Shaft No. 3, the Daly, Daly-West, and the American Flag mines could finally be drained by the tunnel.	Daly, Daly-West, American Flag, Ontario.	This event was a kind of economic turning point for Park City. The combination of the Park City fire, the financial Panic of 1907, and the cave-ins of the Ontario drain tunnel caused a significant depression in Park City during this period. When the Ontario Drain Tunnel was finally cleared, it was cause for a great celebration in Park City, since it brought production levels back up in several mines and put many miners back to work.
1908	The Keystone Mine sued the Silver King Company for removing ore under their claim.	Keystone, Silver King Company.	The Keystone ground was on the west slope of Pinyon Ridge, near the California and Comstock shafts that were being sunk.
1909	The American Flag Company acquired the Constellation Company. This acquisition brought the American Flag's surface holdings to 360 acres.	American Flag, Constellation.	
1909	The Silver King Company, which now controlled the Alliance Drain Tunnel, donated a site for a water reservoir and promised a steady supply of water from the Alliance Tunnel.	Silver King Company, Alliance.	
1910	The Daly-Judge owners began the Snake Creek drain tunnel to drain the Daly-Judge and the Daly-West mines. This tunnel would be three miles long and would drain the underground "lake" that plagued the Daly-Judge and Daly-West mines, although it would not connect directly to their shafts.	Daly-Judge, Daly-West, Snake Creek.	After some difficulties in construction, the work was contracted to the Taylor Free Company, which soon went bankrupt. The job was taken over by J.A. McIlwee & Company, who gave up after a huge water flow was struck. The next contractor was the Williams Leasing Company, followed again by McIlwee & Company. Finally, in 1916, the tunnel reached its planned length and drained the water body at the rate of 8,600 gallons per minute.
1900-1910	Newspaper accounts suggest that a large number of miners still lived at or near the mines during this period.		An account of mine-provided Thanksgiving dinners one year indicated that the Daly-West served 205 dinners, the Silver King served 150, the Ontario served 100, the Quincy served 100, the California and Comstock served 70, and the Little Bell served 40. This is not necessarily a direct indication of the number of miners and their families living at or near the mines, since a number of employees who lived in town may have also attended the dinner, but it provides insight into food-handling capabilities at the mines and suggests that a fair number of workers still lived on-site at that time.
1912	Silver King Company dividends of $14,000,000 equaled those paid out by the Ontario.	Silver King Company, Ontario.	
1913	The Silver King Company began work on a huge underground station, to be called Silver Hill Station. The station included a gallows frame, hoists, motor-generator plants, skip pockets, and other equipment normally found in a surface plant. It was built at the 500-foot level, and connected to the Alliance Drain Tunnel.	Silver King Company.	
1913	The Daly-West mill and hoisting works were destroyed by fire. The damaged facilities would be replaced and operating within a year.	Daly-West.	
1914	Metal prices began to rise slowly, probably due to the war in Europe.		More mining-related jobs were generated and business generally improved.

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1916	The Daly-Judge Mining Company became the Judge Mining and Smelting Company, sending its ore to a new electrolytic smelter that the company had built in Deer Valley. The new company was under the direction of Otto Hanke as president, M.C. Fox as vice president, and George Lambourne as manager.	Daly-Judge, Judge Mining and Smelting Company.	
1916	The Silver King Company mine was electrified.	Silver King Company.	
1916	The Snake Creek drain tunnel was completed to drain the water body that affected the Daly-Judge and Daly-West mines. This project was started in 1910.	Daly-Judge, Daly-West, Snake Creek.	The drain tunnel was successful. It allowed the deeper areas of the Daly-Judge and Daly-West mines to be worked profitably.
1917	The Three Kings Company, located on Treasure Hill, hit a rich strike.	Three Kings.	
1917	Registration for the draft for WWI began.		
1917	Prohibition began in Utah.		
1917	The Park Utah Mining Company, located at the end of McHenry Canyon, was formed.	Park Utah.	
1917	By this time, the Revelator Mine, known as John the Revelator, located just beyond Bonanza Flat and Boulder Basin, was shipping high-grade silver-lead ore.	Revelator.	
1918	George Lambourne took control of the Daly-West Mining Company and became president of the Judge Mining and Smelting Company.	Daly-West, Judge Mining and Smelting Company.	
1918	An influenza epidemic struck Park City.		The epidemic was less severe in Park City than in most other locations, although nine people died.
1918	The war in Europe ended in November, 1918.		After the war ended, metal prices began to decline and the mining companies made cuts as necessary to keep the miners working.
1919	A strike was called by the miner's union to raise wages to $5.50 per day and cut the work day to six hours. By April, 1919, all the mines were closed due to the strike.		The Judge Mining and Smelting Company provided food to their employees at low cost to help them through the strike.
1919	The Walsh-Putnam Act was passed, which raised silver prices.		Prior to the passage of the Wash-Putnam act, the price of silver had slumped, due in part to the establishment of the gold standard for U.S. currency. Many small mines had been forced to close, and even larger operations had been forced to make cutbacks. This act raised the price of silver to $1.00 per ounce, rejuvenating the area to the point where there was a shortage of miners to fill the number of open positions. Closed mines opened, and open mines expanded their production. Even low-grade waste dumps were shipped for processing.
1919	George Lambourne became president of the Park Utah Mining Company, which was doing well as the result of several good strikes and a modern surface plant.	Park Utah.	
1920	The Judge Mining and Smelting Company and the Silver King Company opened their own stores, where miners could purchase items on credit.	Judge Mining and Smelting Company, Silver King Company.	

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1920	A longstanding suit between the Keystone Mine and the Silver King Company was settled in favor of the Keystone Mine.	Keystone, Silver King Company.	
1920	George Lambourne took control of the old Daly Mining Company.	Daly Mining Company	
1921	A longstanding suit between Col. Nickolas Trewick of the Conklin claim and the Silver King Company was settled in favor of the Silver King Company. The suit was filed in 1908.	Conklin, Silver King Company.	The suit was decided in the U.S. Supreme Court and set a precedent that left the Silver King Company free of lawsuits and the undisputed "King" of Treasure Hill.
1921	The Park Utah Mining Company paid its first dividend and was shipping 200 tons of ore per day. A new mining camp, called Keetley, had grown up where Camp Florence had been, at the end of the Ontario drain tunnel.	Park Utah, Keetley, Ontario drain tunnel.	Keetley had homes, offices, a recreation hall, and a Union Pacific Railroad spur.
1922	The Utah Ski Club began ski jumping on Treasure Hill.		This was a period during which ski activities started becoming more organized. It was a sign of things to come. By the late 1930s, the area had begun to attract professional skiers to events such as the ski jump at Ecker Hill north of Snyderville.
1922	The Daly Mining Company, Daly-West Mining Company, and Judge Mining and Smelting Company (the old Daly-Judge) were combined into one company, the Park City Mining and Smelting Company, with George Lambourne as president, treasurer, and managing director. M.C. Fox was vice president, O.N. Friendly was mine manager, and George Kreuger was superintendent.	Daly, Daly-West, Judge Mining and Smelting Company (Daly-Judge), Park City Mining and Smelting Company.	
1925	The Park Utah Company merged with the Park City Mining and Smelting Company and the pioneer Ontario Silver Mining Company, to become the Park Utah Consolidated Mining Company. George Lambourne was president and general manager. E.C. Fox, Charles Lange, and Adolph Hanke were directors. Oscar Friendly, J.W. Stoner, E.A. Hewitt, and Leonard Wilson were mining engineers. H.R. Wallace and George Kreuger were superintendents and foremen.	Park Utah, Park City Mining and Smelting Company, Ontario Silver Mining Company, Park Utah Consolidated Mining Company.	A huge ore deposit was discovered at the 800-foot level and the stock soared.
1926	The Park Galena Company was started on ground adjoining the Glen Allen, which had been put up for sale the same year to satisfy debts.	Park Galena, Glen Allen.	The Park Galena reported good finds the following year and erected a small concentrating mill.
1926	Charles Moore and John D. Fisher located claims in the canyon above the Park Galena and formed the Star of Utah Mining Company.	Star of Utah.	
1927	The New Quincy Company began shipping ore.	New Quincy.	
1928	A new Park City high school was completed.		
1928	Charles Moore purchased the Park Bingham property	Park Bingham.	
1928	The Park Utah Consolidated Mining Company became the nation's largest silver producer for the year of 1928.	Park Utah Consolidated Mining Company.	The late 1920s were prosperous years for Park City mining operations.
1929	The Keystone Mine reopened after a long shutdown.	Keystone.	

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1929	The Star of Utah Company and the Park Bingham properties were merged as the Mayflower Mines Corporation.	Star of Utah, Park Bingham, Mayflower Mines.	
1929	The Wall Street stock market crashed on Black Friday.		Although metal prices and stock values dropped, most Park City mines kept working for the time being. Mines cut workers' pay by 50 cents per day.
1930	Silver prices had dropped to 38 cents per ounce, compared with a high of $1.12 per ounce in 1919.		The mines cut workers' pay by another 25 cents per day. Some smaller companies began to close down.
1932	The larger mines were still operating, but the number of needy and unemployed gradually rose in Park City.		
1932	Roosevelt was elected President of the U.S. Prohibition was repealed.		
1932	The Mayflower Mines Corporation merged with the Park Galena Mining Company to form the New Park Mining Company. The president was Charles Moore. T.L. Walden, Fraser Buck, R.C. Wilson, Clark Wilson, Robert Cranmer, and W.H.H. Cranmer were directors. J.F. Featherstone was secretary and treasurer.	Mayflower Mines, Park Galena, New Park Mining Company.	The New Park was one of just a handful of mines in the district that produced significant quantities of gold ore.
1933	Metal prices began to rise and some of the closed mines were reopened, including the old Flagstaff Mine.	Flagstaff.	
1933	Local 99 of the Mine, Mill, & Smelter Workers union was organized. It proposed a more militant stand on wage and hours issues.		
1934	WPA projects provided relief to over 200 unemployed Park City miners.		
1935	Silver prices rose to 65 cents per ounce and gold climbed to $35 per ounce. More mines reopened, including the old Naildriver. The Park Con Mine opened, and a new shaft, known as the Thayne's shaft, was begun by the Silver King Company near the head of Thayne's Canyon just below the old California-Comstock Mine.	Naildriver, Park Con, Thayne's shaft (Silver King Company).	
1935	The Park Con Company told its workers they would be put on a seven-day work week, which triggered an immediate objection from the MM&SW union.	Park Consolidated Mining Company.	
1936	The Silver King Company would not agree to a "closed shop" or to time-and-a-half pay for overtime work. Negotiations failed, and some 1,000 miners walked off their jobs at the Silver King Company, Park Utah, Park Con, New Park, and several other smaller mines. By October, Park City business was down by 50%, and many miners wanted to return to work, but the union still demanded a 50-cent daily pay increase and an eight-hour work day. "Valley men" (men who worked in the Park City mines but lived in other communities) were going to accept the mines' offer of a 25-cent increase. Fights broke out between striking miners and the valley men, with the valley men backing off and leaving town. In December, a settlement was reached.	Silver King Company, Park Utah Company, Park Consolidated Mining Company, and other companies.	This strike spread to most other Utah mining camps, taking over 2,500 workers off their jobs.

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1936	The D&RGW Railroad ran a special train from Salt Lake City to carry skiers to the slopes just above the Park Con Mine in Deer Valley. The project was repeated the following year, with an additional train from Ogden.		
1938	President Roosevelt ordered a silver price cut from 77 cents down to 64 cents per ounce. This forced the Silver King Company to cut its work force by 150 men. The Park Utah Company announced a similar cut. In April, the Silver King Company shut down its operations indefinitely, and other mines followed suit.	Silver King Company, Park Utah Company, and other mining companies.	This prompted the miner's union to renew its demand for a six-hour work day, claiming that the reduced hours would help put men to work and improve conditions. A tentative contract was rejected by the workers.
1938	The government agreed to return the silver price to 77 cents per ounce. This, coupled with a temporary agreement with the miner's union, prompted the mines to resume operations on a limited scale.		
1938	Camp Cloud Rim, a WPA-built Girl Scout camp on Bonanza Flat was dedicated. It was built on 15 acres donated by the Park Utah Mining Company.		
1938	The Park City Mining Company, originally located as the Liberty Mine in lower McHenry Canyon, announced that it would reopen the old Wasatch Tunnel on Bald Mountain and sink a new incline to connect to the Star of Utah workings. A cave-in trapped eight miners, but they were rescued.	Park City Mining Company, Liberty Mine, Wasatch Tunnel, Star of Utah.	Ore from the Wasatch Tunnel was hauled by truck to the Judge Loading Station.
1938	The Park Utah Mining Company began using a submersible pump to raise water to the 900-foot level for draining the lower workings.	Park Utah Company.	
1939	Ski jumping at Ecker Hill drew crowds of over 5,000.		
1939	The miner's union accepted a 25-cent raise, with the provision that wages could be cut if the metal prices fell again, which is what happened in May, prompting the announcement of a strike. However, metal prices rose again before the strike began and a two-year contract was signed.		This marked the end of four years of frequent strikes, shut-downs, and high unemployment. The mines were getting their production levels back up and the local economy was getting back to normal.
1940	In October, registration began for the draft, in anticipation of war in Europe.		
1941	On December 7, Congress declared war. Much of the abandoned metal mining equipment in the area was shipped as scrap metal for the war effort. Demand for metal was high, but Park City mining stock plummeted in value. A shortage of miners was a factor, with many of the younger miners being called away to war. Before long, some draftees were returned to the mining camps, where their labor was needed. However, their skills were not often well matched to the needs of metal mining.		Production levels in the Park City mines during WWII never reached pre-war levels, due largely to the labor shortage and the lower skill levels of the wartime labor force.
1943	The Ontario Mine drained its long-flooded lower levels to get to their substantial zinc deposits. The mine would soon become a major producer of zinc.	Ontario.	
1944	A major water flow was struck in the Silver King Company's west-end shaft below the 1,900-foot level. The pumps could not handle the flow, and all mining in that area was closed.	Silver King Company.	
1945	On August 14, WWII officially ended.		

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1946	Park City's first ski lift was built in Deer Valley by Otto Carpenter and Bob Burns. This was to be called the Snow Park ski area.		
1946	The D&RGW Railroad and its predecessor, the Utah Central, had served Park City for over 50 years, but in 1946 the D&RGW abandoned its Parley's Canyon route due to lack of freight business and losing passenger business to the bus lines.		
1946	The Newmont Mining Company began operation of the East Utah Mine near the New Park Mine, but abandoned the operation three years later, after not fining any significant ore bodies.	Newmont Mining Company, East Utah Mine.	
1947	The Park City Consolidated Mine had been an active mine from 1929 to 1939, when it had shut down. In 1947, it was supposedly about to reopen, but contrary to rumors and a dividend paid by the company, the mine failed to reopen.	Park City Consolidated Mine.	
1949	A contract between the MM&SW union and the Park City mines was not renewed. This resulted in the loss of some 800 jobs and the closing of mines in the Park City area. Soon after the mines closed, the union membership severed ties with the MM&SW union and became affiliated with the Progressive Metalworkers union. A separate agreement was reached with the New Park Mine, which restarted operations. The other mines remained closed. Then the union membership voted to leave the Progressive Metalworkers union and join the United Steelworkers of America. Many of the Park City mines remained shut down.		There may have been political issues as well as labor cost and metal price issues involved in the failure to renew the contract. Certain figures in government, in their post-war frenzy to hunt down communists, had branded the MM&SW union as a communist-led organization.
1950-1956	Metal prices dropped again and again. The few mines that were still running were operating in the red. Only a few large companies remained.		
1953	The Silver King Company (the Silver King Coalition Mines Company) joined the Park Utah Consolidated Mining Company (including the Park Utah, Ontario, Daly, Daly-West, Daly-Judge, etc.) to form the United Park City Mines Company. Now all of the Park City mining companies, except the New Park Company, were under the same management. The United Park City Mines Company would continue mining operations at a scaled-down level.	Silver King Company, Park Utah Consolidated Mining Company, United Park City Mines Company, New Park Mining Company.	This reduced overhead expenses and allowed undeveloped ground between these mining operations to be mined. The merger resulted in the closing of the Silver King shaft and mill. The shops at the Judge Mine and the hoist at the Daly-West Mine became the operating surface plants. The Park Utah tunnel became the main access and haulage route. New discoveries were made, including a good find on the 1,900-foot level of the Daly-West workings.
1956	An ore body containing 45 ounces of gold per ton was discovered by the independent New Park Mining Company. Despite the presence of high-grade ore, the New Park could not contend with the low metal prices prevalent in the market, and it eventually closed down its Park City mining operations. However, the mine was soon reopened in an unusual arrangement in which the company miners leased the mine from the New Park Mining Company.	New Park Mining Company.	

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1956	Summit Park, a residential development, was started at Parley's Summit.		Despite the fact that Park City's mining operations had been sharply curtailed and that Park City was rapidly losing population and approaching "ghost town" status, Summit Park represented the beginning of an influx of people who were interested in the mountain-living lifestyle of Summit County. People from out of town also began buying and fixing up a few of the empty homes in Park City.
1959	Early plans were being laid by the citizens of Park City to develop its potential as a recreational destination. The Guardsman Pass road between Park City and Brighton was also built this year. Metal prices also began to rise again, and the United Park City Mines Company began advertising for miners. UPCM also began sinking a new incline shaft from the Ontario Mine's 1,800-foot level. New ore discoveries were being made, and no significant new water problems were encountered.	United Park City Mines Company, Ontario.	The New Park Mining Company continued to operate their mine successfully during this period. Workings were sunk below the 2,000-foot level.
1961	Charles Steen, the kingpin of Utah's uranium mining industry, acquired a large portion of the New Park Mining Company stock and became its executive vice president, becoming president of the company the following year. The Hecla Mining Company was contracted to take over the operations of the mine and build a new mill, the first one in many years in Park City. However, the mine did not weather the change in management, and the operation was eventually shut down. Its abandoned equipment was finally sold at auction in 1972.	New Park Mining Company, Hecla Mining Company.	Waste tailings from the mill were pumped back into the mines to fill worked areas and eliminate much of the need for timbering while eliminating waste dumps on the surface. At this time, Park City's economy had rebounded to some degree from its lowest point in 1957 and could still claim title to being the greatest hard-rock mining camp in the state.
1961	The United Park City Mines Company announced the formation of the subsidiary Park City Land and Development Company.		This was the result of an earlier stockholders meeting, in 1959, in which a proposal was made to turn over all of United Park City Mines Company's surface rights to the new company to develop a year-around vacation and recreation complex.
1962	The Park City Land and Development Company applied for a Federal "Area Redevelopment Administration" loan to begin their long-term recreational development plans. The loan was approved and United Park City Mines Company added more money and 10,000 acres of scenic property to the development effort.		Simultaneous improvements were made by Park City to its streets and other facilities.
1962	The new Park City ski complex was started, with investments from the United Park City Mines Company, the Park City Land Development Company, the American Smelting and Refining Company, and the Anaconda Copper Company, plus proceeds from a 10-year bond sale. The complex would soon bring in large numbers of skiers and ancillary services, providing a huge lift to the local economy.		
1971	United Park City Mines Company leased its mining operations to Park City Ventures, a partnership between Anaconda Copper Company and the American Smelting and Refining Company. Park City Ventures invested over $30,000,000 in the new operation, including the modernization of the old Ontario workings, but in 1978 its closure was announced.	Park City Ventures, United Park City Mines Company, Ontario.	

Date	Mining-Related Events and Other Selected Events	Related Mines or Companies	Notes
1978	In 1978, the Ontario workings were closed by Park City Ventures, and operations were to be taken over by the Noranda Mining Company of Canada.	Ontario, Park City Ventures, Noranda.	
1982	The Noranda Mining Company ceased operations at the old Ontario No. 3 Shaft works.	Ontario, Noranda.	With the failure of Noranda's efforts to keep the mines operating, Park City was without a single working mine for the first time in its history. Today, the workings are still quiet, with the exception of United Park City Mines maintenance crews, who still use the Ontario Shaft No. 3 to access and maintain certain drain tunnels as a water source for Park City's potable water system and for the Jordanelle Water Conservancy District.
1999	The Silver Mine Adventure was closed in 1999. At the time of this writing, most of the exhibits were still in place, waiting for a decision as to their disposition.	Silver Mine Adventure	The United Park City Mines Company had opened the Silver Mine Adventure as a museum and tourist attraction. Besides the museum displays of historic mining activities, the facility featured tours of a portion of the underground workings.

PREHISTORIC CONTEXT

Beginning with Paleo-Indian cultures, Utah has a rich and varied archaeological record that spans over 12,000 years. However, early human occupation in high-altitude environments such as those that comprise much of the Park City area was rather limited, beginning with the seasonal occupations of Archaic peoples who extended their landscape usage into highland areas during the late spring, summer, and early fall, when these areas were relatively free of snow and certain floral and faunal resources were accessible.

Archaic Period

The Archaic period is generally characterized by an adaptive radiance across the landscape, accompanied by an increasing reliance upon plant resources. Schroedl (1976) has defined four phases for the Archaic period, each of which is distinguished from the others by technological remains, subsistence strategies, and environmental change. The Black Knoll phase lasted from ca. 8300 to 6200 years B.P. Black Knoll phase sites are characterized by Pinto projectile points and what is interpreted as an elevational dichotomy in food procurement: larger game was hunted at higher elevations, while wild plants were gathered at lower elevations. The subsequent Castle Valley phase (ca. 6200-4500 B.P.) is represented archaeologically by the presence of Rocker, Hawken, Sudden Side-Notched, and Humboldt and McKean projectile point styles. Slab-lined fire pits and the increasing reliance upon grasses and forbs are also characteristic of this phase (Black and Metcalf 1985). The Green River phase (ca. 4500-3300 B.P.) is marked by the presence of Gypsum and San Rafael/Mallory Side-Notched projectile points, split-twig figurines, and an increase in the dietary importance of amaranth and bighorn sheep (Black and Metcalf 1985). The Dirty Devil phase (ca. 3300-1500 B.P.) is characterized by increased sedentism and by the introduction of corn and the bow and arrow (Schroedl 1976). Madsen (1982) and others refer to this time frame as the Late Archaic period (3500-2000 B.P.), with the subsequent Formative period overlapping (1600 to 650 B.P.).

Formative Period

The Fremont culture (A.D. 500 to A.D. 1250), which Jennings (1978) sees as an outgrowth of the earlier Desert Archaic, subjected to heavy influence from the early Pueblo culture of the Southwest, was centered in what is now the state of Utah. Basic Fremont traits include use of the bow-and-arrow, pithouses, good quality grayware ceramics, horticulture, and villages composed of as few as three dwellings and associated storage facilities (Jennings 1978; Marwitt 1970). It has been said that the Fremont were adaptable enough to live in many different environmental settings and that their subsistence strategies seem to have ranged from full-time settled farmers to full-time mobile hunter-gatherers, including everything in-between (Madsen 1982). The Formative period is characterized by a shift from hunting and gathering towards maize horticulture.

Ethnohistoric Period

Historically native peoples have been documented throughout the Wasatch area. Other than sporadic visits by the Spanish and perhaps a few early trappers, Western or European peoples did not enter the Wasatch area until the 1840s, at which time native peoples were observed. The arrival of Mormon immigrants in 1847 led to the establishment of colonies throughout the Wasatch area, which was then occupied by the Ute and Western Shoshone. Today, the Ute live on three reservations established during the mid-1800s: The Uintah and Ouray Indian Reservation in eastern Utah, and the Southern Ute and the Ute Mountain Ute Indian reservations in western Colorado. The Western Shoshone live on several small reservations and colonies throughout California, Nevada, and Utah (Thomas et al. 1986).

GEOLOGICAL CONTEXT

This section provides a general technical overview of the geology of the Park City Mining District and the characteristics of its ore deposits. This information is excerpted from Rockwell, et al. (1999), including references to other sources.

The Park City mining district is situated near the intersection of the north-trending Wasatch Range and the west-trending Uinta arch. Intermediate-composition Tertiary stocks have intruded a 3,000-meter-thick sequence of Precambrian, Paleozoic, and Mesozoic sedimentary rocks. These stocks intruded along an east-trending linear zone aligned with the Bingham Canyon deposit in the Oquirrh Mountains 50 km to the west. The Tertiary stocks are porphyries with phenocrysts of plagioclase, hornblende, biotite and pyroxene, with lithologies ranging from quartz granodiorites to monzonites and latites (Erickson et al. 1968). The sedimentary formations include limestone, dolomite, sandstone, siltstone, and argillite, and were folded and thrust faulted during the Cretaceous Sevier orogeny. The district is centered on one of these folds, the north-trending Park City anticline.

The Oligocene Keetley volcanic sequence overlies the folded sedimentary rocks in the eastern part of the study area near the Jordanelle Reservoir. Stocks in the Park City district may represent source vents for these younger volcanic rocks. Erosion has removed the Keetley volcanic rocks from the main part of the district. Tertiary high-angle faults cut the sedimentary and volcanic rocks and form an ENE-trending zone along which the ore deposits are localized. These northwards-dipping fault zones are often characterized by breccias, slickensides, and abundant iron oxides and hydroxides.

Park City is an epigenetic polymetallic deposit formed at high temperatures (200°-300° C) during and immediately after intrusion of the stocks at about 33-36 Ma (Bromfield, 1989). The ore occurs as fissure veins in both igneous and sedimentary rocks and as stratabound, manto-type replacement deposits in favorable carbonate units along fault fissures which cut the porphyritic stocks. Although the ore deposits are spatially associated with the intrusions, most mineralization is believed to postdate the intrusive events. Metal production data for the Park City district includes (through 1982): gold (1.5 million ounces), silver (253 million ounces), copper (129 million pounds), lead (2.7 billion pounds), and zinc (1.5 billion pounds). The bonanza-grade oxidized lead-silver ores discovered by early prospectors (and long ago mined out) contained cerussite, anglesite, iron oxides, argentite, azurite, malachite, and chrysocolla (Koschmann et al. 1968). The main sulfide ore minerals are galena, sphalerite and pyrite, with tetrahedrite-tennantite, chalcopyrite, enargite, and other Pb/Cu/Sb sulfosalts. Principal gangue minerals are quartz and calcite, with less abundant hematite, chlorite, rhodochrosite and anhydrite.

Large exposures of bleached, iron-stained gossans are not abundant in the district. Contact metamorphism near the Clayton Peak Stock has created marbleized limestones and hornfels/argillite from shales. These rocks crop out along the east-trending ridge near Jupiter Hill (Bromfield 1989). Also present in altered carbonate units near the stocks are specular hematite, epidote, and calc-silicate minerals (skarns).

Propylitic alteration of the stocks is present in the eastern part of the district in the hills to the west of the Jordanelle Reservoir. Mild propylitic alteration consists of aggregates of chlorite, iron oxides, and calcite after biotite and hornblende. More intense alteration has produced calcite from plagioclase and epidote from both feldspars and mafic minerals. The Clayton Peak and Pine Creek stocks are relatively unaltered. Intense silicification, sericitization and pyritization (QSP alteration), and formation of hydrothermal phlogopitic biotite, is limited to a small area in the eastern part of the district along the strike of the Mayflower/Pearl vein/fault system.

TECHNOLOGICAL CONTEXT

Mining Property Types

For the purpose of this study, a mining "property" can refer to a spatially isolated individual feature or to a spatially grouped set of related features. It is not meant to suggest the scale or the functions of a set of features. As such, it could be considered a term of convenience from a property management standpoint. For example, a mining property could be a mine site with its associated rail bed, ore bin, power plant, etc., all grouped more or less together. Or it could be a smelter with its associated adjacent features. Or it could be an isolated ore bin that stands alone, located miles from the mine entrance.

A mining "property type" can also refer to an isolated feature or a grouped set of features, but it also provides information about the function of the property. For example, one property type might be a "prospect" representing the least developed end of the mining spectrum, although another might be a "mine" such as the Ontario mine with its numerous features. As another example, a "mill" might be the Ontario mill, which stood apart from the diggings farther up Ontario Canyon, and could be considered a separate "property" from the Ontario mine. In a case such as the Daly-West mine, where the mill is adjacent to the mine itself, the mill could be considered a feature of the complete "mining and milling operation."

Basic Property Types

For this report, mining property types are broken down into five functional categories: prospecting, extraction, maintenance, beneficiation, and refining, as outlined here in the context of metal mining. Most, but not necessarily all of these property types are found in the Park City area.

Prospecting activities involve the search for significant ore deposits. These activities are exploratory in nature and are characterized by test excavations of various types, including pits, trenches, shafts, adits (tunnels opening to the surface), drill holes, blasted rock faces, etc. It should be mentioned that many exposed ore bodies have been located by exploration alone, without excavation.

Extraction activities involve the process of accessing and removing valuable ores from the earth's crust, and are characterized by a variety of equipment, including headframes, hoists, shafts, adits, ventilation systems, pumps, water drainage systems, electrical power plants and systems, compressed air plants and systems, steam power plants and systems, ore bins, tipples, machine shops, blacksmith shops, administrative offices, assay laboratories, worker housing, ore cart runways, railroads, roads, tramways, and a host of other features. This process often involves removing a good deal of waste rock that covers or separates ore bodies, and includes any equipment, facilities, or other features involved with removing, transporting, dumping, or processing waste rock.

Maintenance activities involve any activity related to normal maintenance of mine or mill workings. This may entail such activities as replacing rotted timbers, repairing ventilation systems, updating equipment and facilities, improving safety features, etc.

Beneficiation activities involve separating the desired minerals or metals from ore, concentrating them, and further separating metallic elements from others with which they were combined. The basic beneficiation processes include milling, concentrating, and smelting. After beneficiation, the metals are ready for further refining. Smelters and refining facilities were typically located at some distance from the mines, and often in different counties or states. In some cases, ore or concentrate has been (and sometimes still is) shipped overseas for processing. Property types associated with beneficiation are characterized by mills, concentrators, smelters, and related equipment, facilities, and transportation networks.

Refining activities involve the process of purifying metals to a point where they are ready to be made into their final end products or combined with other metals to make alloys. Property types associated with refining generally are characterized by the refineries themselves, as well as any directly associated equipment or facilities. Some researchers consider refineries as part of the beneficiation process, but because many refineries are not directly associated with mills or smelters, and because some refining processes may be unique to a particular end use, refining activities are listed separately.

Other Property Types

Other property types include engineer-designed complexes, mining landscapes, and related property types that are not directly related to prospecting, extraction, maintenance, beneficiation, or refining. Some, but not necessarily all of these property types may be found in the Park City area.

Engineer-Designed Complexes are a property type characterized by a number of properties or features that were designed specifically to work together in a compatible and efficient manner. An example might be a mine with its own engineer-designed mill and smelter and an integral transportation system connecting them all. Such complexes are more typical of larger, established mining operations that wanted to control as many aspects as possible of the mining process. The idea of a "complex" can be misleading, however, since it was not always practical or possible to have all of the components adjacent to one another. For example, a mill or smelter might be located at a considerable distance from the mine itself, or worker housing might be placed closer to a town, etc.

Mining Landscapes are a property type characterized by the tangible effects of mining operations on the physical nature of the landscape. This shaping of the landscape can result from a wide range of mining-related activities, such as water damage from placer mining, buildup of waste rock dumps or tailings ponds, cut-and-fill for railroad grades or roads, open pit mining operations, leveling or recontouring ground for equipment staging or building construction, recontouring operations after ore bodies have been removed or mines permanently closed, etc.

Related Properties are those properties that may not have been directly involved in mining operations, but which naturally accompany mining development. Towns and villages that grow up in a mining-based local economy might best exemplify a related property type.

Other Considerations

Mining sites are industrial sites and can, like farms and ranches, be considered production features of the landscape. Mining operations can range from technologically simple to highly complex. The material remains of mining-related activities might be nothing more than the vestiges of a single prospect hole or could encompass a myriad of features extending across miles of landscape. Thus the determination of what constitutes a "property" versus a "feature" of a property can be a difficult question.

For example, a typical prospect or a small-scale mining operation might leave only a collapsed or filled shaft, a waste dump, a trail or narrow road, and a few pieces of discarded trash, all of which could be very restricted in area and represent only a short temporal duration. Larger mining operations often leave a complex and rich set of remains, such as the remnants of ore mills, transportation systems, support facilities, miner housing, power houses, and other facilities and systems.

It is worth noting, however, that "typical" is a word that does not always apply in a mining-related context. Sometimes, more features may remain from a small, forgotten mine than from a large operation, depending on subsequent events. For example, after the ore played out in a large operation, equipment and other structures were often removed and put into service at some other location, since larger companies usually had the necessary equipment and labor to move these items, not to mention the fact that larger operations could often afford better quality equipment and facilities that warranted the extra effort to move them. A smaller operation might be operating on a shoestring budget, with older and less valuable equipment, and if the ore played out or if the company went bust, the equipment might just be left where it was. Or, as another example, the activities of a subsequent operation might totally obliterate all traces of an earlier operation at the same location. So, there may be a "tendency" for larger operations to leave more material evidence of their activities, but there are also many exceptions, as in the above examples. Another tendency would be for older sites to leave fewer remains than newer sites, but again, there are always exceptions to this rule of thumb, usually linked to economic factors.

A mining claim is a conventional unit of area, whose boundaries are registered in the mining district and recognized by all applicable governmental bodies, and, hopefully, by all contemporary prospectors and miners. If a claim had development potential, the claimants would typically attempt to expand the boundaries of their holdings, either by filing claims on adjacent or nearby ground or by buying up additional existing claims. The consolidation of claims was a nearly constant process in most mining districts. To "patent" the claim, which gave the claimants title to the ground and its mineral content, the claimants had to "prove up" the claim by "working" their claim to the degree required by law.

Mines generally underwent significant changes over the years, some being abandoned and others expanding their holdings or being incorporated and transformed into another mine. Such was the process in the Park City area. As rich ore deposits were hit, capital flooded in, and mine development took off. Mining companies sprang up, changed hands, merged with other companies, or went bust at an amazing rate. Over time, the holdings and associated area of a mine could change dramatically—growing, shrinking, or disappearing with the vagaries of investing, deal-making, and metal prices, as well as the size and quality of the ore bodies they were tapping.

As mentioned, subsequent mining-related operations could alter earlier features to widely varying degrees, ranging from total obliteration of earlier features to simply adding to what was already there. This factor can present a major stumbling block when trying to trace the history of a mining-related property from its physical remains. Archaeological investigation can often provide evidence of earlier phases in a property's development, since smaller and less valuable structures, materials, equipment, and other minor features tend to be ignored, discarded, or overlooked when changes are made by subsequent mining-related operations.

Mining camps located in areas of successful mining operations could quickly evolve into towns and cities, such as Park City, the area's primary residential and commercial center. These camps, towns, and cities are related to mining operations, but are not generally considered part of a mining system.

Mining Processes

The technology of hardrock silver mining varies with the geology of the associated ore bodies and the necessary means to access the lode and remove the ore and waste rock. Ore bodies in the Park City region were often narrow and steeply dipped, which necessitated appropriate underground mining techniques for ore access and extraction. The solidity and stability of the rock strata helps determine the methods for tunneling and reinforcement. Many parts of the geology in the Park City Mining District are quite unstable, requiring timbering and other reinforcement methods. Underground water presented major technical challenges to mines in the Park City, whose works were often flooded when a new water source was struck. Drain tunnels and massive pumps helped solve the problem but at a high cost. As new problems were encountered, new technological solutions were implemented. Much of the technological information in this section was derived from publications by George Stott (1916), the Utah Mining Association (1967), and other selected works.

Prospecting Processes and Technology

In the early days of mining in the Park City area, most of the ore bodies were discovered where an outcropping of ore was visible on the surface. After the more obvious outcroppings were taken up into mining claims, subsequent discoveries were usually made as the result of excavation. In either case, excavation soon came into play, since even in the case of a surface discovery, it was difficult or impossible to ascertain the extent and form of the ore body without digging. Typically, shafts, inclines (steep tunnels) or adits (basically horizontal tunnels that open to the surface) were dug towards known or suspected ore bodies. Additional drifts (underground tunnels) were also driven off of shafts and adits towards the anticipated location of ore bodies. A typical size for a drift was a tunnel four feet wide and six feet high. The following section discusses excavation techniques in more detail. Once an ore body was encountered, extraction of the ore could begin. Ore bodies were often missed entirely, with drifts passing within feet or inches of a deposit. Later methods that employed diamond drills to take core samples would discover many more deposits without the expense of hit-and-miss tunneling.

Extraction Processes and Technology

Excavation methods in the Park City area were much like those used in other western underground mines. The typical working consisted of one or more vertical shafts with horizontal levels radiating out from the shafts. Vertically, the levels were spaced an average of about 100 feet apart. Earlier or lower-budget excavations tended to be loosely organized in what has been called a "rat-hole" system, but later or larger operations often consisted of a carefully designed network of tunnels, adits, stopes, inclines, shafts, raises, and other specialized underground features for accessing and removing the ore in an efficient manner. Some of the larger mines had complex systems for ore handling with specialized excavations and equipment, the variations of which are too numerous to discuss here.

Excavations into the ore bodies themselves are usually called stopes, the size and shape of which were determined by the size and shape of the ore body, since the object was to remove all of the worthwhile ore in the deposit. Veins of ore that had a gentle dip would typically involve either overhand (from the ceiling) or underhand (from the floor) stoping, while veins of steep dip were typically overhand only.

In some areas, the walls and roofs were solid enough that timbers were not required, but other areas required timbering or other methods to prevent their collapse. Timbering was used primarily in stopes and fissures and not as much in drifts and cross cuts, which were generally self supporting. Timber frameworks were often constructed to provide platforms for accessing ore as the ceiling of a stope rose as more ore was removed. Timbers might also be left in place in stopes to keep them open, or the stopes might be allowed to collapse of their own accord after the ore was removed. Backfilling stopes and other excavations was not practiced very much until new technologies made it easier and cheaper to backfill or where it was difficult to dispose of waste rock outside of the workings. Large trees in the district disappeared quickly. Stott (1916) mentions the use of 8" x 8" Oregon fir timbers, with the occasional use of 10" x 10" timbers. A few mines occasionally used even heavier timbers for some specialized applications.

During the history of the Park City area, a variety of methods were employed for excavating. Prior to 1869, when powered rock drills began to appear, drilling was accomplished by hand, using hammers and drill bits. Depending on the number of workers, these manual drills are termed single- or double-jack drills. Powered drills typically operated on compressed air that was piped throughout the mine workings. Some early rock drills used high-pressure water or steam, but the compressed air drills seemed to be the most practical approach, which also provided some relatively fresh air at the excavation face. Even after powered drills came into common use, certain situations still lent themselves to the use of manual rock drills. Miners working new prospects seldom had a suitable power plant for producing the air, water, or steam pressure needed for a powered drill. Even in established mines, there were some situations where manual drills continued to be used for decades, such as in stopes where the ore was not stable or where the surrounding waste rock would tend to fall in. Later, after electric power was brought into the mines, a new option was to use an electric-powered compressor car to supply air pressure to areas of the mine that had no pressure pipes..

A wide range of explosives were used throughout the history of the district, including blasting powder, dynamite, "gelatin" compounds, and a variety of other explosives. Early explosive charges were set off with detonator caps and a fuse that burned at a timed rate to allow the miner to exit the area before the charge went off. Later, electric detonators were also employed, but the use of fuses continued.

For lighting, early miners used open candles. These were a long-time favorite among miners, who later—and somewhat reluctantly—began using a variety of more modern devices, including enclosed candle lights, oil lamps, enclosed oil lamps, carbide lamps, or electric lamps. Early "safety" candle and oil lamps had built-in flame propagation arrestors that reduced the chance of a flame igniting an explosive atmosphere. An explosive mine atmosphere was not as large a problem in the Park City mines as it was in coal mines, where coal dust and methane gas posed constant threats of fire and explosion.

In the early mines, pressurized air, water, or steam was supplied by wood or coal-fired boilers and steam engines. Ore trains were usually pulled by horses. After the turn of the century, the mines gradually began using electric motors to produce compressed air or to pump water, and electric-motor-driven locomotives began to replace the horses that pulled the ore trains. By 1920 or thereabouts, most of the major mines had invested heavily in electrification.

Proper ventilation and drainage of deep hardrock mines were constant concerns. The elimination of foul air in the earlier mines depended on the use of ventilation shafts and adits/tunnels to create a natural draft. Later, forced-air systems were introduced to replace or augment natural draft or to serve areas that had no adequate means of ventilation.

Flooding was a severe problem at the Park City mines that seriously limited the depth of the mine workings. Many significant ore bodies were out of reach until the heavy flows of water could be dealt with. Draining the mines presented challenges that prompted a variety of responses. Excavating drain tunnels below the level of the ore body was often done but involved considerable time and labor. Simple bale systems could be employed where flooding was a minor problem, but more powerful means were necessary at the Park City mines. By the 1870s the famous Cornish force pumps were available. A huge Cornish pump, such as the one installed in the Ontario Mine, could remove as much as four million gallons of water a day. In the long run, drain tunnels proved to be the most effective approach, often draining several different mining operations with the same drain tunnel. However, even though these tunnels could be several miles in length and drain to the lowest area possible, there was still much ore below that level, and pumps still had to be employed for the deeper mines. In addition, a collapse of a single drain tunnel could put the lower reaches of several mines out of commission, and many jobs would be lost until the tunnel was eventually cleared, which was not always an easy task and could take many months.

Drainage tunnels frequently were used as the main entry for a mine, allowing easier and faster movement of miners and equipment in and out of a mine. This also freed up the shaft for hauling out more ore and waste rock. The ends of some drain tunnels may also have been closer to town which made it less necessary to have worker housing near the shaft.

Ore was moved through the mine by ore-carts mounted on rails. The ore carts were pulled by burros or other draft animals in the early mines and in mines that could not afford electric locomotives. Due to the extreme slope of many of the ore bodies in Park City mines, hoists were commonly employed at various locations in a mine's workings to raise the ore. The simplest hoist mechanism used a *windlass*, a hand-operated winch. A windlass powered by a horse was called a *whim* . Various types of hoists were used for excavation, such as hoists or winches for pulling scraper buckets or skips. Electric loader cars appeared, allowing easier and faster clearance of ore and waste rock.

A headframe, a gallows-like structure constructed of wood or metal framing, was erected over a mine shaft or steep incline opening, with a sheave or drum perched at the top, over which a cable from a hoisting plant was suspended to raise and lower the cages loaded with ore carts, men, and supplies, or to raise the ore skips in the shaft. Once out of the mine, the waste rock was usually dumped in waste piles and the ore transported to the mill. Other surface works included carpenter shops, blacksmith shops, offices, power plants, pump houses, and other facilities.

Beneficiation Processes and Technology

Separating the metals from the ore involved milling, concentrating, and smelting. Over the years, there were many changes and improvements to the milling and concentrating processes used in the Park City area—far too many to mention here. Milling was a mechanical process that separated the metals from the waste rock in the ore. In a typical milling process, the ore was first crushed to a certain size by crushing machinery, such as a stamp mill, then fed along with water into a ball or rod mill. Early ball mills used rounded flint stones to help pulverize the ore. As it left the ball mill, the ore was classified by size, and any that was not ground finely enough was fed back into the ball mill. The process was designed to produce very uniform grain size.

Various amalgamation methods were employed to process the slurry of water and finely ground ore to help separate the metals from the waste rock. Some, but not necessarily all of these methods were employed in Park City operations. Simple amalgamation could be effected by agitating the ground ore slurry to allow the metals to settle out. Chloridizing-roasting amalgamation and pan amalgamation techniques involved roasting the ore in furnaces before taking it to the amalgamation pans containing a variety of chemicals, such as salt, copper-sulfate, and mercury. Metal that clung to the mercury, for example, was separated by heating the mercury in a retort, which caused the mercury to change to a gas, leaving the metal behind. The mercury could be reused after recondensing. Various leaching processes were developed to extract metal from low-grade ores or as the final extraction step before the slurry was sent to the talus dumps or tailings ponds.

These amalgamation processes gave way to a series of continually improving processes to separate the metal from the slurry, including the flotation process. Flotation involved mixing certain chemicals or oils with the slurry from the milling process. The chemicals or oils stuck to the metal particles and rose to the surface, where they could be skimmed off as a concentrate. This was a much more efficient process that not only reduced operating costs, but also enabled certain metals, such as zinc, to be mined profitably.

The concentrate was then sent to a smelter, where the application of heat and the use of fluxes were employed to separate the metallic elements from others with which they were combined. This often involved a preparatory step, such as roasting the metal concentrate along with coke, to reduce the sulfur levels of the metal concentrates prior to smelting. At first, ore had to be shipped out of the area, such as to Godbe's Smelter in Rush Valley, near Tooele. In 1916, the Judge Mining & Smelting Company opened an electrolytic smelter in Deer Valley, but most of the Park City area ore continued to be shipped out of the area for processing.

Refining Processes and Technology

There were a number of different refining processes for various metals and for the different applications for those metals. In addition, the smelted metal was shipped out of the area for refining purposes, making detailed information about refining processes unnecessary for this report.

Remaining Features of Mining-Related Processes

The remaining features associated with the above processes will vary. It would be easy to make the assumption that larger mines would have left a richer set of remaining features than smaller mines. However, as has been mentioned, there is very little consistency in such assumptions. The many complex alterations that take place during the evolution of a typical mining district can be so extreme and pervasive that it is often difficult to reconstruct a sequence of events from physical remains.

That said, there are certain features that tend to last longer than others. For example, mine shafts and tunnels, even if filled in at some later date, usually leave evidence of their existence, and road and railroad grades also tend to be traceable long after they have been abandoned, unless subsequent changes to the mining landscape have obliterated them. Foundations tend to persist, due to their usually durable nature and the fact that even when a building is destroyed or moved, its foundation often remains.

Machinery and certain structures are often found out of their original context for several reasons. It was common practice to salvage any valuable items from a defunct or declining site and move them to another site where they were more useful. As older equipment was updated with new technology, the older items were often sold to lower-budget operations that could not afford the latest machinery. Metal items tended to be recycled, especially when scrap prices were up or when metal was needed for strategic purposes, such as during the massive metal recycling effort during World War II.

On the other hand, some structures and other features may have persisted for various reasons, such as a low economic value relative to the costs of moving them, scrapping them, or upgrading them. Other "preserving" factors might include their geographical isolation, abandonment and bankruptcy, and the mothballing of certain facilities, equipment, or structures for possible future use.

Despite problems associated with the loss of features over time and with the loss of context for many remaining features, there was so much activity in the district over a long period of time that there is still a very rich set of remaining features in the district, and many of those are either still in their original context or can be traced to their original context.

HISTORIC RESOURCES IN THE FLAGSTAFF MOUNTAIN RESORT AREA

This section describes certain historic mining-related sites in the Flagstaff Mountain Resort project area and their related features. More specifically, it provides:

- Site-specific historic context information for mining-related sites in the project area.
- A description of major features in a site, including physical characteristics, stylistic information, and construction details, as appropriate.
- A brief explanation of each feature's function within a mining system, if known.
- A description of significant problems or deficiencies that threaten a feature's structural integrity or life expectancy. Other problems or deficiencies may exist that were not noted during a preliminary inspection of the features described herein.
- An assessment of the causes or conditions that led to those deficiencies, or that maintain or exacerbate those deficiencies.
- A description of recommended work that might mitigate a feature's deficiencies. This information may be useful if stabilization is selected as a treatment plan for a particular feature.
- Suggestions for interpretive signage. This information may be useful if interpretation is selected as part of a treatment plan for a particular historic feature.

Note: Certain obvious safety hazards pertaining to the features described in this report may be noted. However, SWCA is not a safety engineering firm and recommends that a qualified individual or organization perform on-site inspections to identify potential safety hazards and make specific hazard mitigation recommendations. There may be other hazards associated with these properties in addition to any that are mentioned in this report.

Site-specific historic context information was extracted from the table in the section, "Park City Area Historic Mining Context," which was derived from several sources, including Thompson and Buck (1981), Boutwell (1920), Butler, et al. (1920), Stott (1916), interviews with Hal Compton (N.P., 2000) and Kerry Gee (N.P., 2000), Sanborn fire insurance maps (1889, 1900, 1907), an examination of a large number of historical photos and maps, and several informal sources.

Appropriate stabilization measures are described for several of the features in this section. However, this does not mean that stabilization is necessarily the most practical treatment option. There may be numerous viable approaches for a particular feature. Refer to "Treatment Plans – General Information" for general background information about treatment plans. Refer to "Treatment Plans – Flagstaff Mountain Resort Properties" for suggestions about selecting appropriate treatment options and for a matrix of viable and recommended treatment options for properties described in this report.

All of the features in this report have the potential to yield archaeological remains. Archaeological deposits may contain a wide variety of items associated with any mining-related processes, worker housing, or other human activities. SWCA does not recommend excavation work at this time. In general, no invasive investigations should take place without a scholarly research design, a staff of qualified individuals, arrangements for proper curation of any artifacts, and a plan for publishing the results of the project.

The properties described in this report are grouped by their general location in the project area:

- Middle Ontario Canyon
- Lower Empire Canyon
- Middle Empire Canyon
- Upper Empire Canyon
- Other (Flagstaff Mountain)

PROPERTIES IN MIDDLE ONTARIO CANYON

Properties discussed in this section include the Ontario Mine Site, along with its associated features.

For location information, refer to the numbered items in Figure 2:

Ontario Mine Shaft No. 3 Site

This site includes the Ontario Mine Shaft No. 3 (and its modern surface works), the Silver Mine Adventure, the Ontario Shaft No. 3 waste dump, and a group of historic water tanks that were probably associated with the Ontario Shaft No. 3 surface operations.

Historic Context

The Ontario Mine has been, at various times, the leading silver producer in the Park City area, and for a time was the leading silver producer in the entire United States. The No. 3 shaft is the best known of the Ontario's shafts. For over a century, this shaft and its workings played major roles in local, regional, and national mining history. George Hearst, who purchased the original Ontario Lode claim and started the operation, made his fortune from the Ontario Mine and went on to found the famous Hearst Publishing Company, later headed by his son, William Randolph Hearst.

Preparations to sink the shaft began in 1876. The following year, the Ontario Drain Tunnel No. 1 was started from the No. 3 shaft to drain water from the 600-foot level. The drain tunnel was completed in 1881. That same year, installation of the famous Cornish pump began, which would drain even lower levels and allow access to deeper ore bodies. The enormous pump would raise up to 4,000,000 gallons of water per day to be removed via the drain tunnel. The pump consumed prodigious amounts of wood (and later coal) to power its massive steam engine with its two 20-inch pistons and 70-ton flywheel (Figure 3).

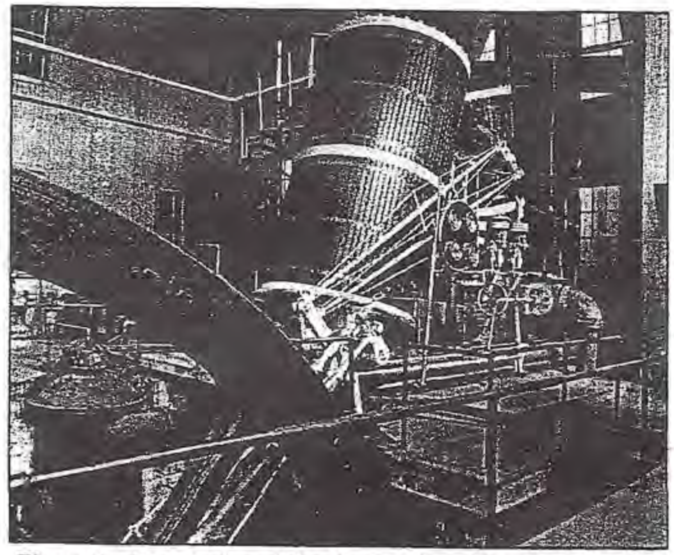


Figure 3 – The engine of the famous Cornish pump. Photo courtesy of the Utah Historical Society.

In 1894, the 3-mile Ontario Drain Tunnel No. 2, also known as the East Drain Tunnel (Gorlinski 1893), was completed, draining the Ontario Shaft No. 2 workings to the 1,500-foot level and allowing access to deeper ore deposits. The tunnel would soon be extended to drain the Ontario Shaft No. 3 workings, as well as the Daly, Daly-West, and American Flag mines. The present-day flow from the Ontario Drain Tunnel No. 2 is some 6,000 to 9,000 gallons per minute.

In 1902, an underground explosion at the Daly-West mine left 25 people dead. Poisonous gases from the same blast killed nine people at the connected Ontario mine. Also in 1902, the Ontario Shaft No. 3 was sunk to the 2,000-foot level (the present-day depth of Ontario Shaft No. 3 is 2,600 feet).

In 1905, cave-ins blocked the Ontario Drain Tunnel No. 2 and water rose to the 1,200-foot level, 300 feet above the drain tunnel. The drain tunnel was repaired up to the Ontario No. 2 shaft, but it remained blocked past that point, leaving the lower workings of the Ontario Shaft No. 3 and the Daly, Daly-West, and American Flag mines flooded until 1908, when the rest of the tunnel was finally cleared. The combination of the Park City fire, financial Panic of 1907, and cave-ins of the Ontario drain tunnel caused a significant depression in Park City. When the drain tunnel was finally cleared, it brought production levels back up in several mines and put many miners back to work.

The Ontario Mine produced almost continuously for many years, weathering many ups and downs during World War I, the Great Depression, World War II, and the lean post-war years. During this period, the Ontario Shaft No. 3 was central to the mine's operations. Mine ownership shifted with the years as well, but the mine remained. In the 1970s, various attempts were made to revitalize the Ontario workings. Anaconda Copper Company and the American Smelting and Refining Company built a new mill and modernized the workings at Ontario Shaft No. 3. However, in 1978, the Ontario workings were closed by Park City Ventures and the operations were to be taken over by the Noranda Mining Company, but this did not pan out, and Park City found itself without a working mine for the first time. Today, the workings are still quiet, with the exception of maintenance crews who use the Ontario Shaft No. 3 to access and maintain certain drain tunnels as a water source for Park City's water system.

Please refer to the section, "Park City Mining District Historic Context," earlier in this report, for a detailed historic context of the Park City Mining District and how this property fits within that context.

Description

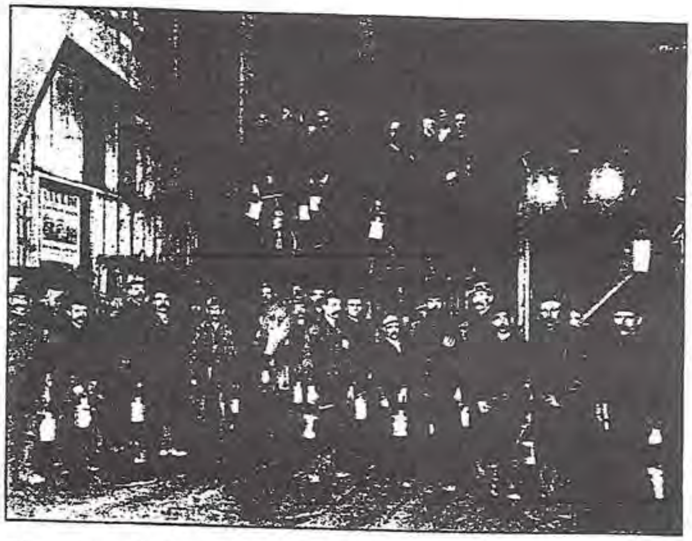
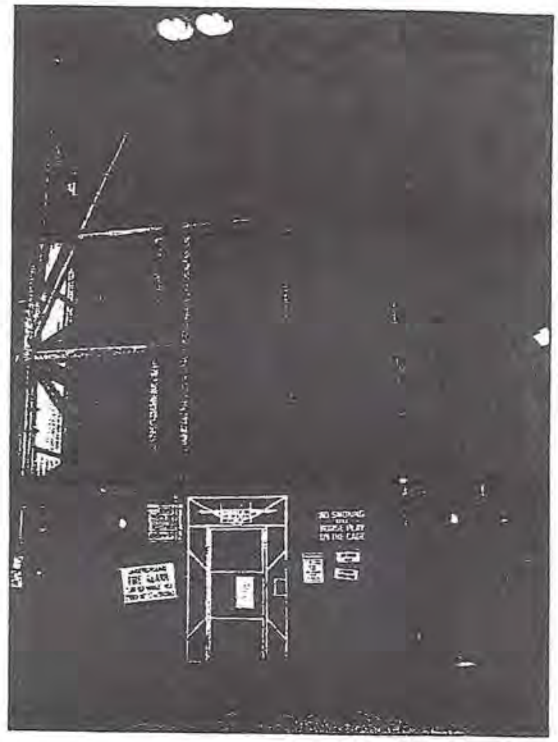


Figure 4 – Miners at the Ontario Mine Shaft No. 3, ca. 1902. Photo courtesy of the Utah Historical Society.
Figure 5 – (Right) – Shaft No. 3 as it exists today.



The Ontario Mine Shaft No. 3 is located in middle Ontario Canyon, west of and adjacent to State Road 224, also known as the Guardsman Pass road. The associated complex is situated atop a large historic mine waste dump, which is easily seen by visitors passing by on State Road 224. All of the surface works were replaced in the 1970s and consist of a complex of metal buildings that house offices, a workshop or garage, concentrator equipment, conveyors, the shaft works, and the Silver Mine Adventure museum in the shaft works buildings. There are also various tanks, pieces of mounted equipment, and smaller structures throughout in the complex. Some of the modern buildings are still in use as office and maintenance facilities for United Park City Mines Company.

Although the surface structures are modern, the Ontario No. 3 Shaft is historic and was used almost continually from the late 1870s into modern times. It also represents the last working mine in the Park City area, having ceased mining operations in 1982. Despite the end of mining activities in the area, the shaft is still operational. Until the Silver Mine Adventure was closed in 1999, the shaft was used to transport visitors down into the mine works, and it still serves the needs of underground work crews who continually maintain several miles of drain tunnels that supply water to the Park City culinary water system and to the Jordanelle Water Conservancy District.

The Ontario Shaft No. 3 is approximately 2,600 feet deep, and the Ontario Drain Tunnel No. 2 keeps the works drained to the 1,500-foot level of the workings. Currently, pumps are used to lower the water level to the 1,700-foot level and maintain it at that point, about 200 feet below the level of the Ontario Drain Tunnel No. 2. Below that level, the workings are flooded. There are still significant silver, lead, and zinc deposits in the Park City area, but the costs of removing and processing ore relative to current and foreseeable metal prices have kept the mines closed.

Function

The Ontario No. 3 Shaft represents the extraction and maintenance processes in a mining system. More specifically, the shaft was used to haul ore and waste rock from the workings and to transport miners and equipment in and out of the mine. It also served as an extra exit point and ventilation shaft. This feature is related to the Ontario Mill in lower Ontario Canyon, which represents the beneficiation process, as does the modern concentrator plant immediately south of the shaft works.

Deficiencies and Suggested Mitigation Work

The historic Ontario No. 3 Shaft and the modern surface works appear to be in good overall condition. There is a certain amount of ongoing maintenance work on these features.

Ideally, a stabilization plan for a significant historic resource should maintain or improve the historic integrity of that resource. This may not always be possible, but at the very least, stabilization work should not weaken the historic integrity of a resource. Based upon this premise, it appears that one viable approach for maintaining the condition and the historic integrity of the Ontario No. 3 Shaft would be to retain the modern hoist works so that the shaft itself would remain accessible, protected, and in a setting—albeit modern—that still demonstrates the shaft's original purpose and its functional association with other elements of a mining system.

The form of the modern hoist works resembles traditional structures in many respects and suggests the shaft's function, which has remained essentially unchanged over time. Should this approach be selected, the hoist works would remain in place and its features would eventually become historic structures in and of themselves. This also could apply to the Silver Mine Adventure facility if it were to continue operation.

Other than the hoist works, the modern surface structures at this site do not significantly maintain or contribute to the historic integrity of the Ontario No. 3 Shaft. Besides being of modern construction, their forms, for the most part, are nondescript and stylistically ubiquitous in modern industrial settings. In addition, most of their exterior forms and features do not suggest their functions within a mining system.

No stabilization work is recommended for this feature at this time.

Potential Safety Hazards

Potential safety hazards could be associated with this feature, but are not known to SWCA.

Interpretation Recommendations

Interpretive signage could be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity. Besides providing basic background information, the signage should point out interesting facts about the resource and take advantage of any clearly visible features to create a more interesting, educational, and personal experience.

For example, the signage could describe aspects of the operation of the shaft and how miners were packed tightly into two-level cages for entering or exiting the mine. The depth of the shaft could be compared to the world's tallest buildings, which are still far shorter than the shaft's 2,600-foot depth. References could be made to the huge amount of silver extracted via this shaft, or to a close call that William Randolph Hearst once had while descending into his father's mine.

Ontario Mine Shaft No. 3 Waste Dump

Description

The Ontario Mine Shaft No. 3 waste dump is a large mining landscape feature located immediately north of the Ontario Shaft No. 3 works and adjacent to State Road 224. Its form can be clearly seen as one passes along State Road 224. The modern structures associated with the Ontario Mine Shaft No. 3 are located atop this feature. A driveway from State Road 224 enters the property at the south end of the dump.

Function

This feature represents the extraction process in a mining system. More specifically, it represents the discarded waste rock that was removed from a mine in order to access high-grade ore deposits.

Deficiencies and Suggested Mitigation Work

Deficiencies that affect this feature's structural integrity, promote damage or deterioration, or present obvious safety hazards have been noted in the following elements:

Waste Dump

Condition – Fair

Priority - None

Deficiency Description – The basic form of the waste dump remains intact, although there has been some recontouring in certain areas of the dump. Vegetation has been growing up on portions of the dump, although there is still a considerable area of bare material exposed to view.

Suggested Mitigation Work – Assuming that there are no structural problems or safety hazards associated with this feature, no stabilization work is recommended at this time.

Potential Safety Hazards

Potential safety hazards could be associated with this feature, but are not known to SWCA.

Interpretation Recommendations

Interpretive signage could be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity. Besides providing basic background information, the signage should point out interesting facts about the resource and take advantage of any clearly visible features to create a more interesting, educational, and personal experience.

For example, the signage might describe how most of the material removed from a typical mine was waste rock that had to be removed to access high-grade ore deposits. The size of this massive feature might be correlated to the silver output of the Ontario Mine Shaft No. 3 operation, which was among the most productive silver mines in the world for a period of time. The vegetation growing up on the dump might be referenced to show how nature is gradually reclaiming this feature.

Description

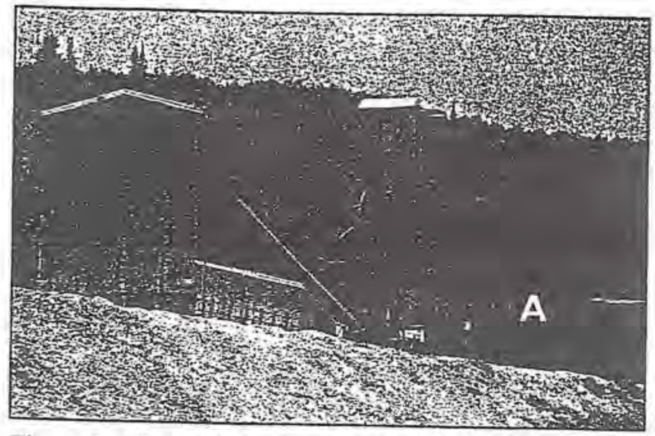


Figure 6 – Silver Mine Adventure facility (Item A).

The Silver Mine Adventure operation, including its associated museum, is housed in structures associated with the Ontario Shaft No. 3 works (items A and B in Figure 6) in middle Ontario Canyon. Some of the exterior walls have been sided with weathered corrugated steel, to create a historic appearance. Adjacent to the front entrance, a large timber-frame assembly demonstrates timbering methods used in mine stopes.

Several pieces of mining equipment are on display in front of the museum and in the stope-frame exhibit. Numerous pieces of mining equipment are located outside of the museum and are not part of any exhibit. Inside the museum, exhibits portray the history of mining in the Park City area and mining-related activities. SWCA conducted a preliminary inventory of the historic mining-related objects in the museum's collection as well as other historic artifacts located in and around the complex. Refer to "Appendix A – Silver Mine Adventure Inventory" for more information about these items.

A key feature of the Silver Mine Adventure was a tour of a portion of the underground workings. Visitors donned rain gear and helmets and were taken down Ontario Shaft No. 3 to the 800-foot level, where various displays of historic mining operations had been set up as educational exhibits. This tour, along with the museum itself, has been closed.

Function

The Silver Mine Adventure operation itself does not represent any process in a historic mining system. However, the contents of the museum's collection represent all phases of historic mining activities.

Deficiencies and Suggested Mitigation Work

The Silver Mine Adventure operation facilities are housed in modern structures that are in good condition and still receive some basic maintenance. The Silver Mine Adventure operation was closed in 1999. Most of the museum exhibits are still intact. The Ontario Shaft No. 3 is still in operating condition and receives periodic maintenance (refer to "Ontario Mine Shaft No. 3"). For stabilization suggestions regarding the museum's collection items, refer to "Appendix A – Silver Mine Adventure Inventory."

No stabilization work is recommended for the Silver Mine Adventure facilities at this time.

Potential Safety Hazards

Potential safety hazards could be associated with this feature, but are not known to SWCA.

Interpretation Recommendations

Not applicable at this time.

Ontario Mine Water Tanks

Description

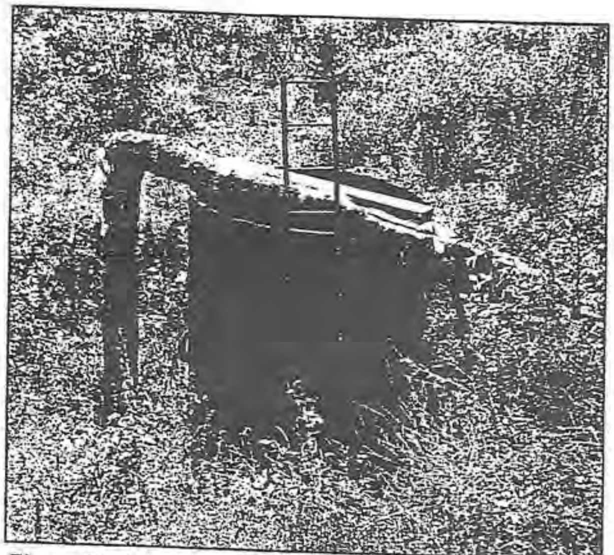


Figure 7 – Water Tank D.

Figure 8 – Water Tank E.

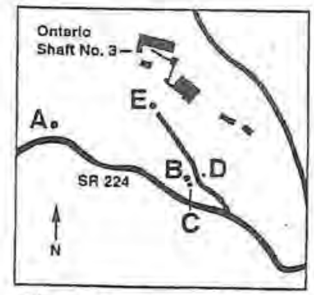


Figure 9 – Tanks A to E.

The Ontario Mine water tanks consist of five circular, wooden-stave tanks of varying sizes located on a slope above the Ontario No. 3 Shaft operations. All of the tanks are located downslope of State Road 224. The largest tank (Tank A) is located adjacent to State Road 224. This tank appears to have been in recent use, but is now out of service. The age of its slab foundation is unknown, but it may be modern.

A group of three tanks is located downslope and northeast of the largest tank. The largest tank in this group (Tank B) is currently in use and appears to be modern. The middle-sized tank in this group (Tank C) is located adjacent to Tank B and also appears to be modern, but is out of service. Tanks B and C are fitted with modern plumbing components and rest upon modern concrete slabs. The smallest tank of this group (Tank D, Figure 7), is just downslope and across a dirt road from the other two, and appears to be historic. Tank D is open at the top and rests upon what is probably a historic foundation. A steel ladder of unknown age is propped against the side of the tank for service or inspection, although it may have been placed there to service a modern pipe that passes directly over Tank D but is not connected to it. The wood staves appear to be redwood, bound by steel rods that wrap around the tank like barrel hoops and pass through cast-iron clamps, which are labeled "National Pipe and Tank Company – Portland, Oregon 113" in raised letters. The rods have threaded ends and are tightened via a nut against the clamp. As typical of most redwood tanks, none of the tanks display any obvious evidence of having been painted.

West of this group of three tanks, at the end of a short dirt road, is a fifth tank (Tank E, Figure 8) that is surrounded by trees and cannot be seen from State Road 224 when the trees are in foliage. This tank has not been used in recent times and is listing to one side. It appears to be the oldest of the five tanks and can be considered historic. This tank, like the others, is circular, but it rests upon timbers that in turn rest upon a set of four historic-period mortared stone footings. The layout of the footings does not correspond to the form of the wooden tank, which raises the possibility that the current wooden tank is a historic-period replacement for an earlier tank. A water pipe with an outside diameter of approximately 4-1/2 inches and a valve with a hand-wheel are still connected to the tank. The tank is approximately 10 feet in height and 38 feet in circumference, which equates to an outside diameter of approximately 12 feet and an inside diameter of roughly 11 feet, 9 inches. Based on these estimated dimensions and a water depth of 9 feet 6 inches, this tank could have held approximately 7,700 gallons of water. The wood staves appear to be redwood, bound by steel rods that wrap around the circular tank like barrel hoops and pass through cast-iron clamps, which are labeled "5/8," which may refer to the rod diameter. The rods have threaded ends and are tightened via a nut against the clamp. There is a flat wooden roof over this tank, but only the edges are visible from the ground. There is no apparent evidence of paint on this tank.

Only two of the tanks appear to be historic. These include Tank D (Figure 7), the smallest tank in the group of three tanks, and Tank E (Figure 7), the larger tank located in the trees to the west of the group of three tanks. However, there is a possibility that the other tanks (A, B, and C) may have been built to replace earlier tanks and that there could be some historic implications if they were removed. If historical associations can be established for tanks A, B, and C, then they may also warrant stabilization treatment.

Function

These features represent the maintenance process in a mining system. More specifically, these tanks supplied water for the Ontario No. 3 Shaft operations, but could also have served the Ontario No. 1 and No. 2 Shaft operations, located just a short distance away across Ontario Canyon. The tanks probably supplied pressurized water for fire hydrants, but could also have served virtually any domestic or mining-related purpose, such as culinary water for boarding houses or water for milling operations. Water storage for fire protection systems was a common application of such tanks.

Sanborn fire insurance maps of 1889, 1900, and 1907 show a six-inch water pipe (for fire control) that leads upslope from the Ontario No. 3 shaft operations to a 75,000-gallon tank (not shown on the map). Even the largest of the five tanks is considerably smaller in capacity. The largest tank (Tank A), which is probably modern, was not measured. The oldest of the five tanks (Tank E) only held about 7,700 gallons. However, even a smaller tank could have been used as a water source for fire control, since it was common to have several tanks, each taking advantage of a different spring or other water source and placed at practical locations for their end purpose.

The placement of a water tank high on a hillside assured that pressurized water would be available without having to use pumps, which could easily fail if they were involved in a fire or explosion. Several possible measures could be taken to help keep the water from freezing during the harsh winters, such as maintaining a certain amount of constant flow, building a shack around the tank to help insulate the tank and which could be heated if necessary, piling bales of straw around tanks as insulation, adding recirculating pumps (later) to heat water by movement, etc.

Deficiencies and Suggested Mitigation Work

Deficiencies that affect this feature's structural integrity, promote damage or deterioration, or present obvious safety hazards have been noted in the following elements:

Tank D

Condition – Fair

Priority – Medium

Deficiency Description – Tank D is in fair condition and appears to be solid and upright. The wood staves have weathered, but seem solid. The foundation also appears to be intact. The tank is open at the top and there are currently several inches of debris inside the tank that prevented an inspection of its bottom. There is a possibility that water from precipitation might accumulate inside the tank.

Suggested Mitigation Work – The debris inside Tank D should be removed to prevent it from holding moisture against the bottom of the tank. The bottom of the tank should then be inspected. If there is no means for water to drain out, a small drain hole or two could be drilled. A water-repellant solution could be applied to the wooden components, and the steel rods and clamps could be coated with a sealant.

Tank E

Condition – Fair to Poor

Priority – High

Deficiency Description – Tank E, which is probably the oldest of the five tanks, is listing to one side. At present, the amount of list may not seem great, but if the staves were to loosen up, the structure might suddenly lose its structural integrity and collapse. The wood staves, which appear to be redwood, have weathered but still seem fairly solid. The condition of the wooden bottom of the tank is unknown. The condition of the flat wood cover or roof over the tank is also unknown. The mortared stone footings appear to be in good overall condition.

Suggested Mitigation Work – Some internal braces should be installed to prevent further listing. Debris should be cleared from the wooden roof to retard rotting and corrosion from contact with moisture. Any badly rotted, missing, or rusted components in the roof should be replaced, repaired, or reinforced as necessary to ensure adequate structural integrity to the roof. The interior of the tank should be cleared of any debris that could trap moisture, and a means of escape for water should be provided, which could involve drilling drain holes in the bottom of the tank or loosening a pipe fitting. Consolidants or water-repellant solutions could be applied to the wood. Steel and iron components could be coated with a sealer, such as a clear urethane or epoxy.

Straightening the tank is not recommended at this time. The tank staves may loosen up if it the tank is straightened, and it is unlikely that the badly rusted nuts could be retightened on their steel rods without damage. If it is decided to do additional work and straighten the tank, a possible approach would be to straighten the tank and check for looseness in the staves. If the staves are loose, and with the tank property supported with temporary braces, one stave could be removed and the sides of the adjoining staves tapered slightly. Then a replacement stave could be driven into place to tighten the staves. The replacement stave would have to be slightly wider than the original and tapered to match the adjoining staves.

Site Clean-Up

There is a small amount of modern trash that should be cleaned up. Debris on or inside the tanks should be removed, although this could be done as part of the stabilization work. The site by Tank E is apparently used as a local "hangout," which tends to foster littering. Fencing or other barriers might be considered to prevent parking in the immediate vicinity.

Potential Safety Hazards

Potential safety hazards associated with this feature include the listing of Tank E, which could collapse if the staves were to loosen. Hazards related to tank collapse might be mitigated by the stabilization work on Tank E. Other potential safety hazards could be associated with this feature, but are not known to SWCA.

Interpretation Recommendations

Interpretive signage could be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity. Besides providing basic background information, the signage should point out interesting facts about the resource and take advantage of any clearly visible features to create a more interesting, educational, and personal experience.

For example, the signage could describe the vertical drop from the tank down to the Ontario No. 3 surface works and the resulting water pressure that it would attain, comparing that with the pressure of a typical household water system. The signage could discuss technical aspects of the tank design, such as why wooden tanks don't leak very much or how the water was kept from freezing during the winter. If the pipe is still visible, perhaps the visitor could be asked to note its course toward its intended destination.

PROPERTIES IN LOWER EMPIRE CANYON

Properties discussed in this section include the Judge Mining & Smelting Company site and the American Flag Mine Site, along with their related features.

For location information, refer to the numbered items in Figure 2:

Anchor (Daly-Judge) Drain Tunnel Portal

Description


Figure 10 – Anchor Drain Tunnel portal.

The portal of the Anchor Drain Tunnel (known later as the Daly-Judge Drain Tunnel) is located approximately one mile up Empire Canyon. The portal's covered extension (Figure 10) is directly adjacent to the east wall of the Judge Mining & Smelting Company office building. Access to the tunnel is secured with a hinged steel grating that allows ventilation. A doorway in the changing room in the rear section of the office building connects directly to the tunnel. This doorway allowed miners to conveniently enter the tunnel from the changing room. This opening is covered with a steel grating. The portal itself is of concrete construction, and its covered extension is a wood-frame structure with galvanized corrugated steel panels.

Function

The Anchor Drain Tunnel and its portal represent the extraction and maintenance processes in a mining system. More specifically, they are associated with ventilation, water drainage, ore haulage, and access for equipment, utilities, and employees.

Underground water was a common problem in the Park City area mines and prevented access to deeper ore bodies. Drain tunnels were an effective, but labor-intensive solution to the problem. Despite the simple concept behind drain tunnels, they still presented significant engineering challenges. For example, when the Anchor Drain Tunnel reached a point directly below the flooded shaft, making the actual connection was difficult. A bore hole was drilled, first partway down through the shaft and then up through the end of the tunnel. The remaining link was blasted to complete the hole, resulting in a flood that almost drowned the workers.

A 1916 account (Stott 1916) explains how the tunnel was used at that time to connect the Anchor (Daly-Judge) Mine and the Daly-Judge Mill:

"Milling and crude ore are hoisted to the 1200-foot level in 16 cu. ft. cars on double-deck cages. The cars are made up into trains and are taken out (through) the Anchor drain tunnel 6,625 feet to the portal by means of an electric locomotive having a draw bar pull of 1200 lbs. Cars of crude ore are transferred to the crude ore bins and the milling ore is dumped into bins at the top of the mill (Daly-Judge Mill)."

Deficiencies and Suggested Mitigation Work

Deficiencies that affect this feature's structural integrity, promote damage or deterioration, or present obvious safety hazards have been noted in the following elements:

East Wall of Portal

Condition – Fair to Poor

Priority – Medium

Deficiency Description – The portal appears to be in generally good condition. The tunnel is being maintained as part of Park City's culinary water system, and it is assumed that this feature is still structurally sound. However, there are some wooden patches on the east wall of the portal extension that may need to be secured. The condition of the sills and the bottoms of the wooden posts in the east wall is unknown. There are some loose corrugated roofing panels at the northeast corner of the roof over the portal, but since this is an extension of the roof of the Judge Mining & Smelting Company office building, this problem would be addressed by deficiency mitigation work on that structure.

Suggested Mitigation Work – Any loose panels should be secured, as appropriate. If the loose panels are of modern materials, such as the plywood patch, they could be replaced with planks matching the older, and possibly historic, wooden planks on the rest of the wall. The posts and sills should be checked for structural integrity.

Potential Safety Hazards

Potential safety hazards could be associated with this feature, but are not known to SWCA.

Interpretation Recommendations

Interpretive signage could be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity. Besides providing basic background information, the signage should point out interesting facts about the resource and take advantage of any clearly visible features to create a more interesting, educational, and personal experience.

For example, the signage could instruct the visitor to stand in front of the portal opening and feel the cold, moist air issuing from the tunnel (at least for summer visitors), providing a very tactile link to the presence of the tunnel, even though they can't actually see the inside of the tunnel. As another example, the signage could point out the tracks that issue from the portal and instruct the visitor to follow them past the historic portal and over to where a trestle once crossed Empire Canyon to carry ore to the Daly-Judge Mill, allowing the visitor to follow a physical link and visualize certain activities in the mining process.

Description

The Judge Mining & Smelting Company office building is located adjacent to the extension of the Anchor (Daly-Judge) Drain Tunnel portal. It is a simple, front-gabled, one-story, concrete-walled structure (Figure 11) that is divided into two functional areas.

Figure 11 – Judge Mining & Smelting Company office building.

Figure 12 shows the building layout. The front section was used as an office and is subdivided into six rooms, consisting of a Reception (Room 1) and Main Office (Room 2) at the north end of the building, a Small Office (Room 3) adjoining the south wall of Room 2, a Restroom (Room 4), Closet 1 and Closet 2 (Room 5 and Room 6), and a large walk-in Vault (Room 7) with a steel door.

The rear section consists of a large Changing Room (Room 8) for miners, with toilet, lavatory, shower, dressing benches, and clothing storage facilities. Room 8 connects with the Anchor (Daly-Judge) Drain Tunnel via a doorway in its east wall.

A small shed-roofed extension on the west side of the building serves as the entry to the rear section. There is no physical connection between the front and rear sections, except for an opening between the attic area in the front section and the loft area in the rear.

There is an attic area in the front section, but it is not known if it was ever used, since an employee of United Park City Mines Company indicated that the attic stairway was built for the purpose of filming a movie, and may not have replaced an earlier stairway. The rear section of the building does not have an attic, although it has a loft area above some of the rooms of the front section.

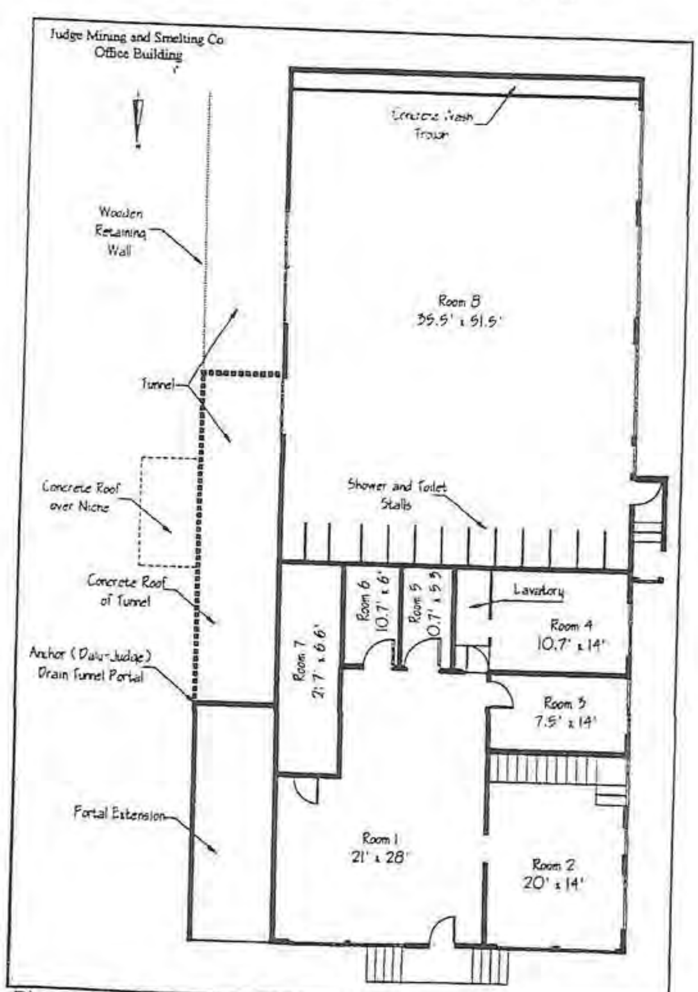


Figure 12 – Floor plan, JM&S Co. office building.

The roof of the building extends over the wood-frame extension of the Anchor (Daly-Judge) Drain Tunnel portal. The roof of the drain tunnel behind the portal is constructed of concrete and abuts the east wall of the changing room.

All of the building's outer walls, plus at least one internal wall, are constructed of poured concrete. The walls of the vault may also be concrete. The exterior walls are finished with stucco, which shows no obvious evidence of paint and retains its natural appearance. The stucco appears to be original and has the logo "J. M. & S. Co. – 1920" incised into the front gable above the entrance.

The structure is built partially into the hillside. The rear (south) wall of the building is embedded into the slope to a level just below the eaves of the roof. Judging by the large rocky outcroppings in the hillside and the size of the trees growing immediately behind the building, the slope has not subsided since the building was constructed, and the current grade is close to the original.

The outside interior walls of the rooms are plastered, with the plaster applied directly to the pecked concrete walls. The exception to this treatment is the east wall of the Reception, which had once been plastered, judging from the peck marks on the concrete, but had later been furred out with standard dimensional 2 x 2 and 1 x 2 lumber(without insulation in the dead-air space) and then sheet rocked.

All of the windows, with the exception of three windows on the east wall of the Changing room, are wood-frame, double-hung windows, without counterweights or springs, and are typical of lower-cost residential windows in common use at the time. The remains of a sash in a front window suggests a one-over-one style, also common at that time. There is only one entrance to the front section of the structure, consisting of a standard-width doorway with a transom window above it.

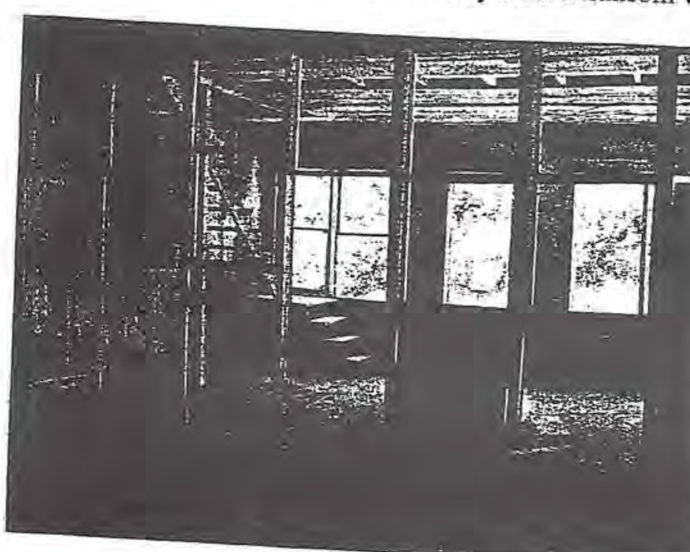


Figure 13 – Divider wall between Reception and Main Office.

The wall between the Reception and the Main Office is a non-structural divider wall (Figure 13) that consists of a wooden framework that once had glass panels in the upper portion of the wall and double-layer beadboard panels in the lower portion. There may have been a cashier's window to the immediate left of the doorway in Figure 13.

In the Small Office, the north, east, and south walls have been faced with 1/4-inch plywood and painted. The plywood may have been applied later as a repair over damaged plaster. The ceiling is faced with soft, wood-fiber panels. There are two double-tube fluorescent light fixtures hanging from the ceiling, which are later additions.

In the Restroom, the north and west walls have been stuccoed, apparently at a later date. The ceiling and the south and east walls are covered with ashlar-pattern stamped-steel panels, painted pale blue. These are commonly known as "tin ceiling panels," from their protective tin plating. Stamped-steel coving is used at the junction of the walls and ceiling. The walls of the toilet and shower stall are also paneled.

In Closet 1 (Figure 14), all of the walls and ceiling are covered with the same stamped-steel paneling as that used in the Restroom. The same treatment is used in Closet 2, which also contains some wooden shelving that appears to have been added at a later date.

Remnants of some stamped-steel coving in the Reception and Main Office suggest that they once had the same kind of stamped-steel ceiling as in the other rooms. The steel ceiling panels are missing in these two rooms, possibly taken for reuse elsewhere. The ceilings above the steel panels were once plastered, but the plaster has fallen to the floor. Despite the use of plaster on the Reception and Main Office ceilings, the stamped-steel panels are probably original, since it was common to apply a "scratch coat," and sometimes a "brown coat" of plaster to wood lath or sheathing prior to covering it with some other material, such as the steel panels. These plaster coats were important for sealing out drafts and for soundproofing (the latter was especially important with stamped-steel wall or ceiling panels).

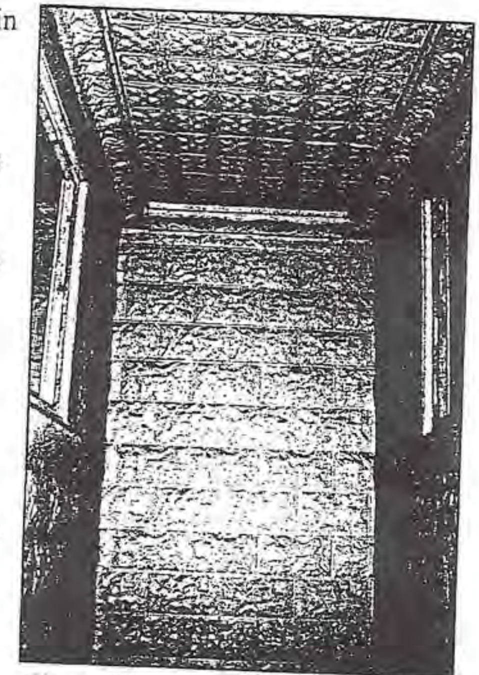


Figure 14 – Stamped-steel panels.

Most of the wood trim above the doorways in the front section of the building is in the style of a simple Classical entablature without an architrave. This was a common stylistic motif for interior trim for a long period of time, including throughout the 1920s. The baseboard molding is of a compatible design, consisting of a tall baseboard (about 8 inches high) that is topped with a strip of cap molding.

The floor structure in the front section is of wood-frame construction with plywood flooring, except for a bare concrete floor in the Restroom. Remnants of imitation linoleum are still visible in several areas. The type of flooring inside the Vault is unknown.

The toilet is a simple art-deco design that is probably a later replacement, since it is known that this design was available in 1938 and most (but not all) 1920-vintage toilets had a short, but visible, pipe connecting the water tank to the bowl.

In the Changing Room in the rear section of the building, toilet and shower stalls line the entire north wall (Figure 15) and a concrete wash basin/trough runs the length of the south wall. All of the walls, except the north wall, are concrete with a thin coating of plaster or stucco. The north wall is covered with the same painted, ashlar-pattern, stamped-steel paneling as used in the front section of the building.

The floor of the Changing Room is probably all concrete, but the floor was covered with a deep layer of debris, making inspection impossible.

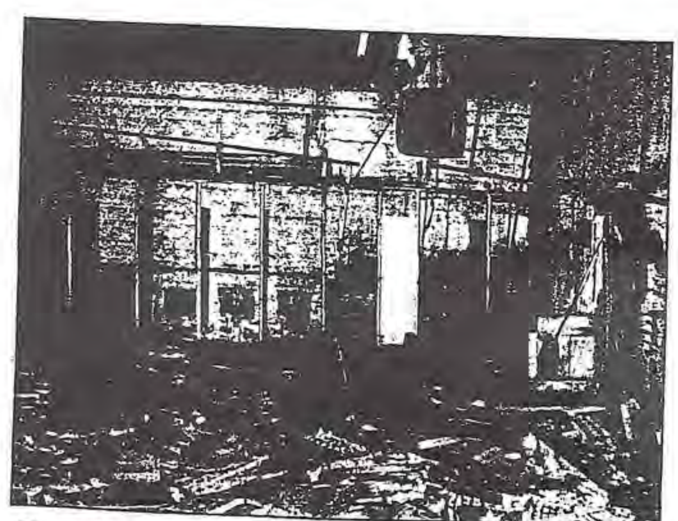


Figure 15 – Interior of rear section.

The roof structure throughout the entire building consists of steel truss beams and wooden purlins, (Figure 16) upon which wooden planks are laid as subroofing, which are then covered with corrugated galvanized steel. The wooden purlins appear to be approximately 3" x 8" timbers on 24" centers. There is no ceiling in the rear section of the building, although there may once have been some kind of ceiling material.

There is a crawl space under the building, accessible from the front of the structure, but this is secured with a steel grid, and it was not explored.

The building's style is not architecturally unique for that period, but stuccoed-concrete mine buildings are unusual in the Park City area.

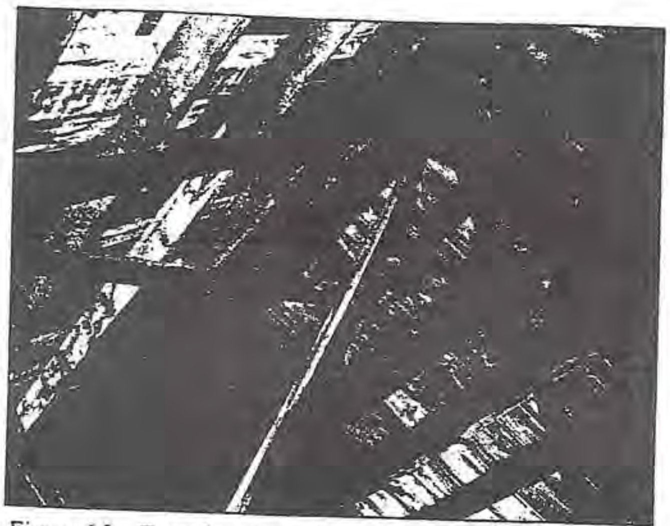


Figure 16 – Truss beams and purlins.

Function

As an office building, this feature represents the extraction, beneficiation, refining, and maintenance processes in a mining system, albeit from an administrative perspective. More specifically, it housed administrative offices for the Judge Mining & Smelting Company operations, which included mining, milling, and smelting operations, and their continued maintenance. It also provided shower and lavatory facilities for mine workers. Its physical proximity to the Anchor (Daly-Judge) Drain Tunnel, Daly-Judge Mill, and other mining-related features helps establish its functional role in the mining system.

Deficiencies and Suggested Mitigation Work

Deficiencies that affect this feature's structural integrity, promote damage or deterioration, or present obvious safety hazards have been noted in the following elements:

Roofing Material

Condition – Fair

Priority – High

Deficiency Description – The corrugated galvanized roofing panels are in fair condition on the west side of the building, with only some minor rusting, but on the east side of the building, a number of panels are badly damaged. It appears that one of the chimneys and a sewer vent pipe have been pushed down, probably by a heavy snow load sliding off the roof, and have torn large openings in the roofing material (Figure 17). Water entering through these holes is damaging the adjacent wooden structural elements of the roof. The other chimney is missing, although it did not tear a large hole in the roof. A secondary problem is that the roofing nails have crept out about half an inch.

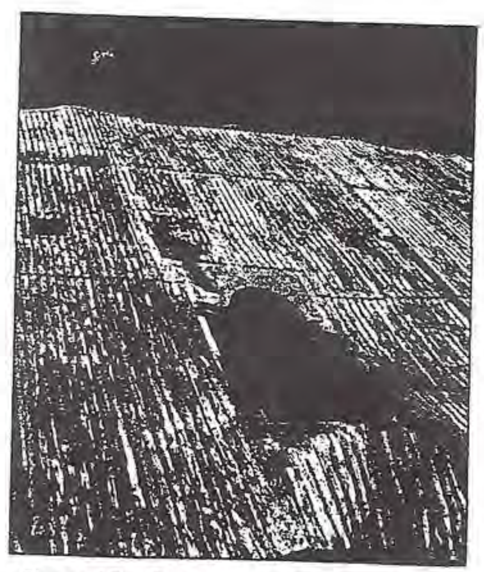


Figure 17 – Damaged roofing panels.

Suggested Mitigation Work – At a minimum, the damaged panels should be replaced in kind, although the fact that the panels have all begun to rust agitates for a longer-term solution that would involve re-placing all of the roofing panels, which would also resolve the loose-nail problem.

Roof Structure

Condition – Fair

Priority – High

Deficiency Description – Most of the roof structural components are solid and straight, with a few exceptions. Some components adjacent to the chimney and sewer vent openings have been damaged by water. There are also two or three cracked purlins in the east side of the roof over the front section, which have been temporarily braced (Figure 18). Other problems could exist, but have not been noted.

Figure 18 – Temporary roof bracing.

Suggested Mitigation Work – At a minimum, the cracked purlins should be sistered and any seriously damaged wooden components near the chimney and vent openings should be reinforced or replaced in kind, as appropriate. The suggested roof work will mitigate further damage to the exposed components.

Exterior Walls

Condition – Fair

Priority – High

Deficiency Description –The exterior concrete walls are in good condition, with some exceptions. There are several large cracks in the east and south walls of the rear section (Figure 19) and at least two places where there has been lateral displacement of more than one inch. The exact cause of these cracks is unknown, but might include soil pressure, settling, or poor concrete quality. There is also a missing chunk of concrete in the shed-style entrance to the rear section of the building that could be described as a large "gouge" of some unknown cause. The degree to which these problems affect the building's structural integrity is unknown.

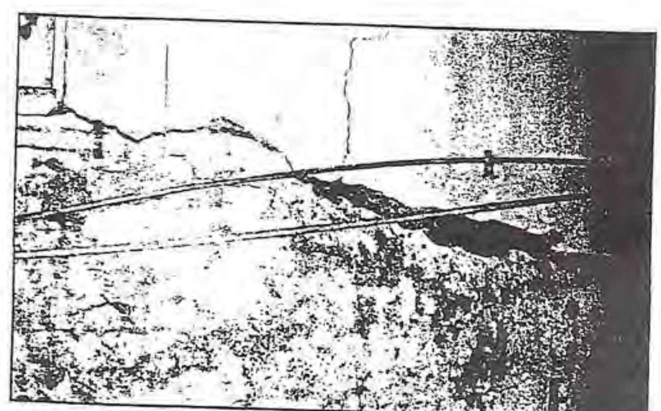


Figure 19 – Cracks in concrete wall.

Suggested Mitigation Work – At a minimum, the building should be examined by a structural engineer, who can recommend a treatment plan to address any structural problems.

Doors and Windows

Condition – Poor

Priority – High

Deficiency Description – The door and window frames and their associated interior trim components are still intact and in fair condition (Figure 20), but almost all of the window sashes and doors are missing. This situation allows moisture, wind, debris, and animals to enter the structure and damage various components. It also allows unauthorized human access.

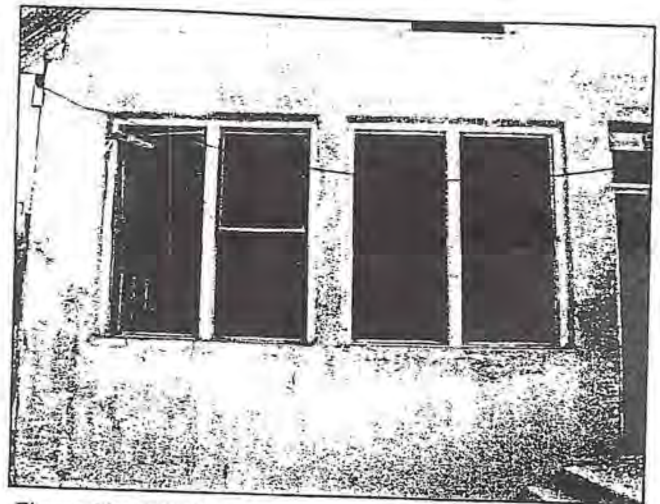


Figure 20 – Window frames in front wall.

Suggested Mitigation Work – Plywood or Lexan fillers could be installed in the window openings. Lexan (or a similar polycarbonate material) is break resistant and allows light to penetrate into the structure, which may be an advantage under certain circumstances. Heavy-duty, lockable doors should be installed. These doors could be constructed of thick plywood sheets. Optionally, if a historic photo or building plan could be located, doors that are stylistically appropriate could be installed.

Flooring and Floor Structure

Condition – Fair

Priority – High

Deficiency Description – Most of the wooden flooring appears solid, with the exception of an area in the Reception immediately adjacent to the west wall of the Vault and a hole through the flooring in the Main Office (Figure 21). These problems can present a safety hazard. There are also a number of loose remnants of imitation linoleum that could be tripped over or might slide when stepped on, presenting another potential safety hazard. The weak area near the vault was probably caused by moisture damage from a leaky roof (this area is directly below the cracked purlins that have been shored up). The hole in the floor was probably caused by vandals. The loose remnants of linoleum are simply the results of wear, abuse, or the lack of normal maintenance.

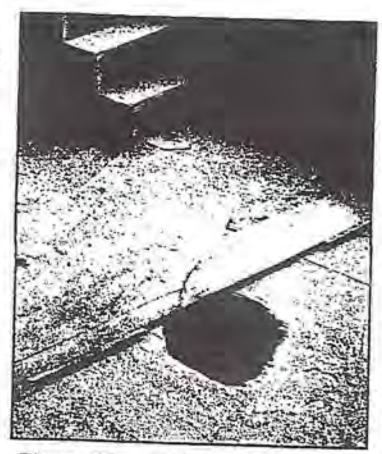


Figure 21 – Hole in flooring.

Suggested Mitigation Work – The floor joists and subflooring in the weak area by the Vault should be inspected and the affected components should be reinforced or replaced as necessary. The hole in the floor should be cut out square with the nearest joists and flush-patched with the same subflooring or flooring material. Doubling pieces should be added to the joists to support the repair material. The seams could also be placed over the center of the joists if allowed by code. The entire floor structure should be inspected from the crawl space, if possible.

Wooden Stairway

Condition – Fair

Priority – Medium

Deficiency Description – According to an employee of United Park City Mines Company, the wooden stairway to the attic (Figure 22) was added for the purpose of filming a movie. The stairway seems relatively solid, but it would not meet current code requirements. There is no railing, which is a clear safety hazard. The flooring in the attic area appears to have been added later, perhaps along with the stairway, and there is no railing around the attic flooring. The top riser of the stairway is higher than the other risers.

Suggested Mitigation Work –The stairway is not original and should be removed after it serves any useful purpose during roof repair work.

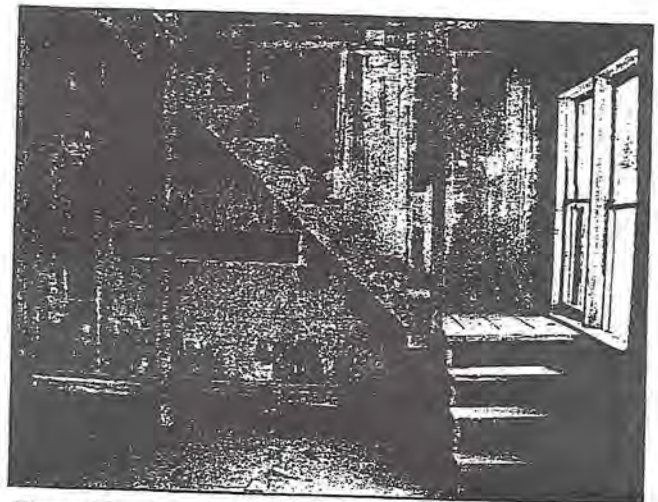


Figure 22 – Stairway in Main Office room, not original.

Site Clean-Up

This structure contains piles of core samples, shelving, boxes, and miscellaneous debris, such as shown in Figure 23. Most of the debris appears to be modern, although there may be some historic items, such as a few wood-and-steel dressing benches in the Changing Room. There is also a quantity of debris outside the structure.

Some of this material may constitute a safety hazard. All debris should be removed in a manner that is safe and appropriate for the materials being removed. Monitoring may be advisable during the removal process to record any historic items that may be found. Some large or durable historic artifacts, such as the steel-and-wood dressing benches in the Changing Room, might be left in the structure and secured against theft. Monitoring may be advisable during the removal process to make sure that any historic artifacts are properly recorded.

Figure 23 – Debris piles.

Potential Safety Hazards

In general, potential safety hazards associated with this feature include piles of debris and other materials throughout the structure, weak spots and holes in the flooring, loose or damaged architectural components, and a dangerous stairway and attic. Hazards related to the debris and other materials might be mitigated by site clean-up work. Hazards related to the loose architectural components and holes in the flooring might be addressed by the suggested deficiency mitigation work. Other potential safety hazards could be associated with this feature, but are not known to SWCA.

Interpretation Recommendations

Interpretive signage could be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity. Besides providing basic background information, the signage should point out interesting facts about the resource and take advantage of any clearly visible features to create a more interesting, educational, and personal experience.

For example, the signage could ask the visitor to look inside the changing room and visualize the miners coming in off their shift, covered with dust, tired, and anxious for a shower and a clean change of clothes. It could point out where their clothes baskets once hung from the ceiling and the brackets on the walls where the miners locked the ropes to keep their baskets out of reach overhead. It could also point out the direct connection with the Anchor (Daly-Judge) Drain Tunnel. Summer visitors could stop to cool off in the cold air that often flows out of the tunnel, and signage could discuss the factors that affect air movements through the mine workings.

Explosives Bunker

Description

This feature is located against a hillside, a few hundred feet north of the Judge Mining & Smelting Company office building and the Anchor (Daly-Judge) Drain Tunnel portal. It consists of a concrete explosives bunker that appears to have been used by the Judge Mining & Smelting Company.

The visible portion of the explosives bunker consists of a concrete portal with a steel door (Figure 24). The bunker's interior is embedded in the hillside and was not available for inspection. The interior dimensions of the bunker are unknown.

Figure 24 – Explosives Bunker, J. M. & S. Co.

The steel door is recessed about a foot into the façade. A small amount of the bunker's concrete roof protrudes from the hillside toward the facade and a steel ventilation stack rises from the bunker's roof.

Stylistically, the doorway is difficult to define. It has a simple, rectangular cornice above a plain frieze, with five widely spaced pointed dentils under the cornice. "EXPLOSIVES" is incised into the frieze above the steel door and resembles the lettering used above the entrance to the Judge Mining & Smelting Company office building. The façade is slightly reminiscent of the older false-front buildings of Park City's Main Street, although it is doubtful that this resemblance was intentional.

Narrow-gauge tracks pass from under the door of the bunker and curve to the south. These tracks may have been connected to the Anchor (Daly-Judge) Drain Tunnel. Trees and shrubs have grown up around the bunker, creating a pleasing aesthetic effect and a feeling of age and abandonment.

Function

This feature represents the extraction process in a mining system. More specifically, it was used to store explosives, which is clear from the large incised sign on the façade. The bunker's association with other features of this mining system is also emphasized by the remaining tracks, the proximity to the other features, and the stylistic similarities to the Judge Mining & Smelting Company office building.

Condition Report and Deficiency Mitigation

This feature appears to be in excellent condition and unaltered, with the possible exception of some hasps or locking hardware that might be original, but could have been welded to the steel door at a later date. However, the interior of the structure was not available for inspection, so its condition is unknown.

Assuming that there are no structural problems or safety hazards associated with this feature, no stabilization work is recommended at this time.

Potential Safety Hazards

Potential safety hazards could be associated with this feature, but are not known to SWCA.

Interpretation Recommendations

Interpretive signage could be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity. Besides providing basic background information, the signage should point out interesting facts about the resource and take advantage of any clearly visible features to create a more interesting, educational, and personal experience.

For example, the signage could relate how a disastrous underground explosion at the Daly-West Mine in 1902 underlined the danger of storing large quantities of explosives underground in the mine workings, and how it became standard practice to keep most of the explosives in above-ground bunkers and bring only small quantities down into the workings at any given time, in order to limit the amount of damage if there were an accidental explosion.

Modern Shed

Description

This structure is located a short distance north of the Judge Mining & Smelting Company office building and next to a road leading to the office building. The building (Figure 25) is a simple shed that is constructed against a concrete retaining wall that appears to be older than the shed and may be historic.

The shed appears to be of modern construction. According to Hal Compton (N.P., 1999), this structure was probably built in the 1960s or 1970s.

Figure 25 – Modern shed near J. M. & S. Co. office.

Function

This feature may represent the extraction or maintenance processes in a mining system, but its exact purpose has not been determined.

Deficiencies and Suggested Mitigation Work

Deficiencies that affect this feature's structural integrity, promote damage or deterioration, or present obvious safety hazards have been noted in the following elements:

Modern Shed

Condition – Good

Priority - None

Deficiency Description – This feature is of modern construction and appears to be in good condition and stable. The rock wall against which the shed is built may be historic, and appears to be in good condition and very stable.

Suggested Mitigation Work – Assuming that there are no structural problems or safety hazards associated with this feature, no stabilization work is recommended at this time.

Potential Safety Hazards

Potential safety hazards could be associated with this feature, but are not known to SWCA.

Interpretation Recommendations

Interpretive signage for this modern feature would be of little value at this time.

American Flag Mine Site

Historic Context

The mineral deposits of the American Flag Mine were discovered in 1898 and the mine was incorporated in 1903. This was a successful mine that continued operations into the 1940s. In the late 1960s, two large landslides covered much of the waste dump. The American Flag is one of a handful of mines in the Park City area that produced significant quantities of gold.

Please refer to the section, "Park City Mining District Historic Context," earlier in this report, for a detailed historic context of the Park City Mining District and how this property fits within that context.

American Flag Mine Waste Dump

Description

The American Flag Mine and its associated dump are located about one mile up Empire Canyon, on the east side of the canyon and opposite the site of the Daly-Judge Mill. Very little remains of the American Flag Mine itself, although it may have some potential to yield archaeological remains. A portion of its waste dump is still visible, but landslides and subsequent road construction have altered much of it.

Function

This feature represents the extraction process in a mining system. More specifically, it represents the discarded waste rock that was removed from a mine in order to access high-grade ore deposits.

Deficiencies and Suggested Mitigation Work

Waste Dump

Condition – Poor

Priority – Low

Deficiency Description – The basic form of the waste dump has been significantly altered by landslides and other activities in the area. Vegetation has been growing up on portions of the dump.

Suggested Mitigation Work – Assuming that there are no structural problems or safety hazards associated with this feature, no stabilization work is recommended at this time. Demolition or removal may an option, since most of the feature is already gone.

Potential Safety Hazards

Potential safety hazards could be associated with this feature, but are not known to SWCA.

Interpretation Recommendations

Interpretive signage could be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity. Besides providing basic background information, the signage should point out interesting facts about the resource and take advantage of any clearly visible features to create a more interesting, educational, and personal experience.

For example, the signage could explain how even a large mining landscape feature like a waste dump could be reclaimed. It could also point out how the American Flag mine was one of the few mines in the area to have produced significant quantities of gold.

PROPERTIES IN MIDDLE EMPIRE CANYON

Properties discussed in this section include the Daly Mine site, Daly-West Mine site, Quincy Mine site, and Little Bell Mine site, along with their related features.

For location information, refer to the numbered items in Figure 2:

Daly Mine Site

Historic Context

Because of the close ties between the Daly Mining Company and the Daly-West Mining Company, historic context information is provided here for the Daly Mine site and the Daly-West Mine site.

About 1881, John Daly acquired 24 claims west of the Ontario Mine, and began work on the Central Tunnel in lower Empire Canyon. He soon struck ore and deeded a half interest in the mine to R.C. Chambers. Daly tried to convince Chambers to form a corporation with him on 40 additional claims, but Chambers refused, so Daly took his own half interest in the additional claims and incorporated it as his second company, the Daly-West Mining Company, which was enormously successful. Daly continually deposited half of his profits in a special account in the event of a settlement between Daly and the Chambers & Hearst interests regarding the additional claims. After ten years of litigation, a settlement gave half of the property to the Chambers & Hearst interests.

In 1891, John Daly began to sink a new shaft, using the hoist and other equipment from the Ontario's No. 4 shaft, which was the old ventilation shaft at the mid point of the Ontario's 600-foot-level drain tunnel. The new shaft had works that connected to the Daly shaft at the 800-foot level.

In 1894, the new Ontario Drain Tunnel No. 2, also known as the East Drain Tunnel (Gorlinski 1893), was completed, three miles in length and connecting to the Ontario No. 2 Shaft, which it drained to the 1,500-foot level and allowed the Ontario works to go deeper in search of silver. The same tunnel would be used to drain the Ontario Shaft No. 3 workings, as well as the Daly, Daly-West, and the American Flag mines.

In 1896, the Daly-West Mining Company completed a new mill and hoisting plant.

In 1897, the Daly-West mine cut into a major underground water flow, which prevented access to promising ore bodies until better pumps could be obtained. Organizational problems and conflicts of interest associated with R.C. Chambers' involvement in the mine led to the closing of the mine for two years.

In 1899, Jacob and Simon Bamberger, of Salt Lake City, agreed to purchase the Hearst interests in the Daly-West Mining Company and the mine was reopened.

In 1902, the Daly-West Mining Company purchased the Little Bell Mine, but allowed it to continue to operate as a separate company. Also that year, an underground explosion at the Daly-West mine left 25 people dead at the Daly-West. Poisonous gases from the blast killed nine people at the Ontario mine. The blast was probably caused by improper explosives handling at the Daly-West Mine. The incident led to improved safety regulations.

In 1902, the Daly-West Mining Company and the Quincy Mining Company were consolidated. The Daly-West, Quincy, and Little Bell were now all under John J. Daly, but functioned as separate companies. The Daly-West Mining Company had brought suit against the Quincy Mining Company for taking ore from the Daly-West, with the Quincy filing a counter suit. Meanwhile, the Daly-West acquired the neighboring Little Bell Mining Company, whose mine connected to the Quincy between its 200- and 300-foot levels. A settlement was reached, with 30,000 shares of Daly-West exchanged for the Quincy property. After the consolidation, the Quincy mine continued operations as before, until 1904, when it was operated through the Daly-West works.

In 1904, the hoist and engine house at the Ontario were destroyed by fire. The hoist and gallows from the Daly Mine No. 2 shaft was moved to the Ontario for temporary use.

Also in 1904, the Daly-Judge Mine ordered an electric locomotive to replace horse-drawn ore trains, and the Daly-West began installing compressed-air-driven rock drills. An attempt to introduce oil lamps was rejected by the miners, who staged a short walkout, preferring to stay with their candles despite the safety advantages of the new lamps. The walkout was settled by allowing the miners to keep their candles.

In 1905, a series of cave-ins blocked the Ontario Drain Tunnel No. 2 and water rose to the 1,200-foot level, 300 feet above the drain tunnel. The last large cave-in was cleared later that year, with one miner drowning in the flood of water. The tunnel was repaired up to the Ontario No. 2 Shaft, but it was still blocked past that point. The Ontario Shaft No. 3, the Daly, Daly-West, and the American Flag mines were still unable to be drained by the tunnel. In 1908, the rest of the Ontario Drain Tunnel No. 2 was cleared, and the Ontario Shaft No. 3, the Daly, Daly-West, and the American Flag mines were finally able to be drained by the tunnel. This event was cause for a great celebration in Park City, since it brought production levels back up in several mines and put many miners back to work.

In 1910, the Daly-Judge owners began the Snake Creek drain tunnel to drain the Daly-Judge and the Daly-West mines. This tunnel would be three miles long and would drain the underground "lake" that plagued the Daly-Judge and Daly-West mines, although it would not connect directly to their shafts. After some difficulties in construction, the work was contracted to the Taylor Free Company, which soon went bankrupt. The job was taken over by J.A. McIlwee & Company, who gave up after a huge water flow was struck. The next contractor was the Williams Leasing Company, followed again by McIlwee & Company. Finally, in 1916, the tunnel reached its planned length and drained the water body at the rate of 8,600 gallons per minute.

In 1913, the Daly-West mill and hoisting works were destroyed by fire. The damaged facilities would be replaced and operating within a year.

In 1916, the Snake Creek drain tunnel was completed to drain the water body that affected the Daly-Judge and Daly-West mines. This project was started in 1910. The drain tunnel was successful and it allowed the deeper areas of the Daly-Judge and Daly-West mines to be worked profitably. Two years later, George Lambourne took control of the Daly-West Mining Company and became president of the Judge Mining and Smelting Company.

In 1922, the Daly Mining Company, Daly-West Mining Company, and Judge Mining and Smelting Company (the old Daly-Judge) were combined into one company, the Park City Mining and Smelting Company, with George Lambourne as president, treasurer, and managing director. M.C. Fox was vice president, O.N. Friendly was mine manager, and George Kreuger was superintendent.

In 1953, the Silver King Company (the Silver King Coalition Mines Company) joined the Park Utah Consolidated Mining Company (including the Park Utah, Ontario, Daly, Daly-West, Daly-Judge, etc.) to form the United Park City Mines Company, putting all of the Park City mining companies except the New Park Company under the same management. The Silver King shaft and mill were closed, the shops at the Judge Mine and the hoist at the Daly-West Mine became the surface plants, and the Park Utah tunnel became the main access and haulage route. New discoveries were made, and the United Park City Mines Company continued mining operations at a scaled-down level for a number of years, but after a final effort in the early 1980s, ceased all mining operations.

Please refer to the section, "Park City Mining District Historic Context," earlier in this report, for a detailed historic context of the Park City Mining District and how this property fits within that context.

Daly Mine Shaft No. 1 and Shaft No. 2

Description

The Daly Mine Shaft No. 1 and Shaft No. 2 are located in upper Empire Canyon, about a half mile further up the canyon than the Anchor (Daly-Judge) Drain Tunnel portal. Little remains today from these operations, except some scattered rock foundations or retaining walls, composed of coursed and uncoursed rough stone.

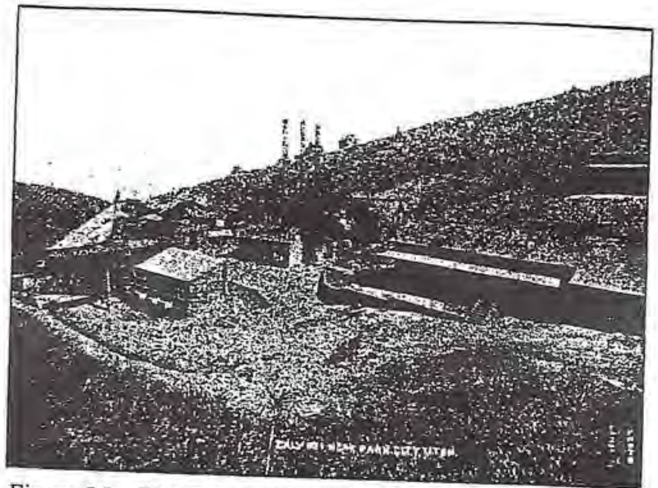


Figure 26 – The Daly Mine Shaft No. 1 operations. Photo courtesy of the Utah State Historical Society.

Function

These rock walls represent the extraction and maintenance processes in a mining system. More specifically, they could be associated with boarding houses or bunkhouses (such as the structure at the right-hand side of Figure 26), but their exact function has not been ascertained.

Deficiencies and Suggested Mitigation Work

Deficiencies that affect this feature's structural integrity, promote damage or deterioration, or present obvious safety hazards have been noted in the following elements:

Rock Wall

Condition – Poor

Priority – Low

Deficiency Description – The rock walls are in poor condition and the area has been heavily disturbed. Little remains of this feature or other aspects of the mine operation.

Suggested Mitigation Work – No stabilization work is recommended at this time.

Potential Safety Hazards

Potential safety hazards could be associated with this feature, but are not known to SWCA.

Interpretation Recommendations

Interpretive signage could be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity. Besides providing basic background information, the signage should point out interesting facts about the resource and take advantage of any clearly visible features to create a more interesting, educational, and personal experience.

For example, the signage could relate the site to the many other mining operations in the area that were founded or influenced by John Daly, one of the most prominent silver magnates in the American West.

The Daly Mine Shaft No. 1 and 2 both have a long and interesting history and are closely interrelated with other mines in the area. The long legal battles between the Daly and Hearst interests could be discussed. Or the role of the Ontario Drain Tunnel No. 2 in draining the Daly and other mines could be explained.

Daly-West Mine Site

Historic Context

Because of the close ties between the Daly Mining Company and the Daly-West Mining Company, refer to the "Daly Mine Site" section for historic context information on both the Daly Mine site and the Daly-West Mine site.

Please refer to the section, "Park City Mining District Historic Context," earlier in this report, for a detailed historic context of the Park City Mining District and how this property fits within that context.

Figure 27 – First mule train at the Daly-West, ca. 1899. Photo courtesy of the Utah State Historical Society.

Daly-West Headframe and Shaft

Description

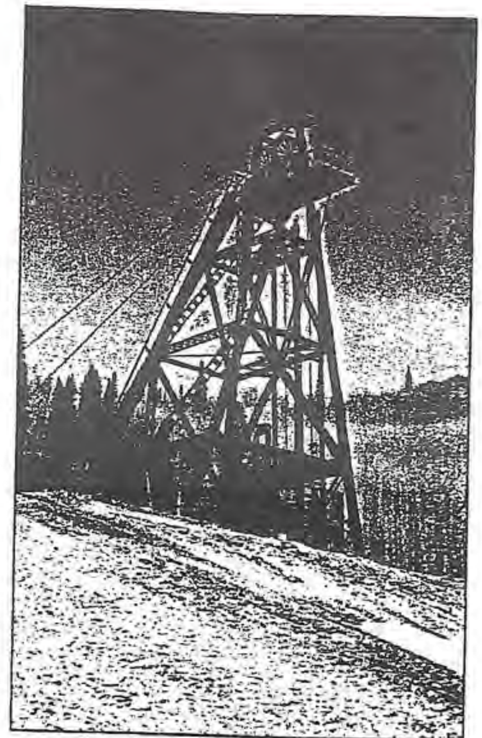


Figure 28 – Daly-West headframe.

The Daly-West headframe and Daly-West shaft are located in upper Empire Canyon, about a quarter of a mile above the Daly No. 2 Shaft. The headframe is directly over the Daly-West shaft, and both of these features are still in operable condition. The shaft provides an emergency exit and a ventilation shaft for the Ontario Drain Tunnel No. 2 and other workings.

The headframe is a distinctive mining-related feature that probably dates from 1913, when the mill and hoisting works were destroyed in a fire. It is constructed of riveted steel "laced girders" that are typical of that period. The entire framework is exposed and it presents an impressive sight. A chain-link fence surrounds the headframe for security reasons.

Just upslope of the Daly-West headframe and shaft are traces of the waste dump and/or surface operations of the Meears Company Shaft No. 1, although very little remains of this operation. The Meears Company Shaft No. 2 operation was located immediately to the northeast of the Daly-West headframe and shaft, but no remains of this operation were noted.

Function

This headframe and shaft represent the extraction and maintenance processes in a mining system. More specifically, the shaft was used to haul ore and waste rock from the workings and to transport miners, equipment, and supplies in and out of the mine. It also served as an extra exit point and ventilation shaft.

Deficiencies and Suggested Mitigation Work

The headframe and shaft are still in usable condition and are maintained as an emergency exit and ventilation source for the drain tunnels that provide water for Park City's culinary water system. The area around the headframe and shaft is fenced. If this feature were to be abandoned, steps could be taken to preserve the feature, such as protective coatings on exposed iron and steel surfaces, lubrication, etc.

In terms of stabilization, as long as this feature is being maintained in operable condition, no stabilization work is recommended at this time.

Potential Safety Hazards

Potential safety hazards could be associated with this feature, but are not known to SWCA.

Interpretation Recommendations

Interpretive signage could be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity. Besides providing basic background information, the signage should point out interesting facts about the resource and take advantage of any clearly visible features to create a more interesting, educational, and personal experience.

For example, the signage could relate the site to the many other mining operations in the area that were founded or influenced by John Daly, one of the most prominent silver magnates in the American West. The headframe is a visually interesting feature, and the signage could point out and explain the function of the various visible components, such as the hoist shack, cables, sheaves, cages, etc. It could also point out that this is a working feature and make reference to the depth of the works or how the air moves in or out of the shaft, depending on changes in temperature or atmospheric pressure. It might also point out some interesting details about the headframe construction, such as the beautiful lace girders, or how the steel headframe was a replacement for a wooden headframe destroyed by fire in 1913. It might also point out some slightly warped areas in the girders that may have resulted from a subsequent fire.

A discussion of fires at the Daly-West site would provide a natural segue to interpretive signage about the fire hydrant shacks above the shaft works.

Daly-West Hoist Plant

Description

This feature is located adjacent to the Daly-West mine shaft and headframe. It is a modern structure that houses the hoisting machinery for the Daly-West shaft.

Function

This feature represents the extraction and maintenance processes in a mining system. More specifically, the hoist plant was used to operate the shaft equipment, which was used to haul ore and waste rock from the workings and to transport miners, equipment, and supplies in and out of the mine.

Deficiencies and Suggested Mitigation Work

The hoist plant is still in usable condition and is being maintained to operate the Daly-West shaft, which serves as an emergency exit and ventilation point for the drain tunnels that provide water for Park City's culinary water system. The hoist shack is not historic and it is not known at this time if any of the equipment or foundations are historic. If this feature were to be abandoned, certain steps could be taken to preserve the feature, such as protective coatings on exposed surfaces, periodic lubrication, etc.

In terms of stabilization, as long as this feature is being maintained in operable condition, no stabilization work is recommended at this time.

Potential Safety Hazards

Potential safety hazards could be associated with this feature, but are not known to SWCA.

Interpretation Recommendations

In and of itself, this modern feature probably does not merit interpretive signage, although some information about the function of this feature could be included as part of the interpretive signage for the Daly-West headframe and shaft.

Daly-West Fire Hydrant Shacks

Description

These three fire hydrant or water-connection shacks are located at the Daly-West Mine, just upslope from the headframe. One shack has a fire hydrant inside and the others have smaller water pipes and valves. All are painted red with white trim, perhaps as a requirement to indicate their function as water sources for fire fighting.

The cedar shake shingles have been covered with corrugated galvanized steel panels, one of which is missing, exposing the shingles underneath.

Figure 29 – Fire hydrant shacks at the Daly-West Mine site.

All three of these shacks are single-unit, side-gabled structures with one doorway and no windows. The doors are simple batten-type doors and are still intact and operational. The wood frame construction incorporates a variety of lumber sizes, mostly rough-sawn, and the shacks vary somewhat in construction technique, as though they were made up without plans or by different people. The shacks all have board-and-batten siding. The type of wood used for the siding was not determined. The shack closest to the headframe seems to be somewhat newer than the others, judging by the planking used in its construction and some other details, but all appear to be historic.

Figure 30 – Another fire shack.

Function

These features represent the maintenance processes in a mining system. More particularly, they provided sources of pressurized water for fire fighting or other purposes.

Deficiencies and Suggested Mitigation Work

Deficiencies that affect this feature's structural integrity, promote damage or deterioration, or present obvious safety hazards have been noted in the following elements:

Fire Hydrant Shacks

Note: All three shacks are grouped together here as one element because of their simplicity and their similarity in design and condition.

Condition – Fair

Priority – Medium

Deficiency Description – Other than some missing galvanized roofing panels and typical weathering, these sheds are in reasonably good condition and do not appear to have been significantly altered over time. It is possible that the wooden sills may have some deterioration below ground level, but this could not be ascertained without invasive testing. Some of the paint appears quite old, and demonstrates considerable weathering, especially on the south-facing sides.

Suggested Mitigation Work – New galvanized roofing panels should be installed to replace any missing panels. Loose existing panels should be secured. If a more historic appearance is desired, the cedar shingles under the galvanized roofing could be replaced in kind. The walls and trim could be cleaned, primed, and painted to match the original paint colors. Soil should be cleared away from the sills to prevent accelerated decay of the sills. This would also allow an inspection of the sills. If any badly deteriorated components are discovered, they should be reinforced or replaced, as appropriate.

Potential Safety Hazards

Potential safety hazards could be associated with this feature, but are not known to SWCA.

Interpretation Recommendations

Interpretive signage could be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity. Besides providing basic background information, the signage should point out interesting facts about the resource and take advantage of any clearly visible features to create a more interesting, educational, and personal experience.

For example, the signage could describe how fire was a constant threat, especially with the many wooden buildings and heat sources in a typical mining or milling operation, and how the need for adequate water sources was critical. Examples of famous fires, including the 1913 fire at the Daly-West works, could be mentioned. The relationship between the fire hydrant shacks and hillside water tanks could be discussed, explaining how the vertical drop from the water tanks provided a reliable source of pressurized water that did not depend on a pump.

Rock Retaining Wall

Description

This feature is a rock wall (Figure 31) located directly upslope from the Daly-West shaft and adjacent to a fenced-in transformer area. This wall is approximately 30 feet in length and averages about three feet in height. It is constructed of uncoursed and unmortared irregular rocks of varying sizes, and it is in reasonably good condition.

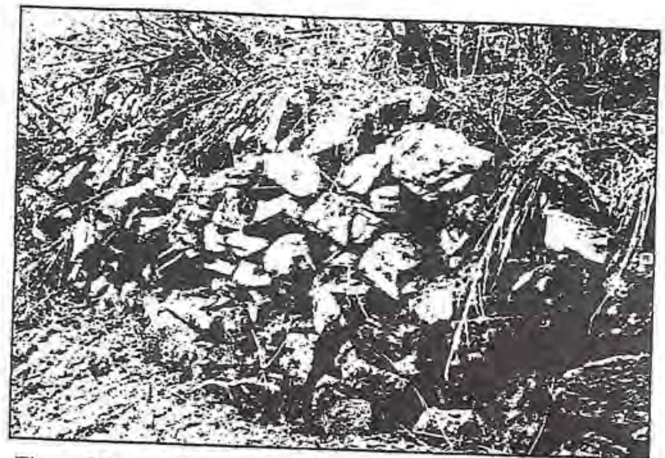


Figure 31 – Rock retaining wall by transformer platform.

This feature appears to be a retaining wall, rather than a foundation wall, due to several design features, including a large radius of approximately four feet at the northeast corner. Such a curved corner is unlikely for a foundation wall, which would typically have square corners. In addition, there are examples in historic photographs of retaining walls that were constructed of loose, irregular rocks in the same manner as this wall. Unmortared walls that were built to support the weight of a structure typically demonstrated much better construction, including the careful stacking of rectangular rocks.

Function

This feature could represent the extraction, maintenance, or beneficiation processes in a mining system. More specifically, it appears that it was constructed as a retaining wall to stabilize the flat area upon which the transformer platform was built. The transformer platform itself is of unknown age. At least one of the three weathered transformers is still in operation, providing power to the Daly-West hoist plant.

Deficiencies and Suggested Mitigation Work

Deficiencies that affect this feature's structural integrity, promote damage or deterioration, or present obvious safety hazards have been noted in the following elements:

Rock Wall

Condition – Fair

Priority – Low

Deficiency Description – The rock wall is in reasonably good condition and most of it is quite stable. It does not appear to have been altered. The only damage to the wall entails a few loose rocks at the southeast corner of the wall, where it could have been struck by something. Someone has restacked the rocks, but it was done rather roughly.

Suggested Mitigation Work – A small number of rocks should be restacked at the corner of the wall to make the corner more stable and restore its profile.

Potential Safety Hazards

Potential safety hazards could be associated with this feature, but are not known to SWCA.

Interpretation Recommendations

Unless the transformer platform proves to be historic, interpretive signage for this feature would be of little value at this time.

Daly-West Mine Waste Dump

Description

This feature is a large waste dump in the middle part of Empire Canyon that is associated with the Daly-West mine. It is a substantial feature that is visible from a great distance.

Function

This feature represents the extraction process in a mining system. More specifically, it represents the discarded waste rock that was removed from a mine in order to access high-grade ore deposits.

Deficiencies and Suggested Mitigation Work

Deficiencies that affect this feature's structural integrity, promote damage or deterioration, or present obvious safety hazards have been noted in the following elements:

Waste Dump

Condition – Fair

Priority – None

Deficiency Description – The basic form of the waste dump remains intact. Some recontouring has taken place in portions of the dump. It is a highly visible feature of a mining landscape. Vegetation has grown up on portions of the dump, although there is still a large amount of bare material exposed to view.

Suggested Mitigation Work – Assuming that there are no structural problems or safety hazards associated with this feature, no stabilization work is recommended at this time.

Potential Safety Hazards

Potential safety hazards could be associated with this feature, but are not known to SWCA.

Interpretation Recommendations

Interpretive signage could be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity. Besides providing basic background information, the signage should point out interesting facts about the resource and take advantage of any clearly visible features to create a more interesting, educational, and personal experience.

For example, the signage could explain the various surface operations at the Daly-West Mine and how the waste rock was transported from the mine shaft and disposed of at the edge of the waste dump. It could also indicate that the dump contains waste rock that was extracted from other nearby mines that became part of the Daly-West operation and began using the Daly-West shaft for access.

Quincy Mine Site

Historic Context

In 1899, eight claims that were being leased by the Putnam Mining Company were incorporated as the Quincy Mining Company, with D.C. McLaughlin as president. Hoisting works were erected and a shaft was sunk to 110 ft striking lead-silver carbonate high grade ore. Shipments by the end of its first year amounted to 725 thousand dollars. In its first year of operation, the Quincy was the second-leading silver producer, and took the lead in its second year of operation.

In 1902, the Daly-West Mining Company and the Quincy Mining Company were consolidated. The Daly-West, Quincy, and Little Bell were now all under John J. Daly, although they functioned as separate companies. The Daly-West Mining Company had brought suit against the Quincy Mining Company for taking ore from the Daly-West, with the Quincy filing a counter suit. Meanwhile, the Daly-West acquired the neighboring Little Bell Mining Company, whose mine connected to the Quincy between its 200 ft and 300 ft levels. A settlement was reached with 30,000 shares of Daly-West exchanged for the Quincy property. The consolidation of the Daly-West and Quincy companies resolved lawsuits between these entities. After the consolidation, the Quincy continued operations as before, until 1904, when it was operated as part of the Daly-West Mine.

However, it is not known when the Quincy surface operations were shut down. A Sanborn map of 1907 indicates that the Quincy surface operations were still running "day and night." It is clear from the remains, however, that this facility has been abandoned for a considerable period of time.

Please refer to the section, "Park City Mining District Historic Context," earlier in this report, for a detailed historic context of the Park City Mining District and how this property fits within that context.

Quincy Mine Hoist Plant

Description

This feature consists of the remains of the hoist plant for the Quincy Mine shaft. It is located in middle Empire Canyon, just upslope of the Daly-West Mine. A rectangular area and traces of rock foundations define the area that was occupied by the hoist building.

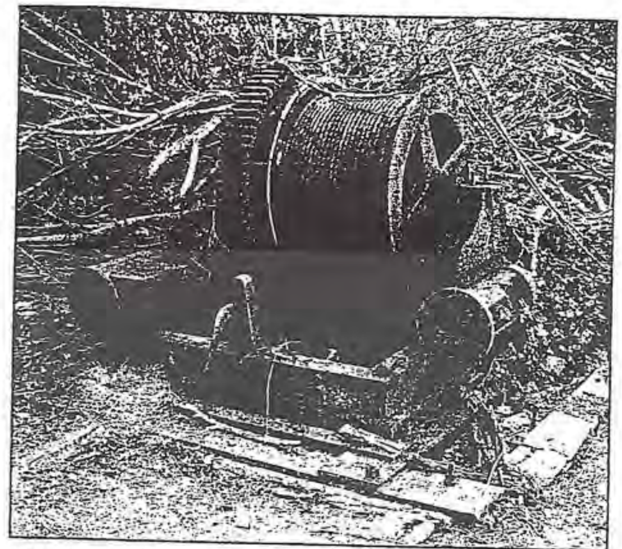


Figure 32 – Two-cylinder, steam-driven hoist.

A two-cylinder steam-driven hoist is still mounted on its concrete pad. The hoist is powered by a double-acting, crosshead-type engine, which, like many hoist engines and marine windlasses, is integrated into the same iron frame as the hoist. Historic photos (Figure 33 and Figure 34) depict what appears to be the same kind of hoist being used as a winch at the Anchor Mine for raising ore cars in an incline. This hoist could even be the same hoist as the one at the Quincy, since it was common to buy, sell, trade, and move equipment from one mine to another.

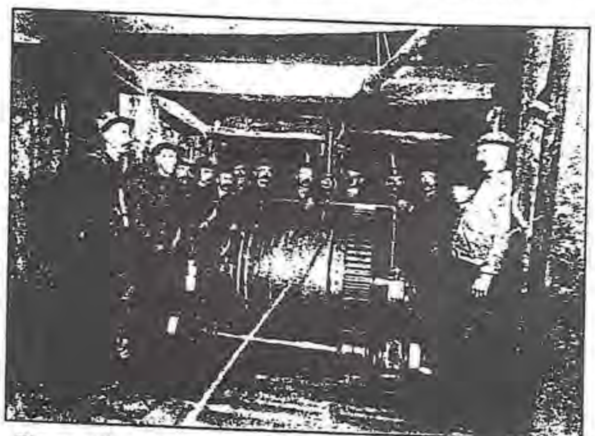


Figure 33 – Steam hoist at the Anchor Mine.
Photo courtesy of the Utah State Historical Society.

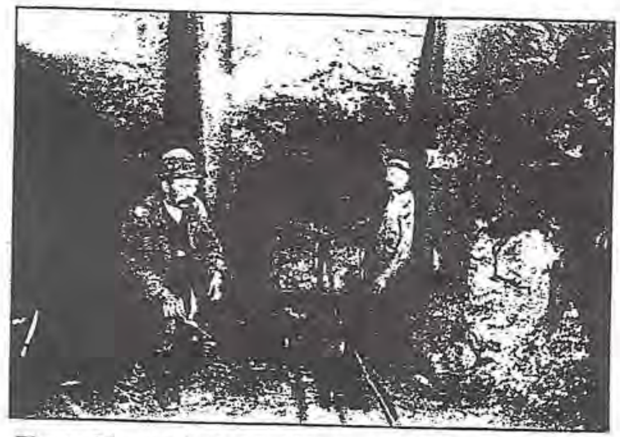


Figure 34 – An incline at the Anchor Mine.
Photo courtesy of the Utah State Historical Society.

Located between the hoist engine and the mine shaft, and apparently within the area once covered by the hoist building, are the remains of a boiler, consisting of the lower portion of its brick enclosure and the boiler's lower water drum (Figure 35).

The larger, upper drum has been removed, and the bricks from the upper part of the brick enclosure are scattered around the base of the boiler. There are also some remaining vertical iron or steel straps that may have acted as supports or anchors for the brick boiler enclosure. It is difficult to make a determination of the boiler type without removing the debris that covers the remains of the boiler and firebox.

Figure 35 – Lower drum of boiler.

In addition to the boiler and engine, the remains of a mortared-brick pad are located immediately north of the hoist engine. Large bolts protrude from the pad in several places. The north edge of the pad is located approximately 12 feet north of the north edge of the hoist engine pad. This feature may have been associated with the headframe structure. Most of the pad is covered with soil and could not be examined.

The foundation of the hoist plant is little more than a trace, with some irregular rocks visible at the ground surface level. More of the foundation may be intact below the ground surface.

Function

These features represent the extraction process in a mining system. More specifically, the boiler and hoisting engine were used to operate the Quincy Mine shaft equipment, which was used to carry miners, equipment, and supplies in and out of the mine workings, and to haul ore out of the mine. The boiler may have been used to supply steam to operate other equipment as well, but this is not known at this time.

Deficiencies and Suggested Mitigation Work

Deficiencies that affect this feature's structural integrity, promote damage or deterioration, or present obvious safety hazards have been noted in the following elements:

Hoist Engine

Condition – Fair

Priority – High

Deficiency Description – One of the hoist engine cylinders has been removed, as well as some other parts, but many of the pieces are still intact, and it is possible that several of the missing parts could still be found in the immediate vicinity. The adjustable cutoff and reversing mechanism for one of the cylinders is still intact. The cable is still wrapped around the drum, and appears to be in good condition, with traces of hardened grease still clinging to the cable. No markings were visible regarding manufacturer, model, serial no., etc., although a portion of the hoist was obscured by vegetation and debris, making a complete surface inspection of the hoist impossible without site clean-up work.

Suggested Mitigation Work – Vegetation and modern debris should away from the hoist. Cleaning a site has the potential of exposing a number of surface artifacts, which immediately become targets for theft, and steam engine parts are especially susceptible because of their popularity with collectors. Hence, surface artifacts should be appropriately recorded, and arrangements should be made for their curation. A sealer should be applied to the metal surfaces of the hoist, and long-duration penetrating lubricants should be applied to the various interstices in the machinery for additional protection. These penetrating lubricants may have to be reapplied every two to five years, depending on the composition of the lubricants and the environmental conditions.

Boiler

Condition – Poor to Fair

Priority – High

Deficiency Description – The larger, upper drum of the boiler was apparently removed many years ago, having been cut off of the main connecting, or return pipe that connects the lower and upper drum. The upper drum appears to have been cut off with an acetylene torch, perhaps during a scrap metal drive during World War II, at which time much of the abandoned machinery in the area was recycled as scrap, but this is merely speculation. The bricks from the upper part of the brick enclosure are mixed in the forest detritus around the boiler. The enclosure was probably dismantled to remove the upper drum. The lower portion of the bricks seems to be at least partially intact and could provide important evidence as to the design and construction of the boiler.

Suggested Mitigation Work – The vegetation and modern debris should be cleared away from the boiler. If plant roots penetrate the bricks, the roots should not be removed, but rather treated with herbicide to prevent their further growth. The bricks should not be disturbed, although during the clearance, some of the bricks that are out of alignment (but have not fallen) could be realigned to help stabilize them. Fallen bricks should be left *in-situ*. Remortaring the bricks should not be done at this time. This is a complex feature that will require further study before taking invasive actions or instituting any repairs that are difficult to undo or which could compromise the integrity of the feature. Any further stabilization or restoration work on this feature should be handled as part of a carefully designed archaeological investigation.

Building

Condition – Poor

Priority – Low

Deficiency Description – The hoist building superstructure is no longer standing, but some pieces of lumber and roofing material can be seen on the ground within the area defined by the hoist building foundations. These items are badly deteriorated and mixed with forest detritus.

Suggested Mitigation Work – Some of the surface detritus could be removed, but the lumber and roofing materials should not be disturbed unless they present a significant safety hazard. They should be left *in-situ*, in their correct context for possible future archaeological work on this feature, at which time they can be properly recorded and analyzed as they are removed. These badly deteriorated items are not likely to be stolen, and could be left in place, even if visible.

Foundation and Pads

Condition – Poor

Priority – Low

Deficiency Description – The foundation of the hoist building and some nearby mortared-brick pads are in very poor condition, in most cases leaving little more than a trace to define the area once occupied by the building, or areas upon which equipment was once mounted. These are low features and relatively stable in their current condition.

Suggested Mitigation Work – No stabilization work is recommended at this time.

Potential Safety Hazards

Potential safety hazards could be associated with this feature, but are not known to SWCA.

Interpretation Recommendations

Interpretive signage could be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity. Besides providing basic background information, the signage should point out interesting facts about the resource and take advantage of any clearly visible features to create a more interesting, educational, and personal experience.

For example, the signage could point out the remains of the boiler and hoist engine and explain their functions and their relationship to the shaft, which is located immediately west of the hoist building. The adjoining Daly-West Mine operation could be discussed in terms of the takeover of the Quincy and in terms of the physical relationships, such as connected underground tunnels.

Quincy Mine Shaft

Description

The Quincy Mine shaft is located in the middle Empire Canyon area, directly above the Daly-West Mine site. Little remains of the shaft, since it has been filled in. However, the fill has settled, and a depression clearly shows where the shaft is located. The shaft is directly adjacent to the remains of the hoist plant.

Function

This feature represent the extraction and maintenance processes in a mining system. More specifically, the shaft was used to haul ore and waste rock from the workings and to transport miners, equipment, and supplies in and out of the mine. It also served as an extra exit point and ventilation shaft.

Deficiencies and Suggested Mitigation Work

Deficiencies that affect this feature's structural integrity, promote damage or deterioration, or present obvious safety hazards have been noted in the following elements:

Mine Shaft

Condition – Poor

Priority - None

Deficiency Description – The shaft has been filled in and a only a slight concavity exists over the filled shaft to suggests its location adjacent to the hoist plant.

Suggested Mitigation Work – Assuming that there are no structural problems or safety hazards associated with this feature, no stabilization work is recommended at this time.

Potential Safety Hazards

The stability of the mine shaft is not known. Potential safety hazards could be associated with this feature, but are not known to SWCA.

Interpretation Recommendations

Interpretive signage could be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity. Besides providing basic background information, the signage should point out interesting facts about the resource and take advantage of any clearly visible features to create a more interesting, educational, and personal experience.

Interpretive signage for the shaft could be combined with the signage for the hoist plant.

Quincy Mine Waste Dump

Description

The waste dump at the Quincy Mine is located in the middle Empire Canyon area, directly above the Daly-West Mine site. From a distance, it is the most visible feature of the Quincy Mine.

Function

This feature represents the extraction process in a mining system. More specifically, it represents the discarded waste rock that was removed from a mine in order to access high-grade ore deposits.

Deficiencies and Suggested Mitigation Work

Deficiencies that affect this feature's structural integrity, promote damage or deterioration, or present obvious safety hazards have been noted in the following elements:

Waste Dump

Condition – Fair

Priority – None

Deficiency Description – The basic form of the waste dump remains intact. Some recontouring has taken place in portions of the dump. It is a visible feature of a mining landscape. Vegetation has been growing up on portions of the dump, although there is still a considerable area of bare material exposed to view.

Suggested Mitigation Work – Assuming that there are no structural problems or safety hazards associated with this feature, no stabilization work is recommended at this time.

Potential Safety Hazards

Potential safety hazards could be associated with this feature, but are not known to SWCA.

Interpretation Recommendations

Interpretive signage could be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity. Besides providing basic background information, the signage should point out interesting facts about the resource and take advantage of any clearly visible features to create a more interesting, educational, and personal experience.

For example, the signage could explain the various surface operations at the Quincy Mine and how the waste rock was transported from the mine shaft and disposed of at the edge of the waste dump. If more information is available about the Quincy's relationship with the Daly-West Mine, the signage might point out how the operation of the Quincy mine changed as the result of that relationship. For instance, it is possible that ore from the Quincy may have been removed via the Daly-West workings, which can be seen from the Quincy.

Rock Retaining Wall

Description

This feature is a rock wall (Figure 36) located in the middle of Empire Canyon, approximately 100 feet east of the Quincy Mine hoist plant. This wall consists of uncoursed, unmortared irregular rocks. The majority of the rocks appear to be in the 6- to 8-inch size range. The wall is largely obscured by soil and vegetation. Its specific purpose is unknown at this time, although it appears to have been a retaining wall, such as often depicted in historic photos in front of mine offices or boarding houses and constructed to provide a small yard area adjacent to the house.

Figure 36 – Rock wall near the Quincy Mine.

Judging by the size of the aspen trees that have grown up inside the perceived perimeter of the wall, and in some cases through the wall itself, the built-up area behind the wall has been abandoned for a considerable period, probably over 70 years.

A 1900 Sanborn map shows a boarding house, but at a much greater distance from the hoist plant. Similarly, an 1889 Sanborn map shows a smaller boarding house, but it is also too far from the mine to be related to this feature.

Function

This feature may represent the extraction and maintenance processes in a mining system. Its specific function was probably related to stabilizing or improving the landscaping adjacent to housing facilities for mine workers or mine office structures, by serving as a retaining wall in front of a structure

Deficiencies and Suggested Mitigation Work

Deficiencies that affect this feature's structural integrity, promote damage or deterioration, or present obvious safety hazards have been noted in the following elements:

Rock Wall

Condition – Fair

Priority – None

Deficiency Description – This feature is in fair condition and reasonably stable. Vegetation has grown around and through the rocks in many places. It appears to be basically in its original form, although much of it is obscured by soil and vegetation.

Suggested Mitigation Work – Unlike certain other structures where vegetation is breaking them apart, the stability of this structure may actually be maintained by the network of roots and plants. Assuming that there are no structural problems or safety hazards associated with this feature, no stabilization work is recommended at this time.

Potential Safety Hazards

Potential safety hazards could be associated with this feature, but are not known to SWCA.

Interpretation Recommendations

The exact function and association for this feature have not yet been identified, so no interpretive signage is recommended at this time.

Wooden Ore Bin

Description

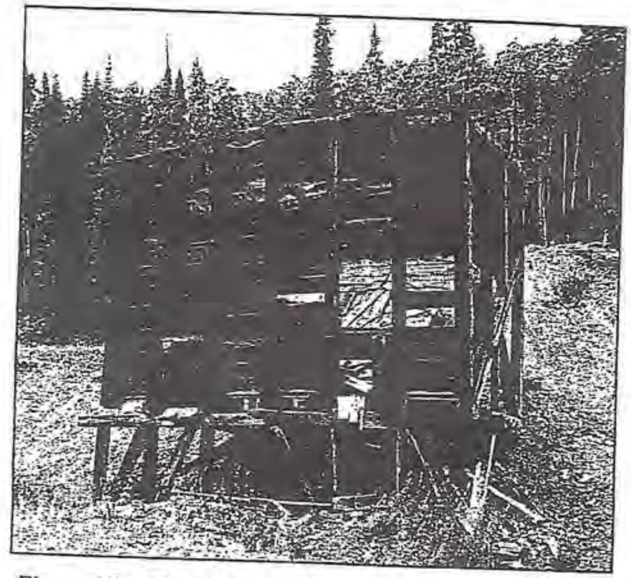


Figure 37 – Little Bell ore bin.

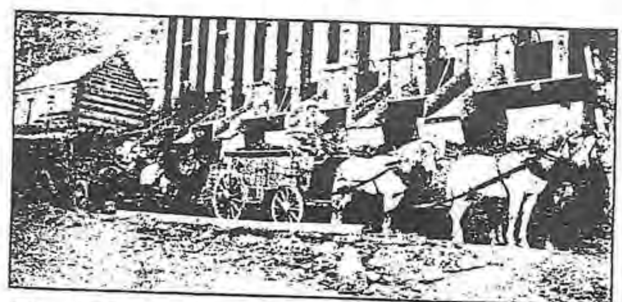


Figure 38 – Similar ore bin at the Quincy Mine. Photo courtesy of the Utah State Historical Society.

The Little Bell ore bin or "bunker" (Figure 37) is a historic structure in middle Empire Canyon, located on the east-facing slope of the Little Bell Mine waste dump and approximately 175 feet east of the Little Bell Mine shaft.

A modern ski slope is located approximately 15 feet east of the ore bin, and two water pipes used for snow-making operations are located about ten feet northeast of the structure. The ski slope occupies the area where the mine's boarding house once stood, and also covers a road that once passed in front of the ore bin. Preliminary research on the Little Bell Mine suggests a construction date of ca. 1900.

The ore bin was used for short-term storage and re-distribution of ore from the Little Bell mine, sometimes called "staging." Ore car tracks, now gone, went from the shaft works to the top of the ore bin. Ore cars were tipped to dump their loads into the ore bin, which would hold the ore until the next horse-drawn ore wagon arrived, at which time the gates at the bottom of the ore bin were opened to allow the ore to pour into the wagon. From there, the wagons transported the ore to beneficiation facilities, such as a mill or smelter. Figure 38 shows a historic photo of a similar ore bin at the nearby Quincy Mine, with a horse-drawn cart awaiting a load of ore.

The ore bin is constructed of wood, excepting the steel-and-iron loading gate doors, nails, steel bracing rods, and other fasteners. The wood is probably a fir species that was imported from the Pacific Northwest. It was quite common at that time to import wood from out of state, since the area's mining operations had used up most of the mature trees in the area for mine timbers and building surface works.

The footprint of the structure measures 12' x 24'. For descriptive purposes, the structure can be divided into two basic components: the ore bin itself and the support structure. The ore bin itself is approximately 17'4" high, plus the height of the support structure. The front wall of the ore bin, including the support structure, is approximately 24 feet high from the top of the front footing. The back wall of the ore bin is approximately 17'4" high from the top of the rear footing.

The support structure consists of a framework of rough-sawn timbers. The front portion of the support structure consists of seven vertical posts, six cross-braces, and a beam across the top, which is in two pieces, joined by a shiplap joint at the center. The timbers in the front portion of the support structure consist of 8" x 8" posts, beams, and cross braces, with slight dimensional variations in their cross sections. The cross braces lean toward the center of the front of the structure (i.e., the three cross braces on the left side lean to the right, and vice-versa). This assembly rests upon a 16" x 16" timber footing.

It is not known if anything lies below this footing. The rear section of the support structure consists of a timber footing placed in the side of the mine waste dump. Owing to the condition of the rear footing, it is difficult to ascertain the original dimensions of the timbers or if anything lies behind or below them. The front and rear sections of the support structure are joined by seven 8" x 8" beams laid front-to-rear, which rest on the top beam of the front support assembly and on the rear footing. Each of these seven beams are supported by a 6" x 8" cross brace between the mid point of the beam and the intersection of the corresponding front vertical support post and the front footing.

The ore bin itself is a single-cell structure that has a steeply slanted floor (approximately 45 degrees) that allows the ore to slide down toward the two loading gates that are located at the bottom of the front wall. Its basic construction consists of a timber framework that is lined with wooden planks to form the ore storage cavity. The ore bin uses a greater variety of rough-sawn dimensional lumber than the support structure. Its construction is relatively simple, and all elements are visible, with the exception of certain internal joint structures, such as mortise-and-tenon joints. The preliminary inspection revealed no evidence of paint, varnish, shellac, or other finish coating on the structure.

The ore bin's front wall framework incorporates seven 8" x 8" posts that rest upon corresponding front-to-rear 8" x 8" beams, which in turn rest atop the top beam of the support structure. The posts are joined to the front-to-rear beam with mortise-and-tenon joints, one of which is visible as an example (Figure 40) The rear wall framework also incorporates seven 8" x 8" posts, which also use mortise-and-tenon joints to join them to the corresponding front-to-rear beams, which in turn rest on the rear footing. The bottoms of the front and rear wall posts are fitted into shallow notches in the front-to-rear beams. Seven 8" x 8" timbers are used atop the bin to connect the top of each front wall post to the top of each rear wall post, probably with mortise-and-tenon joints.

The floor is supported by seven 8" x 8" joists placed between the approximate mid point of the rear wall posts and the intersection of the front wall posts and the corresponding front-to-rear beams. The joists fit into notches cut into the rear wall posts. These joists are cross braced with 6" x 8" timbers, which are in turn cross braced by 3.25" x 5.25" timbers. The framework of each side wall incorporates four 8" x 8" posts, including the corner posts (the end posts of the front and rear walls). The bottom end of the two central posts in the side walls are joined to the end floor joists. There is also a 1.5" x 11" board nailed across the top of the front wall and rear wall framework, plus another that runs horizontally across the backs of the rear posts, just below the top of the ore bin.

The 1.5" x 11" floor planks run lengthwise atop their supporting joists and are nailed into the joists. The wall planks are placed horizontally inside the framework. Every other wall plank extends past the interior of the bin to the outer edge of a corner post. This is handled in such a manner that every other plank on every wall contributes to the tensional strength of the periphery of the bin area, helping it contain the forces of the heavy ore that would fill the bin and press outward to try to split the bin apart at the corners. The planks that do not extend to the outer edge of the corner posts are secured by a board nailed into the corner posts to serve as a stop for those planks. There are also boards installed at the bottom of each side wall frame to serve as stops for the lower planks in the side wall. These stop-boards are of several sizes, including 1.5" x 3.5" (standard 2 x 4), 1.5" x 7", and 1.5" x 5".

Seven steel or iron rods are used to secure the front and rear walls against the outward force of ore in the bin. These rods are located about two-thirds of the way up the front wall of the ore bin, and join the front and rear wall posts together. The ends of the rods are threaded and secured with a nut and a cast-iron washer. One of the rods is broken (missing a section inside the bin), but its ends are intact.

The two gate doors (Figure 39) were operated by a rack-and-pinion mechanism that raised and lowered them inside a cast-iron track mounted inside the jambs. Two cast-iron rack gears are still riveted to each of the steel gate doors, but the pinion assemblies are missing.

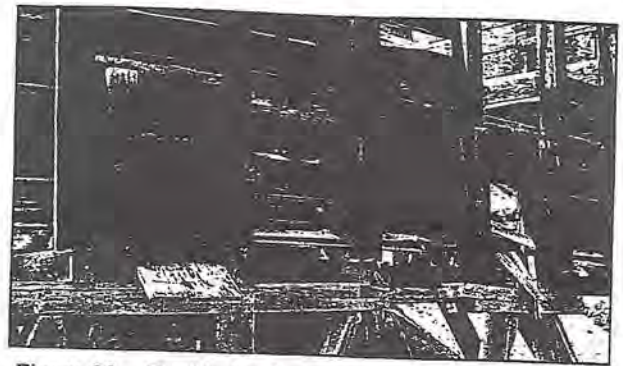


Figure 39 – Ore bin loading gates.

The original mounting points for the pinion assemblies are clearly visible on the wooden jambs around the gate openings. One of the gate doors is still in place and the other is lying on the ground in front of the ore bin. A historic photo (Figure 38) of a similar ore bin shows a round, hand-operated wheel, probably of cast-iron construction, attached to the pinion shaft. The similarity between the placement of the mechanism, the gate doors, and other features suggest that the same type of mechanism was probably used on the Little Bell ore bin.

A missing beam has exposed a tenon (Figure 40) at the lower end of a post, indicating the use of mortise-and-tenon joints in the framework of the ore bin itself, although the support timbers under the bin do not appear to use mortise-and-tenon joints.

Figure 40 – Tenon of a mortise and tenon joint.

The use of mortise-and-tenon joints is appropriate for the ore bin as a means to lock the joints and prevent them from moving under high lateral loads from the ore pressing outward against the sides of the ore bin. The support framework does not experience these lateral loads, and would not benefit as much from the use of mortise-and-tenon joints. No treenails (also known as trunnels or wooden pegs) were obvious in the inspection. Standard wire nails (spikes) were used to help secure the joints. These would have been in common use at the turn of the century and closely resemble today's nails.

Function

This feature represents the extraction process in a mining system. More specifically, the ore bin was used for short-term storage and redistribution of ore from the Little Bell mine, sometimes called "staging."

Deficiencies and Suggested Mitigation Work

Deficiencies that affect this feature's structural integrity, promote damage or deterioration, or present obvious safety hazards have been noted in the following elements:

Support Structure – Front Section

Condition – Poor

Priority – High

Deficiency Description – From what is visible of the wooden front footing, it is likely that the entire front footing is badly rotted. The rot in these elements was the result of long-term exposure to moisture, bacteria, fungus, and insects, a situation directly related to being covered with soil. The lower ends of most of the front support posts and cross braces are covered with soil, making it difficult to determine their condition without excavation. However, it is likely that the lower ends of all of the posts and cross braces have decayed significantly.

The northeast corner of the ore bin support framework has been damaged by an unknown event (possibly a collision, but this is only speculation). Whatever the event, it dislodged an 8" x 8" x 14' wooden beam, causing it to pivot; its north end was displaced to the west approximately 39 inches and its south end displaced to the east approximately 28 inches (Figure 41). In addition to swinging the beam out of place, this event also knocked out an 8" x 8" x 6' post that supported the northeast corner of the ore bin, rendering the adjoining cross brace ineffective. It appears that the wooden beam is still in good condition. The support post, however, is rotted at its lower end. The lower end of the cross brace also appears to have rotted to some degree, although it is difficult to determine the extent of the decay without removing the cross brace.

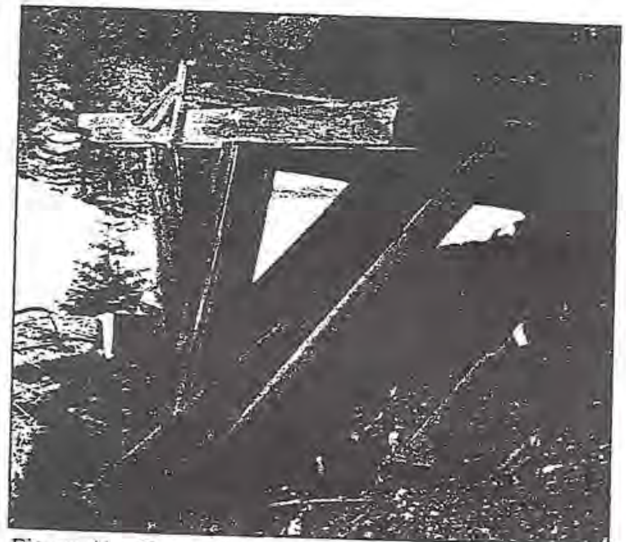


Figure 41 – Damage at northeast corner of ore bin.

At the south end of the structure, a beam is missing at the bottom of the ore bin (Figure 42). The front support post at the southeast corner of the bin is missing, along with the associated cross brace.

Suggested Mitigation Work – All of the rotted timbers and footings in the front section of the support structure are key structural elements and no significant rot can be tolerated in them. Reinforcing these rotted timbers by "sistering" new lumber against them is not recommended for several reasons: First, since the footing is almost certainly rotten, all of the posts would have to be removed in order to replace the footing. Second, the installation of reinforcing posts would require replacement of the cross braces with redesigned braces that could accommodate the extra width of the sistered posts, making their angles much steeper. In addition, the use of reinforcing posts would be a highly visible modification that would significantly compromise the historic integrity of the structure.

The posts, cross braces, and footings should be replaced with rough-sawn timbers of the same dimensions and wood species (probably Oregon fir). Treated wood (either pressure-treated or creosote-treated) is an option and should be strongly considered for the footings. The 16" x 16" front footing may have to be replaced with multiple smaller-dimension timbers, depending on the availability of large-dimension lumber. The wooden beam in the front support structure that was swung out of place is still in good condition and could be rotated back into the correct position and secured with nails.

The soil that covers the front footing and the bottoms of the posts and cross braces must be recontoured so that it does not completely cover the footing. However, part of the footing must remain in the ground to secure the footing and prevent it from shifting under load. The use of treated lumber for the footing, together with improving drainage by using graded gravel and mesh (and perhaps a perforated drain pipe) beneath ground level, would help ensure a long-lasting footing for the structure.

Support Structure – Rear Section

Deficiency Description – The footing that supports the rear wall of the ore bin is badly rotted and the ends of the rear footings have completely rotted away. As with the front footing, the rot in the rear footing was due to long-term exposure to moisture, bacteria, fungus, and insects, caused by its being buried in the side of the mine's waste dump. The slope of the waste dump encourages downslope drainage and water buildup against the rear footing.

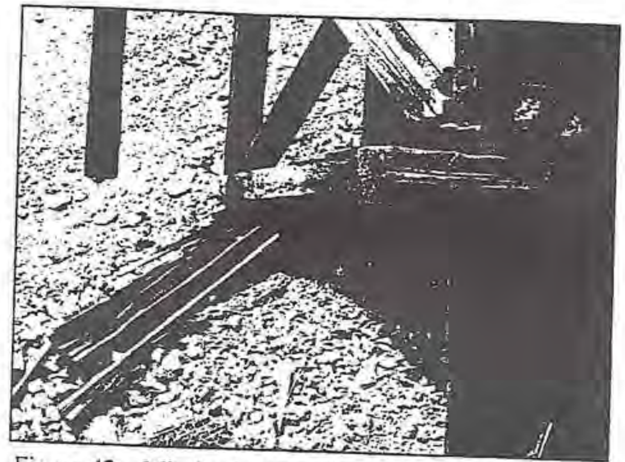


Figure 42 – Missing beam and post, rotted footing.

The missing support at the south end has also caused the southwest corner of the structure to sag several inches (Figure 43).

The overall effect of the damage to the ore bin is that the entire structure is supported only by the central support posts and cross braces at the front and rear of the structure, making its support base effectively much smaller and creating a precarious and dangerous situation, made potentially more hazardous by the unknown condition of the footings.

Figure 43 – Rear view, showing sagging corner.

Suggested Mitigation Work – Repairing the support structure should mitigate most of the sagging and restore the original profile. The rear footing should be replaced with rough-sawn timbers of the same dimensions as the originals, if possible. Some excavation will be required to determine the exact configuration of the rear footing, as it is partially buried and what is visible is badly rotted.

The rear footing must be partially buried in the slope of the waste dump to secure it against shifting under load, but it may be possible to reduce moisture levels against the footing by the use of graded gravel, mesh, and a perforated drain pipe, per building code specs. Pressure-treated or creosote-treated wood should be considered for the rear footing.

Upper Section of Ore Bin (the bin itself)

Condition – Fair

Priority – Medium

Deficiency Description – The upper section of the ore bin (the bin itself) is basically sound. There are some minor problems, however. Some sections of the planks that line the ore bin have been broken out, one of the gate doors has fallen off, the hand-crank pinion gear assemblies are missing, a wooden chute has fallen off, a steel bracing rod is broken, a vertical wall timber is cracked, and there are a number of loose joints. However, other than securing any loose pieces, most of these problems would be addressed at the restoration level, rather than the stabilization level.

Suggested Mitigation Work – Loose pieces of wood should be secured. The cracked side wall post should be secured to make sure that it cannot fall off. If the original location of any detached pieces of wood can be identified, they should be reattached. The wood should be sprayed with a penetrating water-repellant solution or otherwise treated to resist moisture and weathering. These treatment recommendations for the upper section of the ore bin are not as critical as those relating to its support structure, but they would still contribute to the longevity of this structure, as well as maintaining its historic integrity and interpretive value.

If desired, there are some comparatively simple tasks that go beyond basic stabilization and would improve the appearance and integrity of the structure: The fallen steel gate door could be reinstalled in its slot after making sure that the guide slot is secure and properly spaced. If the door is not reinstalled, it should be recorded and arrangements made for its curation. If the hand-crank pinion gear assemblies can be located, they could be reinstalled on the gate door jambs. The broken steel or iron bracing rod (or 'stay') could be repaired by welding in a section of rod to replace the missing section. The missing plank sections in the wall of the ore bin could be replaced.

General Notes

Since the condition of this structure poses a safety hazard, actions should be taken as soon as possible to temporarily stabilize the structure until permanent repairs can be made. Any permanent repair work should be carried out in a manner that uses appropriate materials and does not compromise the historic integrity and appearance of the structure.

Rough-sawn lumber matching the dimensions of the timbers used in the structure should be readily available. As already mentioned, treated lumber may be appropriate for the replacement footings, or for other elements in the structure. The application of a penetrating water-repellant sealer should also be considered, as it helps wood acclimate more slowly, thereby reducing shrinkage problems. It also adds some weathering resistance without producing any appreciable alteration in the color or sheen of the wood. Periodic reapplication of a sealer is recommended as part of an ongoing maintenance program. The existing nails/spikes that were examined are wire nails that were manufactured in a manner similar to today's standard wire nails, making replacement an easy matter. As mentioned, some of the joints involve notching techniques. These notches should be matched in any replacement elements.

Loose joints should be secured with nails of the same form and size of the originals. To assure tight joints, slightly longer nails can be used in some cases, as long as they do not penetrate all the way through the wood. Optionally, an adhesive or consolidant can be used in the original nail holes to help secure the nails. Original nails should be reused whenever possible. Another option is to use additional nails in new locations, but these should be nailed into pre-drilled holes with diameters slightly smaller than the nails to avoid splitting the wood.

For general suggestions about repairing, replacing, or reinforcing any components of a structure, refer to the section, "General Guidelines for Stabilization," later in this document. The following recommendations are only meant as rough guidelines. Many different factors can emerge that may agitate for different approaches. Actual stabilization or restoration work must be handled on a case-by-case basis, incorporating practical decisions that best serve the needs of the community in terms of public safety and historical integrity.

It is possible that missing parts of the ore bin, such as the hand-crank pinion gear assemblies, could be buried in the debris adjacent to the structure, not to mention other artifacts related to the Little Bell Mine or other activities. This area should be monitored for historic material during any excavation activities.

Little Bell Mine Waste Dump

Description

The Little Bell Waste dump is located in middle Empire Canyon, adjacent to the Little Bell ore bin and shaft and south of the Quincy Mine. The mine shaft has been filled in and very little remains of that feature, but the dump is still visible.

Function

This feature represents the extraction process in a mining system. More specifically, it represents the discarded waste rock that was removed from a mine in order to access high-grade ore deposits.

Condition Report and Deficiency Mitigation

The basic form of the waste dump remains intact. It is a visible and essentially unaltered part of a mining landscape. Vegetation has been growing up on portions of the dump, although there is still a considerable area of bare material exposed to view.

Assuming that there are no structural problems or safety hazards associated with this feature, no stabilization work is recommended at this time.

Potential Safety Hazards

Potential safety hazards could be associated with this feature, but are not known to SWCA.

Interpretation Recommendations

Interpretive signage could be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity. Besides providing basic background information, the signage should point out interesting facts about the resource and take advantage of any clearly visible features to create a more interesting, educational, and personal experience.

For example, the signage could explain the various surface operations at the Little Bell Mine and how the waste rock was transported from the mine shaft and disposed of at the edge of the waste dump. The interpretive signage for the waste dump could be combined with the signage for the Little Bell ore bin.

PROPERTIES IN UPPER EMPIRE CANYON

Properties discussed in this section include the Diamond-Nemrod Mine site, Anchor (Daly-Judge) Mine site, and the White Pine Mine site, along with their associated features.

For location information, refer to the numbered items in Figure 2:

Diamond-Nemrod Mine Site

Historical Context

In 1885 and 1886 ore was found at what would become the Black Diamond and Nemrod claims. Sometime prior to 1893, the Farish Shaft was sunk at the southeast corner of the Farish and McLaughlin West Ontario Consolidated Mining Group claims, and a tunnel was excavated, with its portal in the Nemrod claim (Gorlinski 1893). The Farish Shaft was adjacent to the west edge of the Black Diamond claim. The Diamond-Nemrod Company was formed in 1903 as a consolidation of the West Ontario Consolidated Mining Group and the Black Diamond and Nemrod claims. The mine never produced significant amounts of ore, and very little of the Diamond-Nemrod operation remains today.

Diamond-Nemrod Mine Waste Dumps

Description

The Diamond-Nemrod waste dumps are located high on the steep hillside above the Daly-West Mine, and are clearly visible from a distance. The associated Farish Shaft is filled and no longer visible.

Function

This feature represents the extraction process in a mining system. More specifically, it represents the discarded waste rock that was removed from a mine in order to access high-grade ore deposits.

Deficiencies and Suggested Mitigation Work

Deficiencies that affect this feature's structural integrity, promote damage or deterioration, or present obvious safety hazards have been noted in the following elements:

Waste Dump

Condition – Fair

Priority – None

Deficiency Description – The basic form of the waste dump remains relatively intact. It is a visible feature of a mining landscape. Vegetation has been growing up on portions of the dump, although there is still some bare material exposed to view.

Suggested Mitigation Work – Assuming that there are no structural problems or safety hazards associated with this feature, no stabilization work is recommended at this time.

Potential Safety Hazards

Potential safety hazards could be associated with this feature, but are not known to SWCA.

Interpretation Recommendations

Interpretive signage could be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity. Besides providing basic background information, the signage should point out interesting facts about the resource and take advantage of any clearly visible features to create a more interesting, educational, and personal experience.

This mine never produced significant amounts of ore, so interpretive signage may not be worthwhile.

Timbers

Description

These timbers are located near the Diamond-Nemrod waste dump in upper Empire Canyon, high above the Daly-West Mine site. The location of the timbers suggests they might represent the remains of a shaft house. Further research is necessary to evaluate the significance and integrity of this feature.

Function

The exact function of this feature is unknown at this time.

Deficiencies and Suggested Mitigation Work

Deficiencies that affect this feature's structural integrity, promote damage or deterioration, or present obvious safety hazards have been noted in the following elements:

Timbers

Condition – Fair

Priority – Low

Deficiency Description – Normal weathering.

Suggested Mitigation Work – Assuming that there are no structural problems or safety hazards associated with this feature, no stabilization work is recommended at this time.

Potential Safety Hazards

Potential safety hazards could be associated with this feature, but are not known to SWCA.

Interpretation Recommendations

Since the exact function and historic association have not been ascertained, no interpretive signage is recommended at this time.

Anchor (Daly-Judge) Mine Site

Historic Context

The backgrounds of the Anchor Mine, the Anchor Drain Tunnel, the Daly-Judge Mine, and the Judge Mining and Smelting Company are closely intertwined, and their histories are combined here.

Figure 44 – Historic photo of Anchor Mine, no date. Photo courtesy of the Utah State Historical Society.

In 1885, the Utah and White Pine claims were consolidated with a new claim at the head of Empire Canyon, to form the Anchor Mining Company, with E.P. Ferry as manager. Serious water problems were encountered at the 600-foot level, where a water source was struck that flooded the mine up to the 100-foot level. Pumps kept the mine operable to the 400-foot level. John Daly was contracted to build a 6,000-foot drain tunnel from near the mouth of Walker & Webster Gulch to the planned 1,200-foot level of the Anchor shaft, which was only 600 feet deep at the time. In 1886, work began on the new tunnel.

In 1889, the Anchor Drain Tunnel was completed, making the Anchor Mine a viable operation. By 1892, the Anchor would be ranked along with the Ontario and the Daly as the area's largest producers. Before long, the Anchor would build its own mill and stop using the Union Mill in Empire Canyon. The Anchor Drain Tunnel reached a point directly below the flooded shaft and a bore hole was drilled, first partway down through the shaft and then up through the end of the tunnel, and the remaining link blasted to complete the hole, which successfully drained the shaft. In 1890, the Anchor Mine hoists and shops burned but were soon replaced.

In 1893, a national monetary panic struck. Most of the mines temporarily suspended their operations. Notably, the Anchor mine kept operating and shipping ore.

In 1900, John Daly combined his Jones-Bonanza Mine in Bonanza Flat with adjoining claims owned by John Judge, forming the Daly-Judge Mining Company. Also in 1900, a Union Pacific Railroad spur, planned by John Daly of the Daly-Judge Mine and R.C. Chambers of the Ontario Silver Mining Company, was completed to the Ontario Mill and Ontario-Judge Loading Station in Ontario Canyon.

In 1902, The Daly-Judge Mining Company acquired the Anchor Company, which had been experiencing financial difficulties for some time. The hoist and steam plant at the Jones-Bonanza mine was moved to the Anchor Mine, which would become known as the Daly-Judge Mine. At this time, Daly's mines, the Daily-Judge (including the newly acquired Anchor), the Daly, and the Daly-West, were the district's richest, with the exception of the Ontario, which was still the leading mine.

In 1904, the Daly-Judge Mine ordered an electric locomotive to replace horse- or mule-drawn ore trains, and the Daly-West began installing compressed-air-driven rock drills. An attempt to introduce oil lamps was rejected by the miners, who staged a short walkout. The miners preferred to stay with their candles, despite certain safety advantages of the new lamps. The miners were allowed to keep their candles.

In 1905, John Daly sold a stockpile of zinc to pay off a $300,000 debt owed by the company. This made Park City one of the first producers of zinc, which was previously thought to be more or less worthless, but John Daly thought that it might be worth something someday, and stockpiled it as it was separated in the milling process.

In 1910, the Daly-Judge owners began a new and deeper drain tunnel, called the Snake Creek Tunnel, to drain the lowest areas of the Daly-Judge and the Daly-West mines. This tunnel would be three miles long and would drain the underground "lake" that plagued the Daly-Judge and Daly-West mines, although it would not connect directly to their shafts.

In 1916, the Daly-Judge Mining Company became the Judge Mining and Smelting Company, under the direction of Otto Hanke as president, M.C. Fox as vice president, and George Lambourne as manager. It sent its ore to its new electrolytic smelter in Deer Valley. Also that year, the Snake Creek drain tunnel was completed, successfully draining the water body that affected the Daly-Judge and Daly-West mines. Two years later, George Lambourne took control of the Daly-West Mining Company and became president of the Judge Mining and Smelting Company.

In 1922, the Daly Mining Company, Daly-West Mining Company, and Judge Mining and Smelting Company (the old Daly-Judge) were combined into the Park City Mining and Smelting Company, with George Lambourne as president, treasurer, and managing director. M.C. Fox was vice president, O.N. Friendly was mine manager, and George Kreuger was superintendent.

In 1925, the Park Utah Company merged with the Park City Mining and Smelting Company and the pioneer Ontario Silver Mining Company, to become the Park Utah Consolidated Mining Company. George Lambourne was president and general manager. E.C. Fox, Charles Lange, and Adolph Hanke were directors. Oscar Friendly, J.W. Stoner, E.A. Hewitt, and Leonard Wilson were mining engineers. H.R. Wallace and George Kreuger were superintendents and foremen.

In 1928, the Park Utah Consolidated Mining Company became the nation's largest silver producer for the year of 1928. The late 1920s were prosperous years for Park City mining operations.

In 1936, labor strikes plagued most of the mining companies in the district. Then, in 1938, President Roosevelt ordered a silver price cut from 77 cents down to 64 cents per ounce, which prompted cutbacks and sparked labor unrest, but later that year, the government agreed to return the silver price to 77 cents per ounce. This, coupled with a temporary agreement with the miner's union, prompted the mines to resume operations on a limited scale. Also that year, Camp Cloud Rim, a WPA-built Girl Scout camp on Bonanza Flat was dedicated on 15 acres donated by the Park Utah Mining Company.

In 1953, the Silver King Company (the Silver King Company Coalition Mines Company) joined the Park Utah Consolidated Mining Company (including the Park Utah, Ontario, Daly, Daly-West, Daly-Judge, etc.) to form the United Park City Mines Company. Now all of the Park City mining companies, except the New Park Company, were under the same management. The United Park City Mines Company would continue mining operations at a scaled-down level for a number of years, but after a last effort in the early 1980s, ceased all mining operations.

Please refer to the section, "Park City Mining District Historic Context," earlier in this report, for a detailed historic context of the Park City Mining District and how this property fits within that context.

Anchor Mine Waste Dump

Description

The Anchor Mine waste dump is a massive feature located in upper Empire Canyon. It is clearly visible from a great distance and is one of the largest and best preserved of the dumps in Empire Canyon.

Function

This feature represents the extraction process in a mining system. More specifically, it represents the discarded waste rock that was removed from a mine in order to access high-grade ore deposits.

Deficiencies and Suggested Mitigation Work

Deficiencies that affect this feature's structural integrity, promote damage or deterioration, or present obvious safety hazards have been noted in the following elements:

Waste Dump

Condition – Fair

Priority – None

Deficiency Description – The basic form of the waste dump remains relatively intact. It is a large waste dump and a highly visible part of a mining landscape, although there has been some major recontouring of the east side of the dump for a ski run. Vegetation has been growing up on portions of the dump, although there is still a considerable area of bare material exposed to view.

Suggested Mitigation Work – Assuming that there are no structural problems or safety hazards associated with this feature, no stabilization work is recommended at this time.

Potential Safety Hazards

Potential safety hazards could be associated with this feature, but are not known to SWCA.

Interpretation Recommendations

Interpretive signage could be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity. Besides providing basic background information, the signage should point out interesting facts about the resource and take advantage of any clearly visible features to create a more interesting, educational, and personal experience.

For example, the signage could point out many interesting aspects of the Anchor Mine's history, such as the importance of the Anchor Drain Tunnel and the later Snake Creek Drain Tunnel. The three-mile-long Snake Creek Drain Tunnel is interesting because it drains the lower works without actually connecting to them by draining what might be called an "underground lake" that plagued the lower portions of the mine. Or, it might trace the evolution of the mine from the Anchor to the Daly-Judge Mining Company to the Park Utah Consolidated Mining Company to the United Park City Mines Company.

White Pine Mine Site

Historic Context

The White Pine is one of the oldest mines in the district. In 1883, a rich silver deposit was struck under the Utah and White Pine claims at the head of Empire Canyon. In 1885, the Utah and White Pine mines were consolidated under the Anchor Mining Company in 1885, which was later purchased by the Daly-Judge Mining Company in 1902. Since the White Pine operation was absorbed into the Anchor Mining Company and then the Daly-Judge Mining Company at an early date, please refer to the "Historic Context" information for the Anchor (Daly-Judge) Mine site for more details.

White Pine Mine Waste Dumps

Description

Ridge-Line Waste Dump – This waste dump is located on a saddle at the ridge line at the top of Empire Canyon. This feature has sometimes been attributed to the Utah Mine. However, it appears to be located on the White Pine claim, whereas the Utah claim is located to the south, on the other side of the ridge line. A map by Gorlinski (1893) depicts a shaft on the Utah claim, but does not show a shaft at the ridge line on the White Pine claim, although if the White Pine shaft was inactive at that time, it may not have been included for that reason. However, a 1901 USGS survey (published 1903) does show a shaft on the ridge line that appears to be in the White Pine claim. Hence, it appears that the ridge-line shaft and associated waste dump are probably associated with the White Pine Mine. In any case, the shaft has been filled and is no longer visible, and its associated waste dump has been heavily disturbed and/or recontoured.

Downslope Waste Dump – This feature is located a short distance downslope and to the north of the ridge-line waste dump. It has been attributed to the White Pine operation, although it is apparently adjacent to an adit portal, rather than a shaft. A 1901 USGS survey (published 1903) shows an adit portal at what appears to be the correct location. This adit might lead to the White Pine Mine shaft, but this has not been ascertained. This waste dump is located on the War Eagle claim, which became part of the Anchor Mining Company group of claims, probably in 1885. The relationship of the War Eagle claim to the White Pine claim prior to 1885 has not been determined. This waste dump appears to be intact and basically unaltered from its historic form, other than some minor erosion.

Function

These features represent the extraction process in a mining system. More specifically, they represents the discarded waste rock that was removed from a mine in order to access high-grade ore deposits.

Deficiencies and Suggested Mitigation Work

Deficiencies that affect this feature's structural integrity, promote damage or deterioration, or present obvious safety hazards have been noted in the following elements:

Ridge-Line Waste Dump

Condition – Poor

Priority – None

Deficiency Description – The form of the waste dump near the White Pine shaft has been altered significantly by recontouring operations and other work in the area.

Suggested Mitigation Work – Assuming that there are no structural problems or safety hazards associated with this feature, no stabilization work is recommended at this time.

Downslope Waste Dump

Condition – Good

Priority – Low

Deficiency Description – The form of this waste dump appears to be intact and in stable condition.

Suggested Mitigation Work – Assuming that there are no structural problems or safety hazards associated with this feature, no stabilization work is recommended at this time.

Potential Safety Hazards

Potential safety hazards could be associated with these features, but are not known to SWCA.

Interpretation Recommendations

Interpretive signage could be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity. Besides providing basic background information, the signage should point out interesting facts about the resource and take advantage of any clearly visible features to create a more interesting, educational, and personal experience.

The signage would have to concentrate on aspects of the White Pine Mine's history, since little remains in terms of identifiable features. Since it is one of the earliest mines in the district, its role in the development of mining in the Park City area is worth mentioning. Its absorption into the Anchor mining operation also associates it with the long evolution of the Anchor Mine. If the background of the waste dump associated with the tunnel portal could be established, interpretive signage could explain its relationship, if any, to neighboring mines or features, such as the White Pine Mine.

Log Structure

Description

The remains of a log structure (Figure 45) are located below the White Pine Mine and above the Anchor Mine. It has been suggested that this structure may have been a miner's cabin associated with the White Pine Mine (Compton N.D., N.P.). Further research would be necessary to determine its history.

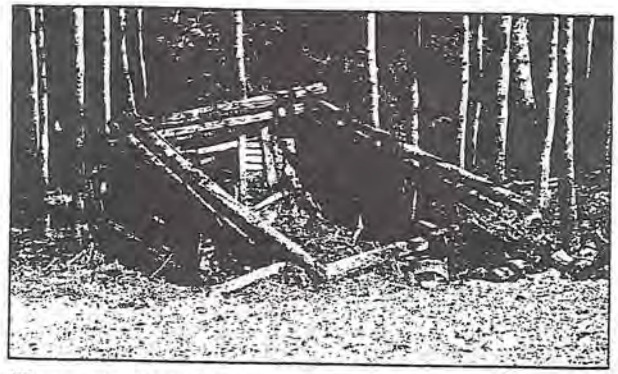


Figure 45 – Log Structure next to ski slope.

The structure consists of a one-room, one-story log building, with a footprint of approximately 16' x 22'. The highest point of the remaining structure is the northwest corner, which is about nine feet above the current ground level.

The structure once had an attic or loft, as evidenced by notches cut into logs at ceiling height and the remains of some of the loft's floor joists that are visible in and above the debris. The door opening is at the north side of the structure, facing downslope, possibly in consideration of an escape route in the event of an avalanche. Each of the other three walls have one window opening.

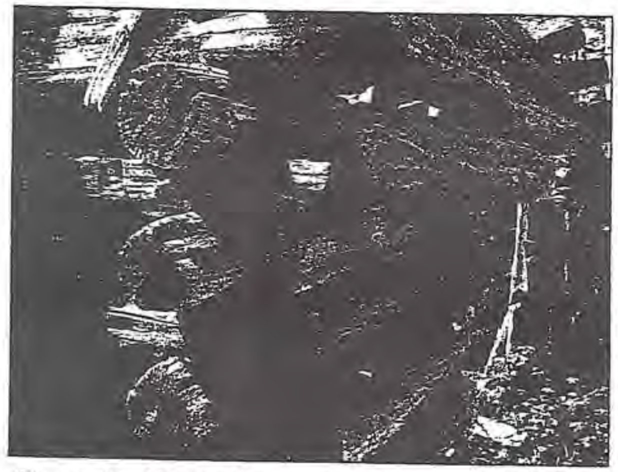


Figure 46 – V-notch log construction.

The wall logs were built with V-notch construction (Figure 46), also known as "sharp notch," and vary somewhat in size, typically ranging from about 8 to 11 inches in diameter. The sides of a number of the wall logs, both inside and outside of the structure, have been hewn to form a slightly flattened surface. An initial inspection of a few of the flattened areas showed no evidence of the use of an adz to create the flat sides, which were probably hewn with an axe. Chinking strips, split from logs, were nailed into the interstices between the log courses. Other supplementary chinking materials, such as cement or clay, would have been used to seal the joints, but the actual material(s) used are unknown at this time. The cabin uses cut nails in its construction, which were still in common use until the late 1880s or early 1890s, when wire nails began to take over in popularity as the result of cheaper mass-production methods.

The foundation structure, if any, is unknown. It was typical for simple log structures such as this to have been built upon leveled sill logs, although stone foundations were not unusual.

Function

The original purpose of this structure has not yet been determined. At this altitude and location it is probably associated with prospecting or extraction activities in a mining system. It may have been a residence, or it could have functioned as an administrative building associated with a nearby mining company, such as the White Pine, Anchor, or other operation. It is still uncertain as to whether a nearby waste dump located about 80 feet away (on the "War Eagle" claim) is associated with the White Pine Mine or some other operation.

Deficiencies and Suggested Mitigation Work

Deficiencies that affect this feature's structural integrity, promote damage or deterioration, or present obvious safety hazards have been noted in the following elements:

Roof and Attic

Condition – Poor

Priority – Low

Deficiency Description – The roof is missing and may have fallen in, in which case its remains could be buried in the deep layer of debris within the structure's walls. The attic or loft has fallen down, and a few of its remaining structural elements are still visible, mixed in among the debris inside the structure. These components are in poor condition, due to normal processes of weathering and decay.

Suggested Mitigation Work – These components should be left *in-situ*. They should not be disturbed unless it is part of a carefully planned and executed archaeological excavation.

Log Walls

Condition – Fair

Priority – Medium

Deficiency Description – Most of the logs that are above ground level (Figure 47) have weathered considerably, but appear to be quite solid and free of significant rot, with the exception of about ten percent of the logs, which are badly decayed from some combination of moisture, insects, bacteria, fungus, and oxidation. Several aspen trees along the east wall of the structure are in direct contact with the wall, but they appear to be serving a beneficial role in helping to keep the structure upright.

Figure 47 – West side of log structure.

Suggested Mitigation Work – A few of the logs that have rotted or shifted off center could be reinforced or replaced and shifted back into position directly over the underlying logs and secured against further movement. This would tend to stabilize the structure to some degree. It may also be advisable to install a few wood braces at key locations where shifting is possible. The logs next to the window and door openings could also be aligned more vertically and unobtrusively secured. Wood consolidants or water repellant solutions could be applied to the remaining logs, as appropriate.

Foundation or Support Structure

Condition – Poor

Priority – Low

Deficiency Description – The south end of the structure has settled noticeably (Figure 47), possibly due to rotting subsurface logs or other support components. An exploratory probe suggested that the logs have rotted very badly below the soil level as the result of long-term contact with soil moisture, bacteria, fungus, insects, etc. A small stream runs down the slope just a few feet from the east wall of the structure, saturating the ground with water, which could be accelerating moisture-related decay. It appears that this stream may have been rerouted by the recontouring of the area immediately west of the structure.

Suggested Mitigation Work – If possible, the small stream should be diverted farther away from the structure to allow the ground to dry out as much as possible. Perhaps the stream's channel could be deepened to reduce the chance of heavier runoff flooding the structure.

Doors and Windows

Condition – Poor

Priority – Low

Deficiency Description – The doors and window sashes are missing, possibly cannibalized at an early date for use elsewhere. Remains of some of the window frames are still in place. Some remnants of the door jamb are lying on the ground in front of the structure. Additional remnants of these features might be present in the debris and soil in and around the structure.

Suggested Mitigation Work – The surface of the area in and around the structure should be searched for any detached components that could be resecured to the structure. For example, if the doorway could be cleared of debris without causing any loss of support, any detached door jamb components could be nailed back into place, using appropriate cut nails.

Site Clean-Up

Debris, consisting mostly of logs and slash from forest clearing activities, has been piled up next to the south wall of the structure. This debris should be removed to reduce pressure against the wall and prevent the rapid buildup of smaller debris between the larger pieces, which could trap moisture against the wall.

Some kind of signs, flags, or barriers may be required to keep skiers and equipment away from the structure, which is susceptible to damage from ski area activities.

Some of the most recent buildup of debris inside and adjacent to the structure could also be cleared away, although care should be taken not to remove anything but the most recent debris that is lying on the surface. Otherwise, archaeological context and materials could be seriously disturbed or damaged.

Potential Safety Hazards

Potential safety hazards could be associated with this feature, but are not known to SWCA.

Interpretation Recommendations

Interpretive signage could be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity. Besides providing basic background information, the signage should point out interesting facts about the resource and take advantage of any clearly visible features to create a more interesting, educational, and personal experience.

This is an interesting feature, and appears to represent a very early period in Park City area mining history. However, little is known about this structure, so no specific interpretive signage recommendations can be made at this time.

OTHER PROPERTIES

Properties discussed in this section include the Flagstaff Mine site, the Naildriver Mine site, and their related features.

For location information, refer to the numbered items in Figure 2:

Flagstaff Mine Site

Historic Context

In 1862, Colonel Patrick E. Connor and 300 soldiers organized Fort Douglas in the Salt Lake Valley. Col. Connors' soldiers soon began prospecting in the mountains around Salt Lake City. Two years later, the first discovery of silver in the Wasatch Range was made at the head of Little Cottonwood Canyon. This would lead to the development of the famous Emma Mine at Alta in just a few years. This discovery is attributed to Colonel P.E. Connor.

In 1868, Col. Connors' soldiers made a discovery on a ridge overlooking Bonanza Flat, which would become the Flagstaff Mine. In 1871, the first ore shipment from a mine in the area was made from the Flagstaff Mine. The shipment consisted of 40 tons of galena ore that was shipped by wagons to a new railroad line at Echo City.

In 1873, E.P. Ferry purchased the Flagstaff Mine for $50,000 from James Kennedy, who had purchased the Flagstaff Mine from the soldier-prospectors who had originally discovered it. Soon after these investors arrived, F.A. Nims formed a "townsite company" and applied to the government for a townsite. With help from R.C. Chambers, the townsite company prevailed over the existing residents in the camp, who then had to purchase their property from Nims, who had received title to the townsite. This was the official start of the town of Park City.

The Flagstaff Mine eventually shut down due to the cost of operations relative to what it could produce, but in 1933, metal prices began to rise and some of the closed mines were reopened, including the old Flagstaff Mine, which produced for a while before shutting down again.

Please refer to the section, "Park City Mining District Historic Context," earlier in this report, for a detailed historic context of the Park City Mining District and how this property fits within that context.

Flagstaff Mine Shaft

Description

The Flagstaff Mine shaft is located near the top of Flagstaff Mountain, which lies between Empire Canyon and Ontario Canyon.

The shaft has been capped with a concrete slab and very little remains of the mining operation other than its waste dumps and some scattered materials that may have been associated with its surface operations.

A 1901 USGS survey (published 1903) shows a second shaft less than 200 feet from this shaft, but it apparently has been filled and was not noted during the site visits.

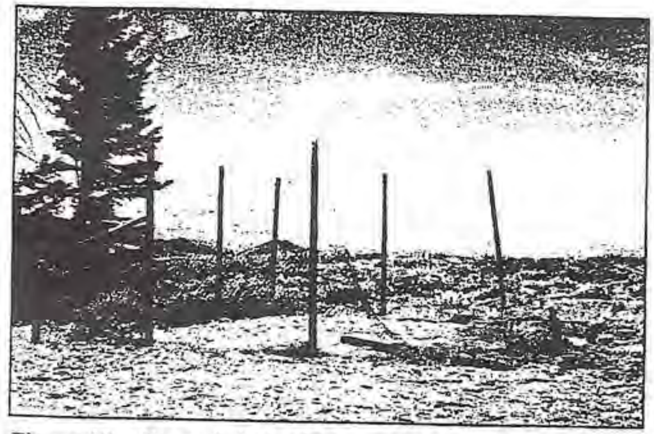


Figure 48 – Capped shaft of Flagstaff Mine.

There are also a large number of prospect pits scattered throughout the area, but it is not known if these are directly related to the Flagstaff Mine.

The Flagstaff mine is best known for being the first of the Park City area mines to have shipped ore, which took place in 1871.

Function

This feature represent the extraction and maintenance processes in a mining system. More specifically, the shaft was used to haul ore and waste rock from the workings and to transport miners, equipment, and supplies in and out of the mine.

Deficiencies and Suggested Mitigation Work

Deficiencies that affect this feature's structural integrity, promote damage or deterioration, or present obvious safety hazards have been noted in the following elements:

Mine Shaft

Condition – Unknown

Priority - None

Deficiency Description – The shaft has been capped with a concrete slab. The structural integrity of the slab is unknown. Some dilapidated fencing surrounds the concrete slab, but is no longer protecting it.

Suggested Mitigation Work – Assuming that there are no structural problems or safety hazards associated with this feature, no stabilization work is recommended at this time.

Potential Safety Hazards

The stability of the mine shaft or the concrete cap is not known. If the fencing is required for safety reasons, then it should be replaced. Potential safety hazards could be associated with this feature, but are not known to SWCA.

Interpretation Recommendations

Interpretive signage could be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity. Besides providing basic background information, the signage should point out interesting facts about the resource and take advantage of any clearly visible features to create a more interesting, educational, and personal experience.

For example, the signage could explain the role of the military in early prospecting activities and their association with this mine, which was the first in the area to have shipped ore in 1871.

Flagstaff Mine Waste Dump

Description

The Flagstaff Mine waste dump is located near the top of Flagstaff Mountain, between Ontario Canyon and Empire Canyon. It is not a tall feature, but is spread over a fairly wide area around the shaft location. It is probably in its original form.

Function

This feature represents the extraction process in a mining system. More specifically, it represents the discarded waste rock that was removed from a mine in order to access high-grade ore deposits.

Deficiencies and Suggested Mitigation Work

Deficiencies that affect this feature's structural integrity, promote damage or deterioration, or present obvious safety hazards have been noted in the following elements:

Waste Dump

Condition – Fair

Priority - None

Deficiency Description – The basic form of the waste dump appears to be intact and more or less in its original form. It is a visible feature of a mining landscape. Some vegetation is growing on parts of the waste dump, but there is still a considerable amount of bare material exposed to view.

Suggested Mitigation Work – Assuming that there are no structural problems or safety hazards associated with this feature, no stabilization work is recommended at this time.

Potential Safety Hazards

Potential safety hazards could be associated with this feature, but are not known to SWCA.

Interpretation Recommendations

Interpretive signage could be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity. Besides providing basic background information, the signage should point out interesting facts about the resource and take advantage of any clearly visible features to create a more interesting, educational, and personal experience.

The signage for this feature could be combined with the signage for the Flagstaff Mine shaft.

Naildriver Mine Site

Historic Context

In 1899, a face of ore at the Naildriver claim was found by Jack Creen, who had taken over the previously barren mine from John Morey.

In 1902, the Naildriver Mining Company was incorporated by Jack Creen. The following year, a new shaft was begun higher on the mountain to connect to its tunnel. A new headframe, bunk houses, shops, and other buildings were constructed, and within a year, the mine was sending wagon loads of high-grade silver ore down Ontario Canyon.

Low silver prices led to the closure of the Naildriver, but in 1935, silver prices rose to 65 cents per ounce and gold climbed to $35 per ounce. A number of mines reopened, including the old Naildriver. Eventually, the Naildriver—like other mines in the area—shut down for good.

Naildriver Mine Waste Dump

Description

The Naildriver Mine waste dump is located in the eastern portion of the Flagstaff Mountain Resort project area. It is the only significant remaining historic feature of the Naildriver Mine. The Naildriver shaft was plugged with concrete in 1980 and no historic features of the shaft remain visible. One item of note is that the Naildriver shaft was 2,980 feet deep—more than the height of two Empire State Buildings.

Function

This feature represents the extraction process in a mining system. More specifically, it represents the discarded waste rock that was removed from a mine in order to access high-grade ore deposits.

Deficiencies and Suggested Mitigation Work

Deficiencies that affect this feature's structural integrity, promote damage or deterioration, or present obvious safety hazards have been noted in the following elements:

Waste Dump

Condition – Fair

Priority - None

Deficiency Description – The basic form of the waste dump has not been significantly altered. It is a visible feature of a mining landscape. Some vegetation is growing on parts of the waste dump, but there is still a considerable amount of bare material exposed to view.

Suggested Mitigation Work – Assuming that there are no structural problems or safety hazards associated with this feature, no stabilization work is recommended at this time.

Potential Safety Hazards

Potential safety hazards could be associated with this feature, but are not known to SWCA.

Interpretation Recommendations

Interpretive signage could be installed to explain the history and function of this feature and describe its relationship with other historic mining-related features in the immediate vicinity. Besides providing basic background information, the signage should point out interesting facts about the resource and take advantage of any clearly visible features to create a more interesting, educational, and personal experience.

For example, the signage might draw attention to the extreme depth of the Naildriver shaft, some 2,980 feet. It might also mention how this mine, like others in the area, opened and closed with fluctuations in metal prices.

TREATMENT PLANS – GENERAL INFORMATION

Basic Categories of Treatment Plans

Treatment plans for historic resources can be divided into several broad categories, as outlined below. These plans can be carried out at different levels and are not necessarily mutually exclusive. For example, a structure might undergo basic stabilization work in addition to the partial restoration of some features.

No Action

This approach involves leaving the resource in "as-is" condition and allowing the forces of nature to act upon the resource. This is typically applied when a resource is relatively durable, isolated, or otherwise protected, or when it is assumed that other preservation options may be considered at some time in the future, in which case this option prevents demolition of the resource during the interim.

Demolition

This approach involves the physical destruction of a historic resource. It is generally only advisable when the resource lacks historic significance, poses a safety risk, lacks visual interest, has little physical integrity, or when no other options are feasible.

Relocation

If a resource has enough historic significance and integrity to justify the effort of moving it to a new location, this can be a viable approach in a number of circumstances, especially if the only other option is demolition. In some cases, moving the structure to an improved location may also improve its value as a community resource, such as when safety or accessibility is enhanced by the move.

Site Clean-Up

This approach involves a general site clean-up, including removing unsightly or dangerous debris, or materials that compromise the historical integrity of the resource. It may also involve landscaping activities, such as pruning shrubs, removing branches, cutting grass, removing or moving rocks, installing turf, laying down gravel, surface recontouring, etc.

Hazard Mitigation

This approach involves having an appropriately qualified individual or organization analyze possible safety hazards and recommend a treatment plan to mitigate the hazards. Actions might include repairing rotted flooring, securing loose boards, repairing structural elements of a building, putting a fence around a dangerous area, placing warning signs, etc. Hazard mitigation often overlaps into the stabilization, restoration, or adaptive reuse process, and vice-versa.

Documentation

This approach involves documenting a historic resource and archiving the information for public education and research purposes, for meeting the reporting requirements of any local, state, or Federal agency that may be involved, or for meeting the needs of other public or private entities that have an interest in the resource. There are many factors that could affect the type, level of detail, and organization of information relating to a historic resource.

Stabilization

This approach involves analyzing the physical condition and environment of a resource, designing a strategy for stabilizing the resource to arrest further deterioration or strengthen weak structural members, carrying out the stabilization work, and conducting periodic monitoring and maintenance. Stabilization work can range from minimal through very extensive. It may involve relatively simple steps, such as the application of coatings or penetrants to reduce the effect of weathering or consolidate loose or decayed material, removing threats to the resource from vegetation, soil, trash, or other objects, or minimal repairs to assure an acceptable level of structural integrity, protection from weather, and public safety. It may also involve fencing or other appropriate measures to prevent vandalism. Stabilization activities can overlap into hazard mitigation work, such as replacing weak structural elements.

Restoration

This approach involves analyzing a resource, researching its history, designing a strategy for restoring the resource to its original condition and appearance (or to its appearance at some historically significant period in its history), carrying out the restoration work, and conducting periodic monitoring, maintenance, and repair work on the resource. The term "restoration" is subject to interpretation. If carried to its logical conclusion, it may be an impossible task, but the general idea is to bring the structure as close as possible to some historically significant condition and appearance as possible, and to use materials and methods that are as authentic as possible, given some set of reasonable constraints. A full restoration can often be a difficult and expensive undertaking, requiring careful planning and a long-term vision of the role of the resource in the community. Security and public access are other issues that must be addressed.

Adaptive Reuse

This approach involves the use of a resource in a manner that may not be consistent with its historic use, but which serves to protect most of its historic integrity. Typically, the resource should be open to the public to allow the resource to serve an interpretive role in the community. Examples might include information centers, museums, gift shops, bookstores, coffeehouses, shelters for the public, and so forth. When planning for this approach, the same factors should be considered as for a full restoration of a resource. In addition, the intended use of the structure should be carefully researched to ensure its long-term viability. This is especially important when the new use is a commercial enterprise or when it will require a significant amount of continued funding to maintain it.

Interpretation

This approach involves developing a historic resource into an educational resource for the community. For example, at a minimal level, an interpretive plaque might be placed outside a structure to explain its role within a historic context and provide other information of interest about the resource itself or the surrounding area. At a higher level, a resource might be incorporated into a historic district, used as a living museum, or serve as a subject of a media documentary production.

Special Approaches

There will always be unique situations that demand specialized solutions. These solutions may consist of some combination of the above approaches, or they may be unique. The important thing is that any significant historical resource should be dealt with in a manner that will best "preserve" and "present" the resource for the maximum benefit to the community while operating within a practical constraints.

General Guidelines for Certain Treatment Plans

General Guidelines for Hazard Mitigation

As with any industrial landscape, there are potential hazards associated with mining-related activities and their remains. Hazards may include unstable structures, unstable ground over filled excavations, uncovered excavations, hazardous substances, etc. SWCA is not a safety engineering firm, and recommends that historic mining properties should be inspected by an individual or organization that is qualified to recognize potentially hazardous situations and recommend appropriate hazard mitigation measures.

To help assure that hazard mitigation measures are carried out in a manner that does not significantly compromise the historic integrity of the resources in this report, copies of hazard mitigation plans should be submitted to SWCA at the earliest opportunity for review prior to commencing activities.

General Guidelines for Site Clean-Up

Generally speaking, site clean-up activities involve the removal and disposal of debris and other items that compromise the aesthetics, safety, or historic integrity of a site. Materials to be cleaned up may be historic or modern (less than 50 years old). Generally speaking, modern materials should be removed, but historic materials should be left in place unless they are out of context, present a safety hazard, or are likely to be damaged or stolen. If removing any materials will cause significant disturbance below the ground surface, the action should be monitored for possible archaeological content. Any potentially hazardous debris, either historic or modern, should be dealt with according to acceptable safety procedures as outlined by the hazard mitigation consultant and in accordance with Federal, state, or local requirements. Refer to "General Guidelines for Hazard Mitigation," above.

In some cases, there may recent ground features that are aesthetically unpleasing, create hazardous situations, or make access difficult. If these are modern features, such as tire ruts or piles of sand or gravel, they may be filled, removed, or contoured to make them less obtrusive. However, if they are historic features, such as an old drainage ditch, a prospect hole, or the outline of an old building or foundation, they should not be disturbed unless they present a significant safety hazard, in which case the action should be monitored for possible archaeological content.

Certain modern features that are on or attached to a property may qualify for disposal. For example, if an otherwise historically authentic structure has a modern sign tacked onto it, the sign may usually be removed in a manner that does not damage the structure.

General Guidelines for Documentation

Documenting a historic resource and archiving the information may be necessary to meet the reporting requirements of local, state, or Federal agencies, or to satisfy the needs of any other public or private entities that have an interest in the resource. When a reporting requirement exists, the reporting guidelines should be obtained from the applicable agency or other entity before proceeding with research and the compilation of information. In the absence of any specific legal requirements for reporting, various other factors may affect the type, level of detail, and organization of information that should be compiled relating to a historic resource. Time, labor, and economic restraints may be limiting factors. The degree of interest in a particular historic resource and the perceived level of historic significance can influence the documentation effort. The desired or potential future plans for the resource can also be a major factor in determining documentation needs. Some expansion upon this latter factor may be in order.

For example, having adequate documentation of a feature prior to its demolition or alteration will help assure that information about that resource is not lost forever. One common approach in this situation is the preparation of a HABS/HAER (Historic American Buildings Survey/Historic American Engineering Record) document. HABS/HAER documentation generally includes measured drawings, large-format photography, and a history of the resource. The HABS/HAER program goal is to create an archive of American architecture and engineering and help people understand what historic resources can tell us about America's diverse ethnic and cultural heritage. This does not mean that HABS/HAER documentation applies only to features that are to be demolished or altered. This level of documentation can serve as a valuable resource about any historic features, regardless of what is planned for them.

As another example, if a historic feature is being considered for nomination to the National Register of Historic Places (NRHP), documentation should be created to satisfy NRHP eligibility criteria and meet NRHP reporting standards. Even if there are no plans for nominating a feature to the NRHP, it may still be useful to create documentation that could be used at some indeterminate time in the future as part of an NRHP nomination package. In addition, many state, county, and local government bodies have based their own standards for historic significance and integrity upon NRHP criteria, or slight variants thereof.

Of course, documentation can go much further, depending on the types and amount of available data for a historic resource and the ability or desire of the interested parties to carry out research work on the resource. It might include data recovery work from surveys and excavations, curation and registration of artifacts, detailed photography, recording oral histories, producing detailed floor plans and elevations, etc.

General Guidelines for Stabilization

Stabilizing a historic resource should maintain or restore a reasonable level of structural integrity to the resource (which often overlaps with hazard mitigation work), arrest or slow the rate of deterioration, and secure the resource to a reasonable extent against damage or wear from benign or malicious human contact, while retaining a reasonable degree of access as a community resource. Absolute stabilization is seldom, if ever, possible, but there are a number of measures that can significantly improve structural integrity and slow the rate of deterioration for many historic resources. Every resource requires a unique set of stabilization methods, due to differences in materials, environment, design, construction, security, visitation rates, and a host of other factors. For general planning purposes, here are a few areas of concern:

Protection from the Elements

This approach generally involves creating, replacing, or enhancing some kind of barrier to protect a historic resource from damage from natural sources, such as wind, rain, snow, hail, surface water, ground water, sunlight, insects, bacteria, fungi, etc. The barrier may be an existing element of the resource itself, such as the roof of a building, a secondary barrier, such as a canopy constructed over an archaeological site or a retaining wall, a coating material, such as paint or varnish, a chemical treatment, such as a water-repellent penetrant solution applied to wood or stone, a windbreak, such as a row of trees, etc.

The selection of appropriate methods can be problematic, since any obvious alteration or addition will affect the historic integrity of a resource, and "invisible" methods that enhance the resource's ability to withstand the elements are sometimes not as effective. A combination of approaches is often employed to produce an adequate level of protection without significantly compromising historic integrity.

Protection from Human Intervention

This approach generally involves restricting human access, or controlling the type, time, or rate of access to a property, with the idea of reducing vandalism, undue wear and tear, or compromising the feeling of a setting. This could involve constructing barriers, such as fences or walls, periodic or constant monitoring, alarm systems, closing off certain areas of a property during certain time periods, etc. Unfortunately, human access will be difficult to control for many of the properties in this report, simply because of the extent and relatively uninhabited state of much of the area, combined with the many possible means of entering and exiting the area. For more sensitive or valuable properties, fences may be the best solution.

A tall security fence is more effective, but it may significantly compromise the setting and feeling of a property and reduce its interpretive value, whereas a low, traditional fence will be less obtrusive and will control access by most reasonable individuals, but will not stop a serious vandal or thief. The nature of some of the properties in this report is such that they would not tend to attract miscreants, but others, such as a historic house or building, may be quite prone to vandalism. The complete restoration of a feature is not often recommended unless adequate security measures can be taken to protect it.

Structural Stabilization

This approach involves evaluating the structural integrity of a property, identifying any related structural problems, and implementing the necessary repairs or stabilization treatments in a historically correct manner, with the goal of maintaining or attaining an adequate level of structural stability. Structural stabilization work overlaps with hazard mitigation work, insofar as a lack of structural integrity may result in a potentially hazardous situation. For all but the simplest structures, the evaluation and planning stages should involve a qualified individual or organization, such as a structural engineering firm.

Whenever possible, structural stabilization work should be handled in a manner that does not limit a structure's potential for future restoration or adaptive reuse. This means that repair or replacement work should avoid compromising the historic integrity of a structure, and that reinforcement work, with the possible exception of permanent hidden reinforcements, should be reversible/removable without causing any significant damage to the structure.

Stabilization efforts tend to apply more to structural or protective elements of a structure than to finish or cosmetic elements, which often fall into the "restoration" category. However, an improvement in aesthetics and other aspects of historic integrity is often a secondary result of structural stabilization work.

Replace, Reinforce, or Repair?

Damaged or deteriorated components that are critical to structural integrity are high-priority elements. More often than not, these should be replaced or reinforced, although sometimes a structural element can be repaired to its original strength without adding external reinforcing members (this should be approached carefully, since many types of repairs do not restore original levels of structural strength, and their application is often irreversible). Some factors to consider when deciding whether to replace, reinforce, or repair structural elements are listed below. These guidelines factor in an underlying premise of maintaining maximum historic integrity while not limiting future restoration or adaptive reuse options.

Replacing Weakened Components

Replacing a damaged or deteriorated structural component generally requires more effort than reinforcement, although the results are often more satisfying from the perspective of maintaining historic integrity.

Replacement components should be duplicates, made of the same materials, with the same finish, and exhibiting the same type and quality of workmanship as the original. They should also produce the same design strength as the original. Components that are highly visible or represent important design elements would merit a greater effort to make accurate duplicates.

If a damaged structural element is unique and historically significant in and of itself, a reasonable option may be to leave it in place, in which case it should either be repaired or reinforced to bring it back to its original design strength. Replacement is still an option, although this would typically require that the original component be placed in an appropriate repository, such as a museum collection, to protect the item and allow its use in research or public education.

Reinforcing Weakened Components

Reinforcement is a very common approach in stabilization work, since it usually involves less effort than replacement. However, there are several factors to consider before proceeding with reinforcement work, such as whether to use visible or invisible reinforcement, or whether the reinforcement should be permanent or temporary.

Any kind of visible reinforcement to a weakened structural element will alter the form of a structure and compromise its historic integrity of design, workmanship, materials, setting, and feeling to some degree. On the other hand, visible reinforcement is a viable option under certain circumstances, such as for emergency stabilization or for interim stabilization until some future date when the original component may be repaired or replaced with an exact duplicate. There may also be some circumstances, as previously mentioned, when a structural element is historically significant in its own right, and where it is desired that the original component remain in place and undisturbed, in which case a visible reinforcement may be applied as either a temporary or permanent measure. In most cases, a visible reinforcement should be applied in a reversible manner that will facilitate its removal at a later date with only minimal damage (if any) to original components. Invisible reinforcement of a visible structural element is another option (refer to "Repairing Weakened Components," below).

Reinforcement is also a viable long-term or permanent option for hidden structural elements, such as wall studs that are permanently covered with wall materials, or floor joists that are covered by floor and ceiling materials. While not totally correct as a permanent measure from the standpoint of historical integrity, it is still a common approach that allows more effort and money to be directed to the more visible aspects of a stabilization or restoration project.

Repairing Weakened Components

Any repair of a weakened structural element should return the element to its original design strength, although this is often difficult to accomplish without reinforcement. There are numerous consolidants and fillers available, such as epoxy resins, polyurethanes, etc. that are quite strong, especially when impregnated with reinforcing fibers. However, these materials seldom impart the original tensile, shear, or bending strength to a structural element unless used in conjunction with some additional reinforcing material, such as fiberglass cloth, kevlar, carbon fiber, steel, etc. When repairing a damaged or deteriorated structural component, any permanent repair work should be invisible or at least unobtrusive, and should not significantly compromise the historic integrity of the component.

Invisible reinforcement is a common approach for repairing weakened structural elements, although it often requires specialized tooling and construction skills. One example of this would be the internal reinforcement of an intricately carved wooden banister, using a high-strength insert that runs the length of the banister. This would require boring a hole lengthwise through the component or cutting a channel in a manner that the channel could be filled in a nearly undetectable fashion after installing the insert. If properly executed, this kind of repair can often create greater-than-original structural strength.

Repairs can be temporary or permanent. Temporary repairs are less of a concern from the standpoint of historic integrity, but are more demanding in terms of reversibility with minimal or no damage to the repaired component. Permanent repairs should be designed to last for at least the normal expected lifespan of the original component when it was new, and in most cases should be as undetectable as possible. There are occasional exceptions to this visibility guideline, depending on the philosophy of the parties involved. For example, when repairing a historically significant and unique component (one that has historical significance in and of itself), some individuals or organizations may opt for using a repair material of a contrasting tone for filling holes or damaged areas, in order to distinguish the original portion of the panel from the repaired areas.

Generally speaking, due to the time and expense involved, repairing a component rather than replacing or reinforcing it tends to fall into the restoration category, although it is often used in situations where stabilization work is intended to be long-term or permanent and no restoration work is planned for the future.

TREATMENT PLANS – FLAGSTAFF MOUNTAIN RESORT PROPERTIES

The guiding factor in the design and selection of treatment plans for a historically significant resource is the need to "preserve" a resource, either by physically preserving or restoring the resource itself, or by documenting the resource prior to its disposal or alteration. This underlying philosophy helps ensure that the resource—or the knowledge to be gained from it—is not lost to society. Treatment plans can range from "no-action" through various levels of stabilization work to total restoration or adaptive reuse of a resource. They may also involve demolition, relocation , documentation, or interpretation of a resource.

There is typically a wide range of viable treatment options for any given historic property. Some options may prove more practical than others, depending on many different variables. There are always a number of logistical factors, such as financial resources, time limitations, availability of materials and skilled labor, legal issues, ownership issues, zoning requirements or limitations, etc. There are also a variety of important factors to consider that relate to the property itself.

For example, some typical factors to evaluate when considering stabilization work include:

- The historical significance and interpretive value of a resource.
- The community's level of interest in a resource.
- Any imminent threats to a resource.
- The remaining physical integrity of a resource and whether or not stabilization is feasible.
- The archaeological potential of a resource.
- The resource's potential for later restoration or adaptive reuse.
- The ability to monitor and maintain the integrity of a resource after stabilization.
- Any issues relating to hazard mitigation, damage avoidance, vandalism prevention, etc.

As another example, when considering the restoration or adaptive reuse of a historic resource, there are several prerequisites that will help assure a successful long-term outcome, including:

- Adequate historical significance and interpretive value.
- An adequate increase in value to the community as the result of restoration or adaptive reuse.
- A mechanism for periodic inspection, continual maintenance, and appropriate repair work.
- A source of continued funding, labor, or other resources for inspection, maintenance, and repairs.
- An effective security plan to control access, monitor disturbances, and prevent abuse.
- An established individual or body with authority over the historic resource.
- An adaptive reuse plan that allows an adapted resource to serve a viable, long-term purpose.

There are many viable treatment options for the historic properties in the Flagstaff Mountain Resort area. As with other historic resources, some options may not prove practical under certain circumstances. Until long-term plans are designed or selected for these properties, a recommended conservative approach would be to stabilize certain historic features that are structurally unsound or rapidly deteriorating. By solidifying and protecting these features, a variety of future treatment choices will remain open.

Table 2 lists the historic properties described in this report and shows both viable and recommended treatment options for those properties. "YES" indicates an option that is recommended at the time of this writing. "NO" indicates that an approach is not recommended or viable at this time. "Viable" indicates that an approach may be viable, but is not necessarily recommended at this time. "????" indicates that not enough data is available to make a recommendation, or the potential success of a treatment option is unknown. Circumstances affecting the viability or practicality of these options are subject to change.

Table 2 – Treatment plan matrix for historic properties

Key: *YES = Recommended; NO = Not recommended or viable; Viable = Viable option; ???? = Unknown at this time or lack of adequate data*

Property or Feature	Demolition	Relocation	Site Clean-Up	Hazard Mitigation	Documen-tation	Stabiliza-tion	Restoration	Adaptive Reuse	Interpreta-tion
Ontario Mine Shaft No. 3 Site									
Ontario Mine Shaft No. 3 (page 39)	NO	NO	????	YES	Viable	Viable	????	????	YES
Ontario Mine Shaft No. 3 Waste Dump (page 41)	Viable	NO	????	????	Viable	Viable	NO	????	YES
Silver Mine Adventure (page 42)	Viable	????	????	????	Viable	????	N/A	Viable	????
Water Tanks (page 43)	Viable	Viable	????	YES	Viable	YES	Viable	????	YES
Judge Mining & Smelting Co. Site									
Anchor (Daly-Judge) Drain Tunnel (page 49)	NO	NO	YES	YES	Viable	YES	????	????	YES
Judge Mining & Smelting Company Office (page 51)	Viable	????	YES	YES	Viable	YES	Viable	Viable	YES
Explosives Bunker (page 59)	Viable	????	????	????	Viable	Viable	Viable	Viable	YES
Modern Shed (page 61)	Viable	Viable	????	????	Viable	????	N/A	Viable	????
American Flag Mine Site									
American Flag Mine Waste Dump (page 63)	Viable	NO	????	????	Viable	????	NO	????	YES
Daly Mine Site									
Daly Mine Shaft No. 1 and No. 2 (page 67)	Viable	NO	????	????	Viable	Viable	NO	????	YES
Daly-West Mine Site									
Daly-West Mine Headframe and Shaft (page 70)	NO	NO	????	????	Viable	Viable	Viable	????	YES
Daly-West Mine Hoist Shack (page 72)	NO	????	????	????	Viable	????	N/A	????	Viable
Daly-West Mine Fire Hydrant Shacks (page 73)	Viable	Viable	YES	????	Viable	YES	Viable	Viable	YES
Rock Retaining Wall (page 75)	Viable	NO	????	????	Viable	YES	????	????	Viable
Daly-West Mine Waste Dump (page 77)	Viable	NO	????	????	Viable	????	NO	????	YES
Quincy Mine Site									
Quincy Mine Hoist Plant (page 79)	Viable	Viable	YES	YES	Viable	YES	????	????	YES
Quincy Mine Shaft (page 83)	Viable	NO	????		Viable	????	NO	NO	YES
Quincy Mine Waste Dump (page 84)		NO	????	????	Viable	Viable	NO	????	YES
Rock Retaining or Foundation Wall (page 85)	Viable	NO	????	????	Viable	Viable	????	????	Viable
Little Bell Mine Site									
Little Bell Mine Ore Bin (page 88)	Viable	Viable	????	YES	Viable	YES	Viable	????	YES
Little Bell Mine Waste Dump (page 94)	Viable	NO	????	????	Viable	????	NO	????	YES

Property or Feature	Demolition	Relocation	Site Clean-Up	Hazard Mitigation	Documen-tation	Stabiliza-tion	Restoration	Adaptive Reuse	Interpreta-tion
Diamond-Nemrod Mine Site									
Diamond-Nemrod Mine Waste Dumps (page 97)	Viable	NO	????	????	Viable	Viable	NO	????	YES
Timbers (page 98)	Viable	Viable	????	????	Viable	Viable	NO	Viable	????
Anchor (Daly-Judge) Mine Site									
Anchor Mine Waste Dump (page 101)	Viable	NO	????	????	Viable	Viable	NO	????	YES
White Pine Mine Site									
Log Structure (page 105)	Viable	Viable	YES	YES	Viable	YES	Viable	????	YES
White Pine Mine Waste Dumps (page 103)	Viable	NO	????	????	Viable	????	NO	????	YES
Flagstaff Mine Site									
Flagstaff Mine Shaft (page 111)	Viable	NO	????	????	Viable	????	NO	NO	YES
Flagstaff Mine Waste Dumps (page 113)	Viable	NO	????	????	Viable	Viable	NO	????	YES
Naildriver Mine Site									
Naildriver Mine Waste Dump (page 115)	Viable	NO	????	????	Viable	Viable	NO	????	YES

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