MINING THE AMETHYST VEIN

Selective Cultural Resource Inventory of the Principal Historic Mine Sites on the Amethyst Vein

Creede Mining District

Mineral County, Colorado

Volume I

Prepared Under Contract Between

Willow Creek Reclamation Committee

and

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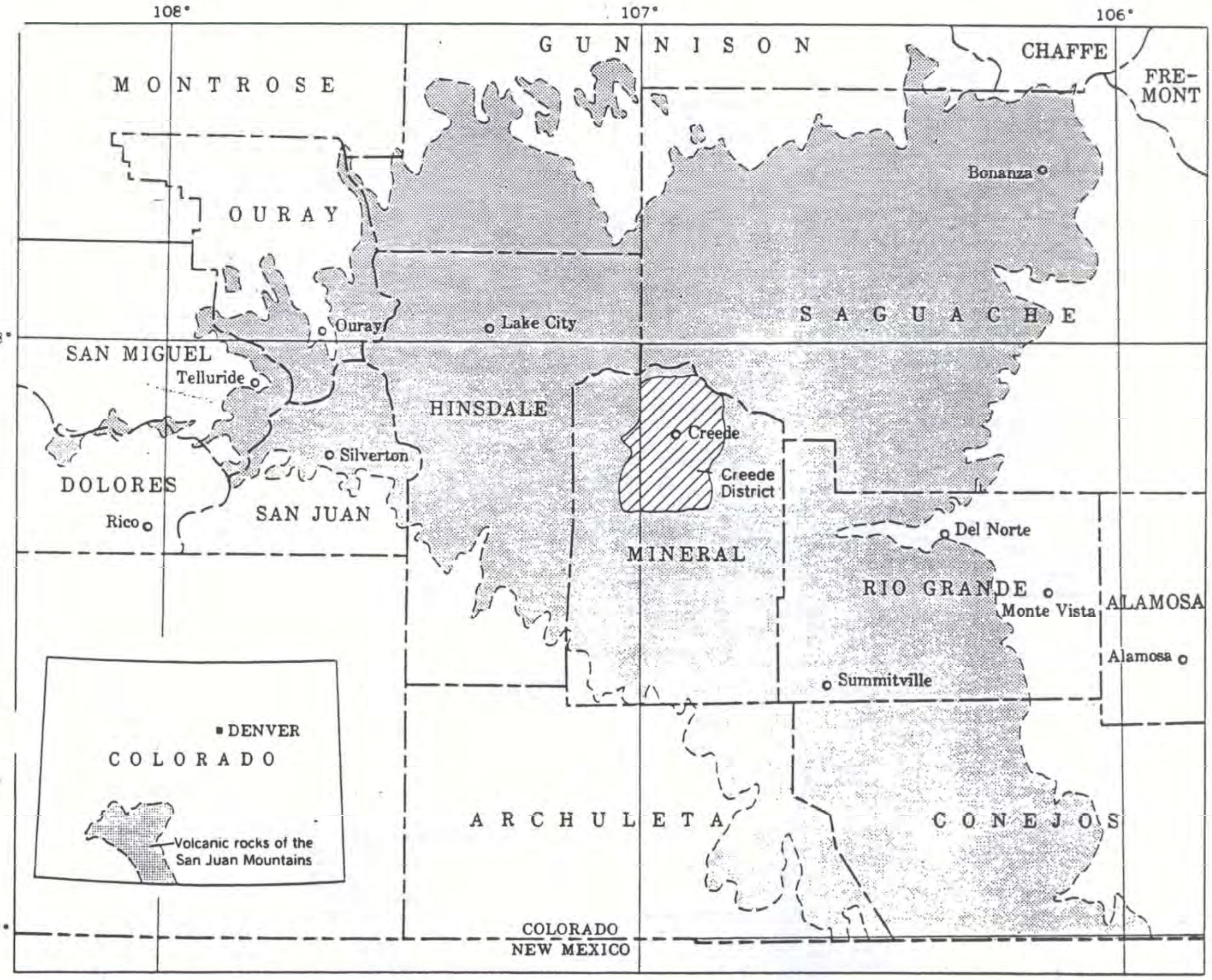
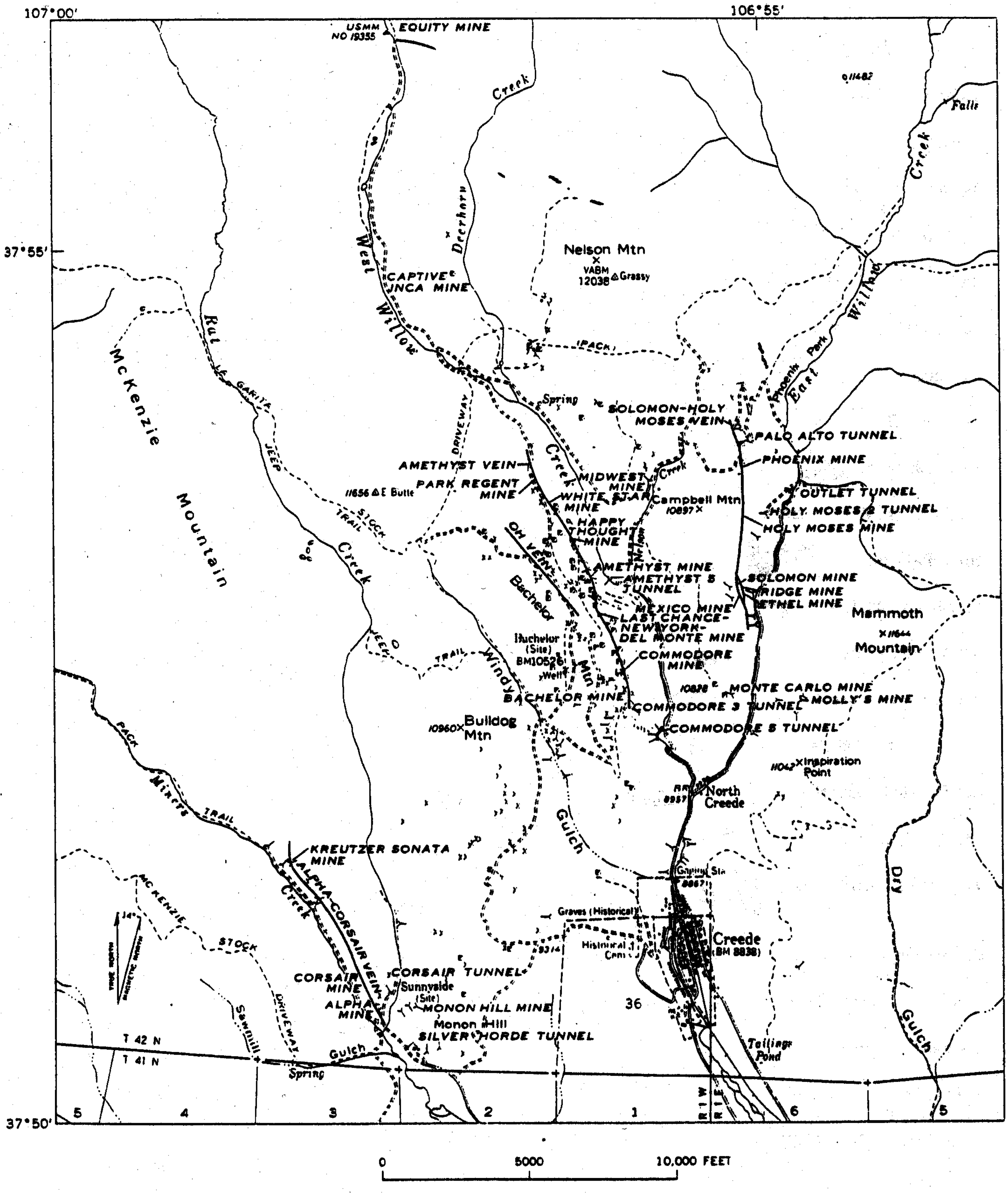


Map of the principal ore veins, mines, and prospects in the Creede Mining District, Mineral County, Colorado. Steven & Ratte, 1965.



ABSTRACT

During the summer of 1999 Mountain States Historical inventoried the principal historic mine sites and select prospect sites on the Amethyst Vein in the Creede Mining District, Mineral County, Colorado. A total of 12 mine complexes and 4 prospect complexes were recorded in a manner surpassing Class III standards.

Most of the sites included the remains of mine surface plants and associated residential features. Analysis of the material remnants has led to an understanding of mining and associated residential occupation on the Amethyst Vein.

Nearly all of the recorded sites possess value as cultural resources, and most are eligible for listing on the National Register of Historic Places. The sites retain a high degree of historical integrity and possess ambiance. The large mine complexes also encompass standing structures, intact machinery, and buried archaeological deposits. Management recommendations for the elegible sites include stabilizing standing structures, excavating buried deposits, and limiting potential disturbance caused by possible environmental remediation efforts to portions of the sites that have already been disturbed.

CHAPTER 1 INTRODUCTION

Project Overview

In 1999 the Willow Creek Reclamation Committee discussed with Mountain States Historical the need to conduct a voluntary cultural resource inventory of the principal historic mine sites within the Creede Mining District.

The Willow Creek Reclamation Committee formed in response to the Environmental Protection Agency's concern over potential metals contamination entering into local waterways from the Creede district. The Committee consists of representatives of local government, private landholders, the Department of Fish and Game, the US Forest Service, the EPA, and the Colorado Department of Public Health and the Environment. Fearing EPA action, the Committee elected to address the potential environmental problems on its own. The Committee, which is adamantly pro-historic preservation, feels that direct involvement by the EPA is highly undesirable because the EPA may damage historic sites, and the EPA may seek to name property owners as Potentially Responsible Parties. The Committee and Mountain States Historical assumed that the Creede district's principal historic mine sites are probable contributors of metals, and may therefore be involved in future environmental remediation.

In the worst case, environmental remediation could involve the wholesale removal of waste rock and tailings associated with the historic mine sites, with the cleanup at Leadville, Colorado serving as an example. In so doing, the historic integrity of the mine sites would be destroyed, and when considered in sum, this would damage the historic integrity of the Creede Mining District. The Creede district encompasses one of the West's most intact sets of historic mine sites, and the loss of historic integrity would be a permanent detriment to the public, and to the local economy, which relies on the tourists drawn by the historic mines. In the best case, water diversion systems may be installed at the mines that contribute metals to control run-on/ run-off. Such systems would slightly compromise the sites' historic integrity.

The Committee acted in a proactive fashion and contracted with Mountain States Historical to begin conducting an inventory of the Creede Mining District's principal historic mine sites, which will influence possible remediation plans. During the summer of 1999 the principal mines and selected prospects on the Amethyst Vein were inventoried. All sites were located on private property. In all, 14 mining, milling, and residential complexes were addressed. The inventory is a voluntary action and was initiated with an emphasis on preservation, and on favorable but objective evaluation of the target mine sites.

The Committee contracted with Mountain States Historical because the consultant specializes in recording, evaluating, and interpreting historic mine sites. Eric Twitty, principal investigator, conducted all fieldwork, analysis of data, and preparation of the report and historical context.

In association with the inventory, Mountain States Historical developed a historical context for the district which includes the principal factors that may have influenced mining. The context document serves as historical framework for this and future cultural resource work in the district.

Project Area

The inventory was limited to the seven principle historic mines and four selected prospects located along the Amethyst Vein, which extends two miles north from the Nelson Tunnel portal, located on West Willow Creek, to the Park Regent Mine. Mountain States Historical defined each *mine* as a set of underground workings attributed to a *single mining operation*, and all directly associated *surface plants*. For example, four of the selected mines, the Amethyst Mine, the Bachelor Mine, the Commodor Mine, and the Last Chance Mine, featured two openings each that provided access to a maze of underground workings. The individual openings were equipped with independently functioning surface plants. Each surface plant was inventoried separately, and analyzed in terms of belonging to the greater mining operation. A surface plant historically consisted of the collection of facilities that supported work underground in a particular mine opening. For a detailed definition of the function of a surface plant, see Chapter 4 in the historical context. The cultural resources not directly associated with the selected mines' surface plants were not included in this study.

In the early 1990s the Colorado Department of Minerals and Geology inventoried some of the sites included within the project area. In the cases of the Commodor and Amethyst mines, the Department inventoried only one of the two surface plants associated with each mining operation. Specifically, the Commodor Mine features two tunnels, and the Department only inventoried the surface plant associated with the lower entry. In this case, Mountain States Historical rerecorded the lower tunnel and it used the original site number for reporting, and it obtained a new site number for the upper tunnel. The Amethyst Mine features a shaft and a tunnel. The Department only inventoried the tunnel complex. Mountain States Historical rerecorded the tunnel complex and it used the original site number for reporting, and it obtained a new site number for the shaft.

CHAPTER 2 EFFECTIVE ENVIRONMENT

The Creede Mining District covers an area of approximately 47 square miles in Mineral County near the upper Rio Grande River in the east San Juan Mountains. The district encompasses much of the Willow Creek drainage system, Miners Creek, and land along the Rio Grande River's north side. The region's topography is predominantly mountainous. Extremely rugged terrain rises along the north side of the Rio Grande River Valley and culminates in a series of 12,000-13,000 foot high peaks, which form the Continental Divide. Both the Divide and the Rio Grande valley extend east-west in the vicinity of the mining district. East and West Willow creeks, their tributaries, and Rat and Miners creeks dissect the mountainous area within the district. East and West Willow creeks join to form Willow Creek, Rat Creek drains into Miners Creek, and they flow south into the Rio Grande.

The terrain within the district is typical of that resultant from volcanic activity. Gently sloped terraces and the summits of table top mountains lie between approximately 10,000 and 11,000 feet, and the topography below is steep and rocky. Further, volcanic rock formations manifest as cliffs and pinnacles in the lower, eroded portions of the East and West Willow creek valleys.

Because the Creede Mining District is located in the eastern San Juan Mountains, it lies within rain shadow, and as a result, the ecological communities adapted to dry conditions. The Rio Grande River Valley features stands of juniper-pinion trees and areas of grassland, while the mountain slopes bounding the valley support subalpine fir and spruce forests. Lodgepole pines and fir trees predominate the dry lower slopes, and spruce trees replace the pines with increase in elevation. In addition, stands of aspen trees thrive on flat areas above 8,500 feet. Some of the groves are natural, while many others grew in logged clear-cuts. Because the soil within the district, ranging from silty to sandy loam and is well-drained, ground cover in the forests is limited to woody, drought-tolerant species such as mountain juniper, holly, and kinnikinnick. Subalpine meadows thrive in open areas between forests, and arctic willows line most of the area's stream channels.

The climate in the district is typical of that in the drier, deep Rocky Mountains. The summers tend to be warm, however the temperatures during the day rarely exceed 85 degrees Fahrenheit, and the nights cool down to the 40s and 50s. The months of June and September are often dry, while thunderstorms punctuate the afternoons July through August. The Fall also tends to be dry, yet the weather has an element of unpredictability. At the least, the temperatures during both day and night are cooler than during the summer. Cold snaps, snow, and prolonged warm weather are possible during September through November. Winter usually commences during November and lasts until late April. During wet years, periodic storms can deposit up to several feet of snow at a time and send temperatures plummeting below zero degrees. The San Juans occasionally experience dry years in which little snow accumulates and temperatures rise into the 30s and 40s. Because cold air tends to sink, during the winter the mountain canyons channel streams of frigid air, while the areas on the slopes above tend to be much warmer. The prevailing winds in the area blow from the west, and they may carry in storm systems. In all, the climate in the Creede Mining District is hospitable for much of the year, however winter storms and wet summers presented the early settlers with a formidable challenge.

CHAPTER 3 ECONOMIC GEOLOGY

To gain a full comprehension and appreciation of mining in Creede, a brief account of the district's geological history and fabulous ore bodies is important. The San Juan Mountains began to rise approximately 100 million years ago, during the Cretaceous Period, when powerful forces in the earth's mantle forced the region up out of an ancient sea floor. A dome of magma intruded the Earth's crust and the heat and pressure caused the overlying sedimentary rocks to metamorphose, fracture, and dome upward. This intense activity abated and the Ancestral San Juan Mountains were eroded almost totally flat, resorting back to a sea floor. The importance of these geological events lay not in the creation of lasting topography, but in the deposition of the minerals sought by miners during the nineteenth century. As the magma body intruded into the overlying sedimentary formations when the Ancestral San Juans formed, the rock strata became fractured and superheated fluids, mostly water, deposited metal ores in the form of veins and chimneys in the cracks and areas of weakness. These ores were not the bodies worked by Creede's miners, but their impact on Creede was crucial, because they initially drew the prospectors who eventually located Creede's rich deposits. Several million years would pass before the ore systems at Creede formed.[1]

After the Ancestral San Juans had been uplifted and eroded to their base, the area became the focus of intense volcanic activity which created the mountains that exist today. The first eruptive period deposited thousands of feet of andesitic and conglomerate rock strata that geologists have termed the San Juan Formation. When the volcanic activity abated, natural forces make significant headway eroding the strata. Two more violent eruptive periods subsequently occurred, in which the Silverton Volcanic Group formed, followed by the Potosi Volcanic Group. Andesite tuff comprised the Silverton Group and rhyolite comprised the Potosi Group. The portion of the Potosi Series in our area of study is known as the Creede Formation. After the explosive volcanic activity, the San Juan region subsided, creating expansive fault systems. Further, subsidence of the many caulderas associated with the volcanic activity resulted in localized radial faulting. The Creede area was subjected to both types of faulting, laying the groundwork for the formation of the fabulous ore bodies mined during the nineteenth century.[2]

Even though the volcanic activity largely ceased, the San Juan region was by no means geologically quiet. The area experienced periodic upheavals followed by settling, and superheated fluids began infiltrating the fault systems. In many areas the fluids deposited veins of silicic rocks such as gabbro, diorite, quartz, monzonite, and pegmatite in the fractures. In the Creede area, the fluids deposited silver, lead, zinc, and minor amounts of other metals in some of the fractures. Over thousands of years, great fluctuations in the region's groundwater redeposited the metalliferous materials, enriching the zones near the water table. This factor was the primary reason that Creede's ores were located relatively close to ground surface.[3]

The Creede district became host to four principal vein systems resulting from the millions of years of geological processes. The veins were oriented primarily north-south, and they dipped steeply eastward. The eastern-most vein system, termed the Mammoth Vein, lay under Mammoth Mountain on the east side of East Willow Creek. Unfortunately for some of Creede's prospectors and mining companies, the Mammoth

Vein proved to contain only limited quantities of economic ore. The Soloman-Holy Moses Vein, the second principal system, lay underneath Campbell Mountain on the west side of East Willow Creek. The Soloman-Holy Moses proved to one of the district's richest ore bodies, and its discovery by Nicholas Creede and associates in 1889 stimulated greater exploration for Creede's mineral wealth. The Last Chance-Amethyst Vein, the district's third important vein system, proved to be an unequaled bonanza for mining companies. The system consisted of one main vein flanked by minor stringers, and it extended uninterrupted for over two miles along the west side of West Willow Creek. The Amethyst Vein proved to be the district's richest ore system, and it experienced activity for almost 100 years. The district's last significant ore system, the Alpha-Corsair Vein, lay along the east side of Miners Creek. The Alpha-Corsair Vein was the first to be discovered in the district and it ranked third in importance.[4]

Miners found the ores in these veins to be quite favorable for extraction and milling. Most of the ores consisted of zinc compounds, galena, pyrites, argentite, native silver, and gold in a matrix of plain and amethyst quartz, chlorite, barite, fluorite, and additional sulphates. This mineral blend filled the voids created by faulting in the hard volcanic country rock. Alteration to the country rock abutting the veins was minimal, and as a result the ore broke away easily and cleanly. In addition, the ores tended to be soft, making drilling and blasting easy, and in some places it was so soft that miners extracted it with pick and shovel. In many places the country rock maintained integrity, resulting in sound hanging and footwalls. Several mines on the Amethyst Vein experienced catastrophic cave-ins, which were probably a result of poor engineering and oversight, rather than inherently unstable geology.[5]

The shallow natures of Creede's vein systems lent themselves well to initial exploration through adits. However, as mining companies developed the ore at depth, they realized that shafts were necessary to profitably extract the payrock. Hence the mine workings in the district tend to include both adits and shafts, and most of the workings on each vein system tend to be interconnected. Engineers joined mine workings for three main reasons. First, it allowed for thorough exploration of consolidated mineral claims. Second, interconnected workings provided access and escape routes in the event of danger. However, the most important factor proved to be ventilation. Like other mining districts in volcanic geology, Creede's miners encountered gases such as nitrous compounds at depth. The gases displaced breathable air, which impeded the extraction of ore. As a result, mining companies were forced to link workings to stimulate the movement of natural air currents where possible, and to employ ventilation fans where necessary.[6]

The ore systems at Creede presented a curious variety of opportunities and obstacles for mining companies. The Soloman-Holy Moses and the Amethyst veins contained huge quantities of silver-rich compounds which produced up to $80 to $100 per ton. Once mining companies exhausted the shallow ores in the principal veins by the end of the Gilded Age, mining engineers and geologists pooled their knowledge and searched for additional veins, which they periodically encountered from the 1920s to the 1960s during underground exploration. In addition to new discoveries, mining companies found that Creede's seemingly exhausted principle veins offered low-grade ores left by early operations as unprofitable. By working new and old veins, mining companies in Creede and their workers profited from 1891 until the early 1980s.

End Notes

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CHAPTER 4 THE HISTORY OF THE CREEDE MINING DISTRICT

Silver is Discovered

For centuries the San Juan Mountains were the exclusive domain of the Ute Indians. Rugged, remote, and inhospitable, Spanish, then American explorers examined the piedmont areas surrounding the mighty range, but few ventured deep into the mountains. Rumors circulated that the Spanish had mined silver in the mountains as early as the late 1700s, and if so, their impact was limited. Then, in 1865, the Utes saw their isolation and peace begin to erode. A party of prospectors led by Charles Baker penetrated deep into the Animas River drainage in search of placer gold. The party encountered minor amounts of the metal near present-day Silverton, and while they did not locate economic quantities of gold, the prospectors' impact was great. The Baker party reported that the San Juan Mountains held great promise for mining, and they proved that the area could be accessed. During the next 10 years other prospecting parties imitated Baker, and in addition to placer gold, they sought hardrock gold and silver, which the San Juans offered in abundance. Their success in finding riches stimulated mining, which led to the growth of settlements such as Silverton, Ouray, Telluride, Lake City, and Rico. Due to the remoteness of the San Juans, and because of the threat posed by angry Ute Indians, mining developed slowly.

The Utes were not hostile at first. They understood that Whites were interested in minerals and not in extensive settlement, and they permitted prospectors to search the high country unmolested. However, as more Whites arrived in the early 1870s, conflict seemed eminent. When faced with the disaster of another Indian war, the federal government employed the typical strategy in which it coaxed the Indians into signing a treaty. In 1873, Felix Brunot, President of the Board of Indian Commissioners, held negotiations with Chief Ouray, and hammered out the Brunot Treaty. According to the agreement, the U.S. Government paid the Utes $25,000 for 4,000,000 acres of mineral-bearing land, and the Utes retained the right to hunt on the ceded territory. With the treaty in effect and the threat of hostile Indians mitigated, isolation became the main impediment to mining in the San Juans. To facilitate the region's development, Colorado road-builder Otto Mears, freight companies, and mining interests all contributed to the development of a network of roads, some barely passable even after completion, between the many settlements in the mountains.[i]

Ironically, the area that became Creede lay just several miles north of one of the most heavily traveled routes into the deep San Juans. Prospectors, freighters, and other travelers followed the Rio Grande River on their way to Lake City and the Silverton area, unaware of the riches that lay near Wagon Wheel Gap, which served as a way stop. Further, the Denver & Rio Grande Railroad graded a line through South Fork, 20 miles south, increasing traffic along the Rio Grande.

After the Brunot Treaty had been negotiated, parties of prospectors felt less inhibited and they fanned out, searching remote and inaccessible areas of the mountains for ores. In 1876, one group including John C. McKenzie and H.M. Bennett, examined the area that became Creede, which was unsettled at the time. After considerable prospecting they discovered silver ore west of where the city of Creede would stand, and they staked the Alpha claim. The party failed to rouse interest in their find, and, still holding optimism for the area, returned on subsequent prospecting forays. In 1878 McKenzie discovered another ore body and staked the Bachelor claim, named after his marital state. Little did McKenzie suspect, as he erected his claim posts, that he was standing on one of Colorado's richest and longest ore veins. After prolonged failure to stimulate interest and arouse investors, Creede's first successful prospectors sold the Alpha in 1885 to brothers Richard and J.N.H. Irwin. McKenzie optimistically retained title to the Bachelor. After attempting to work the ores in arrastes, and after further futile searches, the various parties gave up.[ii]

In 1889, 13 years after McKenzie and Bennett first drew attention to the area, another party of prospectors encountered bonanza ore. In May, Nicholas C. Creede, E.R. Taylor, and G.L. Smith located the Holy Moses claim on Campbell Mountain, which they named after their exclamation of astonishment and surprise at the strike's richness. Nicholas Creede, for whom the district is named, was no ordinary prospector. Creede was born William Harvey in Fort Wayne, Indiana in 1842. He fell in love with a young woman, and during their courtship she left Harvey for his brother. Harvey may have even married his beloved. Horrified, Harvey left home and changed his name to Nicholas C. Creede. The young Creede arrived in Colorado in 1870, lured by the sirens of mineral wealth. Creede successfully prospected in the Collegiate Mountains, and he had better luck than other hopefuls in the range’s Silver Creek area. There, he sold an ore-bearing claim for a little money, and within a short time the purchasing company began turning a handsome profit. Creede felt that he had been taken, and vowed never to sell low again.[iii]

Creede's demise was tragic. After locating the Holy Moses claim, the party of prospectors interested an investment syndicate including mining and railroad magnate David H. Moffat, U.S. Army Captain L.E. Campbell, and Denver & Rio Grande Railroad general manager Sylvester T. Smith. The business trio not only supplied capital to develop the property, but they hired Creede to serve as their professional prospector. Their decision to retain Creede proved wise, because he subsequently staked the Ethel claim, and in 1891 he located the fabulous Amethyst Mine. Creede sold a share of each of his finds to his employers, but remembering his lesson learned in the Collegiates, he kept a substantial portion for himself. Creede had accomplished what other prospectors only dreamed of. He encountered mineral wealth several times and profited handsomely from each. Within a short time Creede retired in Pueblo, then moved to Los Angeles in 1893 to enjoy the mild, dry, sea-level climate. A storm was brewing for Creede in the East, however. By 1897 Creede's estranged wife, of whom little is known, had learned of her spouse's good fortune, and she made it known that she was planning on coming out West to live with Creede. When Creede learned of his wife's intent, he panicked, and in his despair he took an overdose of morphine.[iv]

The word of Creede's find began spreading through Colorado, and prospectors traveled to the King Soloman district, as the area was then known, in 1890 to examine the potential. Several new-comers and seasoned prospectors made further discoveries, lending to the growing curiosity. Veteran prospectors Dick Irwin and Nick Crude, who served as one of Kit Carson's scouts, encountered silver and lead ore near the old Alpha claim. In 1891 a party of prospectors including Theodor Renniger, Ralph Granger, Julius

Haas, and Eric Von Buddenbock, subsisting on a $25 grubstake, set up camp and began their search for wealth. The party encountered samples of float along the banks of West Willow Creek and followed the lead upslope. Unsure of what they had found, the prospectors asked Creede to examine their strike and pass judgement. Creede immediately recognized the richness of the ore, and urged the prospectors to stake claims, which they did under the name Last Chance. Inspired by the party's find, Creede calculated the orientation of the ore body, traveled a short distance north, and staked the Amethyst claim. The Last Chance and Amethyst mines became the district's wealthiest operations.[v]

Creede and his party of prospectors interested the Moffat syndicate in the Holy Moses in 1891. The district was largely unknown to the mining world at that time, and Moffat probably surmised that he and his associates were presented with a mining investors' dream. Moffat's syndicate had the opportunity to buy a cluster of fabulous mines at low prices, before attention from the mining world drove prices up. The Moffat syndicate's interest in Creede's claims lent legitimacy to the area and served as a crack in the dike retaining the waters of further investment.

Shortly after Creede and Moffat's deal for the Soloman, Renniger and his party acquired investors for the Last Chance. Julius Haas sold his share in the claim to the other three prospectors for $10,000. Renniger and Von Buddenbock sold their shares to investors Jacob Sanders and S.Z. Dixon for $50,000 each. Like Creede, the last of the Renniger party, Ralph Granger, refused to completely sell out, even when offered $100,000. Granger, Dixon, and Sanders interested Willard Ward and silver magnate Henry O. Wolcott in the property, and the men formed the Last Chance Mining Company. The activity in the district had finally drawn the attention of the mining industry. The conservative mining periodical *Engineering & Mining Journal* described the finds as "immense", lending fuel for a rush.[vi]

Reports of the Creede district's wealth began rippling first through Colorado, then through the West, and finally to other parts of the nation in 1891. Mining industry workers, professional miners, roustabouts, and hopefuls ventured to the new area, causing the area's population to soar. Most of the newcomers stopped over in one of several camps near the Rio Grande River, and many continued several miles up to the high country to stake claims. By 1891 prospectors had determined that the best ore was concentrated in three vein systems, the Amethyst, Holy Moses, and the Alpha, discussed in the geology section above.

East and West Willow creeks served as the principal gateways to the Holy Moses and Amethyst veins, respectively, and camps naturally sprung up at the creeks' confluence. Prospectors had established the camp of Creede on East Willow Creek as early as 1890, the camp named Jimtown grew along the main trunk of Willow Creek approximately one mile downstream, and South Creede sprang up downstream from Jimtown. Crude's Camp, also known as Sunnyside, rose to the west near the Alpha ore system. Each town became a commercial center, attracting merchants, the offices of brand new mining companies, and local government. Tides of miners and prospectors coming from and going to the workings ebbed and flowed through the settlements.[vii]

The Creede district's four main camps were typical of the West's boomtowns spawned by mining rushes. The inhabitants focused on making money, and as a result the development of social and physical infrastructures became a secondary priority. Architecture was also a secondary consideration. At first, the camps consisted of a mix of wall tents, log cabins, and rough frame buildings, all with limited floor space. Yet, businesses such as saloons, hotels, and mercantiles abounded. Like other Western mining settlements, Creede's camps grew in topographically inappropriate places. Except for Sunnyside, the other camps were located in the deep and constricted canyon of Willow Creek, which presented traffic problems and the threat of flooding. By 1891 the population of the camps along Willow Creek soared from several groups of prospectors to approximately 1,000 inhabitants.[viii]

The prospecting and mining activity on the Amethyst and Holy Moses veins was as frenetic as that in the burgeoning settlements below. Prospect operations, in varying stages of development, extended for over two miles along both veins. Prospectors had blanketed the ground with claims, which restricted the available surface space for each operation. As a result, prospectors and miners explored their claims at depth predominantly through vertical and inclined shafts, instead of adits. Parties of prospectors using primitive hand windlasses worked in the shadows of advanced, heavily equipped steam operations. All sought bonanza ore.

Great distances and a terrain that can be described as treacherous, at best, separated the settlements along Willow Creek from the workings on the veins above. Miners and prospectors found it most convenient to live at or near their operations, instead of making the twice-daily trek. Not only would a commute by foot or horseback have consumed too much time and energy, but also such travel bordered on impossible in adverse weather, especially during the winter. As a result, several small camps formed. When the search for ore gave way to extraction, mining companies erected boarding houses at their mines for the same reasons.[ix]

Creede's boom peaked in 1892 and 1893. The Denver & Rio Grande Railroad graded a line up the Rio Grande River from its main track at South Fork to the settlement known as South Creede. The D&RG RR later extended the rail line to North Creede. During the boom, trains were bringing up to 300 immigrants per day to the district, and the population of the Willow Creek settlements swelled to 8,000. During this time Jimtown and South Creede merged to form the town of Creede, and the original Creede, located on East Willow Creek, became North Creede.[x]

The dramatic increase in population and economic activity fostered a need for a formal local government. The problem with representation lay in the fact that the Creede district overlay the intersection of Saguache, Hinsdale, and Rio Grande counties. In 1893 Mineral County was carved out of the three counties. Ironically, the town of Creede was not the original county seat. The honor went to the townsite of Wason, located on the Wason Ranch south of Creede. The residents of Creede were outraged, and they thought Martin Van Buren Wason, a powerful local rancher and transportation mogul, pirated the county seat, and after a considerable fight, they moved it to Creede.

Not only did the Creede boom offer possibilities to those seeking mineral wealth and jobs at the mines, but the lawlessness and abundant money presented opportunities for gamblers and criminals. People of mythic proportion, both honest and crooked, called early Creede home. Prize fighter Jack Dempsey started his boxing career while a boy in Creede. Bob Ford and Bat Masterson both operated saloons and gambling houses in town, and Poker Alice practiced her questionable card games in Creede. Gambling shark Bob Fitzsimmons had a statue of a man cast in concrete, and buried it in the mud of Farmers Creek. One of his underlings "discovered" the seemingly petrified man, and Fitzsimmons used it for publicity. But Jefferson Randolph "Soapy" Smith was the most notorious criminal to live in Creede. Smith earned his nickname in Denver by playing a con game in which he inserted a $20 bill under the wrapper of a bar of soap and mixed it in with a bushel of ordinary bars. For a small sum of money, he permitted individuals to select one bar from the bushel in an effort to retrieve the salted bar that Smith had buried. Curiously, few people ever won playing Smith's game. By the early 1890s, Smith had become a well-known and clever gambler, and was respected in the underworld. Seeing Creede as an opportunity, Smith established himself there, and became involved in local politics which he tied into his ring of organized crime. He reigned for several years, trying to walk a fine line between Creede's honest citizens and his shady syndicate. Smith appeased both sides by permitting gambling, some of which was crooked, as well as prostitution, while squashing petty crime and overt lawlessness. Smith left Creede in 1893 following the death of his friend, Joe Simmons, and in the face of the economic depression caused by the Silver Crash.[xi]

Silver ore began pouring out of the district's principal mines by 1892, and the towns along Willow Creek began to exhibit signs of mature industrial communities. In the town centers, the ramshackle architecture of the earliest inhabitants gave way to large, stately frame buildings. Six sawmills, operated by the Creede Lumber Company in surrounding forests, supplied lumber. In 1892 Lute Johnson founded the *Creede Candle*, and the famous Cy Warman established the *Creede Chronicle*. The *Candle* published newspapers until 1930. Creede hosted the district's first school, and the town of Creede was officially incorporated. New comers and some of the district's original prospectors, such as C.F. Nelson, sat on local governmental panels. Destruction visited Creede in 1892, when a significant portion of the town burned, and the area near Willow Creek succumbed to flood waters. Activity in the towns continued unabated, however, until the fateful year of 1893.[xii]

To many residents, the experience of life in early Creede was nothing less that exciting. Above the noise, traffic, bustle, talk of mineral riches, and money, stood optimism and the romance of Western mining. This environment spurred Cy Warman to write the famous poem capturing the essence of early Creede:

CREEDE

Here's a land where all are equal –
of high and lowly birth –
A land where men make millions,
dug from the dreary earth.
Here the meek and mild eyed burro
on mineral mountains feed –
It's day all day, in the day-time
And there is no night in Creede.

The cliffs are solid silver
with wond'rous wealth untold;
And the beds of running rivers
are lined with glittering gold.
While the world is filled with sorrows
and hearts must break and bleed,
It's day all day, in the day-time
And there is no night in Creede.[xiii]

During the early 1890s the mines on the Amethyst Vein also began showing signs of maturation. The large operations drew a growing workforce, and they required an infrastructure for fuel, water, and transportation. The town of Bachelor, named for the Bachelor Mine, sprang up on a grassy area at the vein's south end, and the town of Weaver grew deep in West Willow Creek's canyon near the vein's mid-point. Mine workers and merchants serving the area's mines established Bachelor in 1891, and they platted the townsite in 1892. By 1893 the town hosted 8 stores, 10 saloons, assay offices, boarding houses, and several hotels and restaurants. The town center was small, but the residences and boarding houses associated with the numerous mines, up to several miles away on the Amethyst Vein, were included, peaking the population at a questionable 6,000. Because the town kept a fire engine on hand, Bachelor's most significant fire claimed only several business buildings.[xiv]

The town of Weaver never attained the size or degree of formality that Bachelor experienced. At its peak, the town consisted of a collection of rough frame and log cabins, and a few wall tents, located at the confluence of two deep canyons. Miners and workers of the Amethyst and Last Chance companies, and teamsters constituted the bulk of Weaver's population. The town hosted a school, which reflects the strong presence of an industrial working population. Bachelor and Weaver both thrived until the disastrous year of 1893.

The Mines

The towns of Creede, North Creede, Bachelor, and Weaver would have remained primitive camps were it not for the rich mines on the Amethyst and Holy Moses veins. Between 1891 and 1893 the Creede district's principal mines included the Bachelor, the Last Chance, the New York, and the Amethyst, all of which penetrated the Amethyst Vein. The Holy Moses, the Soloman, and the Ridge mines, also exceedingly wealthy, lay along the Holy Moses Vein. Of this group, the Amethyst and Last Chance mines stood out as the top producers.

The Moffat syndicate owned the rich Holy Moses and Amethyst mines. When the Moffat syndicate purchased the Holy Moses, it formed a mining company with L.E. Campbell as general manager, and it secured the services of a competent mining engineer who equipped and developed the property. Thirty workers and miners erected a surface plant and drove exploratory drifts and crosscuts to block out ore. To the Moffat syndicate's delight, they encountered 18 inches of native silver and galena ore which assayed at $1,000 per ton. Production began, and miners brought 30 tons of ore to the surface per day. By 1893 the value of the ore had dropped to $100 per ton, which was still a handsome return.[xv]

Senator Thomas Bowen, a San Juan mining magnate, purchased the King Soloman Mine and the Ridge Mine from C.F. Nelson, he organized a mining company, and put these properties into production. Like the Holy Moses Mine, miners began developing the King Soloman, and in 1892 they too struck phenomenally rich ore.

On the Amethyst Vein, the Moffat syndicate formed the Amethyst Mining Company to work Creede's spectacular find. During the mine's early operating period, Senator Thomas Bowen and L.D. Roundebush bought into the company. The syndicate hired a capable mining engineer who followed standard convention when he developed the property. The engineer equipped the mine with a sinking plant, which he upgraded once miners had blocked out sufficient ore. In 1892 the engineer had mineworkers erect a large shaft house enclosing a new steam hoist and an 80 horsepower boiler. By this time miners were producing 35 tons of ore per day, and to accommodate this, and the greater volumes anticipated, the mining company financed the construction of an innovative and efficient ore handling system. Miners input raw ore from the mine into an ore sorting house on the surface. There, workers separated waste and deposited the concentrated ore into several holding bins. An aerial tramway transported the ore from the ore sorting house across 2 miles of the most hostile terrain down to another set of holding bins serviced by the D&RG RR at North Creede. This ore handling system permitted the mine to produce ore in economies of scale.[xvi]

The Wolcott syndicate owned the fabulous Last Chance Mine. Henry O. Wolcott was a lawyer, eventually a senator, a promoter of Colorado business, and a member of Denver's elite. The Wolcott family made its fortune in Colorado silver through rich mines in the central portion of the Rockies, and through Colorado business and finance. Henry's brother, Senator Edward O. Wolcott, heavily influenced Colorado business and politics. The Last Chance Mining & Milling Company secured the services of a competent mining engineer, like the Amethyst operation. The engineer probably installed a sinking plant to facilitate mine development, but once this was complete, he had mineworkers painstakingly erect possibly the most extravagant production-class surface plant in the district. To achieve ore production in economies of scale, the engineer equipped the mine with a massive direct-drive double drum steam hoist, which raised and lowered two hoisting vehicles in a three-compartment shaft. The surface plant also included an air compressor, several return tube boilers, a spacious shop, and a massive ore sorting house. Freight wagons hauled the ore to the rail line in North Creede.[xvii]

The Moffat syndicate, which now included Senator Thomas Bowen, purchased the Bachelor Mine from J.C. McKenzie for $20,000 in late 1891 or early 1892. The Bachelor Mine, which lay south of the Last Chance operation, did not experience production until 1892. Miners began developing the property through a tunnel, which prospectors had driven 350 feet during the previous year or two. Miners expanded the underground workings and erected a relatively simple surface plant. The mine would become a substantial producer at a later time.[xviii]

In 1892 A.E. Reynolds purchased the Commodor Mine from McKenzie, and he acquired the New York Mine. A.E. Reynolds was not as well-known as other Colorado mining moguls, however, he invested heavily in San Juan mines, and his capital made many operations in the region possible. The New York Mine occupied ground upslope from and west of the Last Chance property. In fact, the New York claim overlapped a portion of the Last Chance claim, which led to litigation between Reynolds and the Wolcott syndicate. The mine's owner hired an engineer who erected a modest surface plant to facilitate exploration during 1891, and in March of 1892 miners struck rich ore. Unlike many mining Western mining companies, Reynolds was reluctant to see his profits go to lawyers instead of his own coffers. As a result, he formed a cooperative merger with the Last Chance Mining & Milling Company, and the interests consolidated their holdings.[xix]

Colorado's silver barons were handsomely rewarded for their investments in Creede's mines. Within a year the mines produced $4,200,000 in silver, 50% of which came out of the Amethyst, and 30% of which came from the Last Chance. And to their delight, production increased during 1893.[xx]

In marked contrast to the Creede district's principal mines, the other operations on the Amethyst and Holy Moses veins remained in a primitive state between 1891 and 1893. Nearly all of the additional operations consisted of deep prospects equipped with conventional temporary or sinking-class surface plants. Most of the mining companies on the Amethyst Vein were either searching for or had just encountered ore in 1892, but had not proven the vein's extent. Most operations of similar magnitude on the Holy Moses Vein would prove to be worthless. Because the topographical relief on the south portion of the Amethyst Vein varied, prospecting outfits were able to explore their claims through adits, which required less capital. The topography overlying the vein's north portion, however, was relatively flat, necessitating that prospect outfits sink shafts to search for ore.

During the early 1890s the prospects at Sunnyside, in the western portion of the district, appeared to hold great promise. The strikes made by John C. McKenzie and H.M. Bennett at the Alpha in 1876 led to a close inspection of the area by prospectors during Creede's early boom, and several claims with showings of ore were developed in 1892. The Kreutzer-Sonata Mine, the Monon Mine, and the Sunnyside were the most significant operations. However, bonanza ore failed to materialize, and the excitement on the Amethyst and Holy Moses veins eclipsed the activity at Sunnyside. Further, the Silver Crash of 1893 snuffed out what little interest existed in the marginal properties. Sunnyside would attract attention again at a later time.

Progressive mining engineering and technology came early to Creede. In 1892 John W. Flintham, manager of the Denver Consolidated Electric Light Company, realized the potential electric market that Creede presented. He organized the Creede Electric Light and Power Company and ordered a construction crew to build a small electrical generating plant along the D&RG RR right-of-way in Creede. The plant consisted of a dynamo turned by a steam engine, which was powered by a return tube boiler, all enclosed in a 24 by 95 foot frame building. Creede's plant was modest and capable of generating only enough power to energize electric light circuits and run some simple mine machinery. Despite its modesty, Creede's plant was important to the mining industry, because it was one of the first generating plants erected in the West. More than 20 years would have to pass before the mines in Creede would see electrification to any great extent.[xxi]

The surface plants erected by prospecting outfits to support work in adits typically consisted of a simple blacksmith shop, a mine rail line, a timber dressing area, and often an associated residence. The surface plants associated with shafts included a hoisting system, which ranged from the hand windlasses erected over shallow shafts, to horse whims, to steam donkey hoists, to stationary sinking-class steam hoists and portable boilers. Most of the district's prospect operations never progressed beyond their sinking class surface plants for economic and for technological reasons, discussed below.[xxii]

During the Creede district's first boom, the mines and the needs of the work force fostered an enormous demand for food, dynamite, tools, and machinery. By 1892, the district's principal mines began producing ore in economical volumes, which had to be delivered to the D&RG RR railhead in North Creede. Pack trains were far too costly and inefficient to manage the district's freight. The need to move the materials of mining required the establishment of a transportation infrastructure throughout the district capable of accommodating wagons. By the mid 1890s all of the principal mines, most of the substantial prospect operations, and the townsites were accessed via roads. The network was probably created by a combined effort. Workers employed by individual mining companies completed feeder roads, and construction contractors funded by subscriptions contributed by the district's businesses and mining companies graded main thoroughfares.

The roads between the towns on Willow Creek and the mines up on the Amethyst Vein handled an enormous volume of traffic. The grades in West Willow Creek's canyon proved especially treacherous, both during construction and while in use. An old-time resident of Weaver recalled how a construction crew was blasting a road above the town, probably to the Amethyst Mine. During one particular incident, the blast sent a boulder rolling downslope, and it bounded toward town. Just as a sick man rose out of bed for a drink of water in a cabin below, the boulder crashed through the roof and crushed the bed in which he had just been laying. While run-away wagons and other accidents were not uncommon on the steep grades to the mines, the worst road in the district was the "Black Pitch", between Weaver and North Creede. Despite precautions such as wheel locks and strong harnesses, wagons broke loose and plunged into the ravine, occasionally killing teamster and team.[xxiii]

The teamsters who plied Creede's roads were described as being rough and rowdy. Most lived in either Creede or Weaver, and they made approximately two round trips per day between the ore holding bins at North Creede and the mines. Teamsters served all of the mines on both veins, except for the Amethyst and Holy Moses mines, which relied chiefly on their aerial tramways to haul ore.

All of the supplies hauled up to the mines, and all of the ore that flowed down from them had to pass through the town of Creede. Local cattle king Martin Van Buren Wason understood this. In fact, he forecasted the need for a central artery to Creede, and graded a toll road to the promising camp in 1891 in expectation of reaping a handsome profit. The road to Creede was not Wason's first experience with toll roads. Wason was born in New Hampshire and became a sailor at an early age. He weathered the dreaded Cape Horn during several sailing voyages, and he spent much time in Central and South America. While in these remote lands Wason served as a captain on a pearl boat, he became a rancher in Argentina, and mined gold in Central America. Wason returned to the United States via California in 1870, and there he acquired a small herd of fine horses. In 1871 he drove his herd, accompanied by Vaqueros, through parts of the West until he arrived in Colorado. On his way from Poncha Springs to the San Luis Valley, Wason arrived at Otto Mears' toll gate on Poncha Pass. Having insufficient money to pay the necessary toll, he was forced to retreat and sneak around the gate by traveling a wide arc through the surrounding mountains. This included making numerous trips to transport supplies and disassembled wagons. When Wason established a ranch on the Rio Grande, he remembered his dependence on toll roads and graded his own, in hopes of making a profit. Wason's road, used by immigrants and freighters bound for mines in the deep San Juans, extended from Wagon Wheel Gap at the south, past his ranch, and terminated north. He linked the road to Creede with his original trunk line.[xxiv]

Wason's greed led to protracted problems with the mining community. He had workers erect a toll gate on his road and charged wagons 75 cents to pass, which was an exorbitant fee. The citizens, and especially the mining companies, were justifiably outraged, and they considered the road to North Creede to be a public thoroughfare. Their outrage reached uncontainable proportions in 1892, and they hung a dummy of Wason in effigy. Wason, fearful, hired Jesse H. Stringley as a guardian. Stringley carried a six-gun and a badge, but the gunfighter was arrested on the grounds of impersonating an officer of the law, and defrocked. Sentiment against Wason continued to be strong, and he was unprepared when the powerful mining interests brought their political and economic might against him. As the mining interests went, so went Creede. F.M. Osgood, M.J. Connolly, Mike Regan, and L.C. Lowe appealed to the Hinsdale County Commissioners to force Wason to turn the road over to public domain. The commissioners, upon investigation, discovered that Wason's underlings had levied tolls against all wagons, and not merely those laden with ore, as his contract with the county had specified. Wason's toll officers were arrested, and in their absence, under the cover of night, some of Creede's men, probably teamsters, dismantled and removed the toll gate. It vanished without a trace. Creede's war against Wason was won, but not entirely over. When Creede attempted to remove the new Mineral County Seat from Wason's under-populated townsite, Wason retaliated by threatening to resurrect the toll gates. The officers of the big mines took political and economic aim at Wason, and he backed down. The war ended when Colorado's governor purchased the road in 1899 for $10,000.[xxv].

Mining at Creede Collapses

The excitement, the search for wealth, and the conversion of the wilderness into an industrial landscape was just beginning to reach a crescendo when the Silver Panic of 1893 struck. Ever since hardrock mining began in the West, the price of silver has fluctuated in response to natural market forces, and in response to the implementations and revocations of federal price supports. Western senators, such as Creede's Henry and Edward Wolcott, and Thomas Bowen, were instrumental in instituting price support programs. The Bland-Allison Act of 1878 mandated that the Federal Government purchase silver at a guaranteed price, which caused the value of the semi-precious metal to rise to $1.15 per ounce. In direct result, mining in the San Juans intensified. A decrease in the price of silver in 1886 severely hurt mining. In 1890 the Western senators again pushed for price supports and passed the Sherman Silver Purchase Act, which boosted the price of the white metal to $1.05 per ounce. The artificially high price affected Creede, because silver barons such as David H. Moffat, Senator Thomas Bowen, the Wolcotts, and A.E. Reynolds began campaigns to acquire and develop the mines.[xxvi]

The silver tide ebbed in the West in 1893 when reformists repealed the Silver Purchase Act. The price of silver plummeted from around $1.00 to 60 cents. Mining in Colorado, New Mexico, Nevada, and Idaho completely collapsed. The ripple affect caused a panic that overcame at first the West, then other parts of the nation, resulting in an economic depression. Western silver towns, including Creede, were devastated, and Colorado's silver miners faced the challenge of having to seek alternative modes of employment. Lucky for them, Cripple Creek, which was a gold-producing district, was under development and in need of skilled miners. The silver barons lost fortunes, and the less affluent mining investors lost all.[xxvii]

Twilight overcame the Creede Mining District. By the end of 1893 a significant portion of the district's population migrated elsewhere, and only the Amethyst and Last Chance mines continued to operate, albeit at low levels. All of the district's other mines and prospects were either totally abandoned or idle. The towns of Bachelor and Weaver, directly dependent on the Amethyst Vein's mines, lost nearly all of their residents and businesses. Creede and North Creede also lost much of their residents, and the D&RG RR dramatically curtailed rail service. However, Creede possessed two factors unique to other silver mining districts also in economic duress. First, the Amethyst and Holy Moses veins contained amazingly rich ore capable of providing income even at silver's abysmally low prices. Second, the mines' owners were adamant about profiting from their investments. The key to success, they determined, was to produce ore in unprecedented volumes. They employed technology and engineering to achieve production in economies of scale, drastically reducing the cost of mining.

By March of 1894 the Creede Mining District began a slight recovery. Several mines in addition to the Amethyst and Last Chance properties resumed operations, employing a total of 500 mineworkers. During 1894 and 1895 optimistic investors resumed exploration and development of several properties on the Amethyst Vein, which would ultimately net them profits. The Del Monte Mining Company began to deepen its shaft and explore its claim, which lay southeast from the Last Chance Mine. David Moffat, W.B. Felker, Byron E. Shear, and W.H. Byrant used the hard times experienced by investors during the economic depression, and they purchased the Happy Thought Mine, north of the Amethyst Mine, and in 1894 they financed a resumption of shaft sinking on the property. Last, O.H. Poole funded the installation of a sinking class plant and the erection of a 10 stamp mill at the Park Regent Mine, located at the north end of the Amethyst Vein. Most of the miners working at these operations lived in boarding and bunkhouses on-site.[xxviii]

As the national and state economies recovered in the several years following the Silver Crash, mining in Creede resumed. All of the principal mines reactivated, and work resumed at some of the developed prospect operations. The principal producing mines on the Amethyst Vein at this time included, from south to north, the Bachelor, the Commodor, the Del Monte, the New York, the Last Chance, the Amethyst, the Happy

Thought, the White Star, and the Park Regent. The principal active mines on the Holy Moses Vein included the Soloman, the Ridge, the Holy Moses, the Outlet, and the Phoenix. In all, the number of principal mines active after the Silver Crash increased.

Engineers Come to the Rescue

Mining engineering played a key role in the resumption of profitable mining at Creede in the late 1890s. On an individual scale, the district's mining companies improved their surface plants to facilitate the production of greater volumes of ore at a lower cost per ton. The Amethyst Mining Company installed a larger hoist and set of boilers, which permitted rapid hoisting speeds from greater depths. The Bachelor Mining Company hired a crew of miners to develop its vein through a series of tunnels, permitting the extraction of ore simultaneously through several levels. To efficiently move the great tonnages of pay rock to the railhead at North Creede, Bachelor engineers erected an aerial tramway similar to those that operated at the Holy Moses and Amethyst mines. The Happy Thought Mine installed a bigger hoist like the Amethyst. Many of the large mines which did not have air compressors to power mechanical rockdrills installed the machines to expedite the drilling and blasting process underground.[xxix]

Another engineering tactic that some of Creede's large mining companies exercised involved milling the ore locally. In the late 1890s and early 1900s the Soloman, the Ridge, the Happy Thought, and the Amethyst mining operations erected small ore reduction mills near their mines. The idea was not to produce refined silver bullion, but to reduce and concentrate the metals content, and ship the concentrates to a smelter. Prior to the erection of these mills, Creede's mining companies exported all of its raw ore to smelters at Pueblo and Denver, Colorado, to Joplin, Missouri, and probably to Omaha, Nebraska. The smelters crushed and concentrated the raw ore, then extracted and separated the metals. To turn a profit, the smelting companies levied a per-ton charge for processing. By concentrating the ores on-site, Creede's mining companies not only saved a portion of the smelters' processing fee, but they saved shipping costs, because the heavy, worthless waste rock was removed.[xxx]

O.H. Poole erected the first concentration facility at Creede when he installed a 10 stamp mill at the Park Regent Mine in 1895. Poole's mill, however, was a failure. Poole relied on two batteries of stamps to pulverize the ore, and another mechanical process to concentrate the slimes. The machinery that Poole selected was inappropriate for Creede's silver and lead ore. The mining engineers working for the district's large mining companies had theoretical and practical experience with milling silver ores, and they designed effective facilities. The standard treatment for Creede's ores began with reduction by a primary jaw crusher. Cornish rolls, which were pairs of heavy iron drums, and ball mills pulverized the rock fragments. The rock may have passed through up to three sets of rolls or ball mills, each designed to further reduce the crushed rock. The fines produced by the rolls were sent to concentration tables, which used gravity to separate waste from metal-bearing materials. The tables consisted of iron frames bolted onto the mill floor, and table tops designed to vibrate. The table tops lay at a slight pitch and they featured riffles, and as they rapidly vibrated the light waste floated upward and the heavy metal-bearing fines worked their way downward. Creede's mills may have included a series of such tables to further refine the concentrates produced by previous tables in the circuit. The mills' end product consisted of shipping-quality concentrates.

The mills erected by Creede's big producers followed the technological convention of the day, and their sizes and assemblages of equipment were relative to the mining company's volume of production and capital. The Amethyst Mill included several circuits for processing ore, while the Happy Thought Mill consisted of one circuit. Modern electric motors powered the Happy Thought Mill, and electric motors backed up by a steam engine powered the Amethyst Mill. The mills' engineers used common means to transfer power from the motors to the mill machinery. The motors and steam engines turned overhead drive shafts mounted in the buildings' rafters, via canvas belts. Additional belts extended from the drive shafts to the mill machinery. The engineers also followed convention when they designed the mills to rely on gravity to transfer the materials from one step in the concentrating process to the next. To achieve this desired gravity flow, all of the mills were built on terraced hillsides.[xxxi]

In 1901 the Moffat interests added the Humphreys Mill to Creede's roster of concentration facilities. The Humphreys Mill was by far the district's largest, and it represents another attempt to save money by concentrating the ore locally. Engineers applied state-of-the-art technology when they designed the mill and selected the appliances. Like traditional mills, the Humphreys facility used gravity to move the rock between stages of reduction, and it included several independent circuits for concentrating ore. The mill, located on the west bank of West Willow Creek at North Creede, began operating in 1902 and it treated ore hauled out of the Nelson Tunnel. While construction workers were completing the mill, D&RG RR track gangs graded a spur line to the mill's base so that finished concentrates could be shipped by train. Engineers erected a hydroelectric plant by the mill to supply power for drive motors. However, they miscalculated the degree to which West Willow Creek's flow fluctuated, and to their chagrin, the creek slowed to a trickle in the winter of 1903. In response, the engineers installed a backup steam plant to see the mill through future winters. The Humphreys Mill operated for well over 10 years, returning the initial investment plus profits to the mill's financiers.[xxxii]

In addition to improvements made to individual mines and the installation of ore reduction mills, the mining interests of Creede applied engineering on a broad scale to boost the volume of production and lower the costs of mining. The mines on the Amethyst Vein faced the problems of a high water table, poor ventilation, and an increase in operating costs with depth. In 1892, when the district was enjoying its first boom, Charles F. Nelson, who discovered the Soloman Mine, organized the Nelson Tunnel Company with the intent of remediating these problems for at least some of the mines. Nelson served as the company's director, A.W. Brounell acted as president, and J.S. Wallace was treasurer. Nelson held visions of using the tunnel as a prospect bore to search for deep ore, of using the tunnel as both a drain and enormous ventilation duct for the mines, and as a haulage way for ore trains. Nelson also promoted the minor benefits of his proposed tunnel, such as serving as an escape route in instances of fire, and acting as a platform from which mining companies could develop deep ore. Nelson proposed establishing a portal and surface plant on West Willow Creek below the Bachelor Mine, and driving the tunnel along the Amethyst Vein. David Moffat's and Henry Wolcott's mines were at once interested. The cost of the project would, of course, be enormous. Nelson expected to cover the costs by charging subscription fees, and levying a toll per ton of ore hauled through the tunnel.[xxxiii]

The Bachelor Mine possessed the first workings that the Nelson Tunnel would encounter, and so Moffat's Bachelor Mining Company naturally was the first operation to subscribe. Nelson had mineworkers erect a surface plant consisting of a well-equipped shop, an air compressor that powered mechanical rockdrills, and a generator driven by a Pelton water wheel, on waste rock 400 feet east of the tunnel portal. Miners managed to drill and blast 1,500 feet before the Silver Crash of 1893 brought the project to a halt. This distance brought the tunnel within the Bachelor ground, where tunnel workers encountered ore. Work on the tunnel resumed after the economic depression, and when the tunnel reached 2,100 feet in length, Nelson's contact was fulfilled.

The rate of progress and the discovery of ore were crucial to the success of Nelson's tunnel concept. The Last Chance, New York, and Amethyst mines offered subscriptions when the Wooster Tunnel Company formed around 1897. The Wooster company leased a right of way through the Nelson Tunnel, and contracted to drive a drift from the extant tunnel north to the Last Chance, New York, and the Amethyst properties. Using 4 heavy piston drills, miners advanced the tunnel 6 feet per shift, and in 1899 they first reached the Last Chance workings, then the Amethyst workings.

Even though the Wooster Tunnel had reached the vicinity of the Amethyst and Last Chance properties, the company required time to make the final connections. Because water was very costly to pump from deep workings, the Amethyst and Last Chance mines allowed the lower passages to flood. This presented the Wooster engineers with a problem. To avoid a life-taking inundation in the tunnel upon breakthrough, the water in the deep workings had to be drained. An engineer had the bright idea of using diamond drills, which were in the developmental stage in the late 1890s, to bore long-holes into the sumps of the Last Chance and the Amethyst shafts. In 1900 trained drillers from the Sullivan Drill Company arrived and began boring holes toward the Last Chance Shaft. In the process, they struck a subterranean body of water pressurized to such a degree that a jet of water forced the drill away from the tunnel face. Much to the disappointment of the engineer in charge, Mr. Rowley, the hole penetrating the Last Chance Shaft failed to yield the volume of water that he anticipated. After inquiry at the Last Chance Mine, he discovered that a great quantity of silt and mud had accumulated in the shaft's sump, forming a barrier. To free the mass, Rowley packed an iron tube with 50 pounds of dynamite and used drill-steels to push it through the long-hole into the Last Chance Shaft. After the charge detonated, a tremendous volume of water jetted through the hole. Once the Last Chance shaft was drained, the process was repeated for the Amethyst Shaft.[xxxiv]

Impressed with the success of the Nelson and Wooster tunnels, the mines farther north along the Amethyst Vein subscribed to another tunnel designed to undercut their workings. In 1900 the Humphreys Tunnel commenced from the end of the Wooster Tunnel. The financing and logistical arrangements for the Humphreys Tunnel were similar to those of the Wooster company. Miners drilled and blasted the passage around the clock for two years, and by 1902 the Humphreys Tunnel had reached the Park Regent

Mine, which was the northern-most operation on the Amethyst Vein. The aggregate length of the three tunnels totaled 11,000 feet, and all major operations except for the Commodor Mine enjoyed decreased pumping and transportation costs, improved ventilation, and the discovery of new ore. Mining companies found that the savings achieved through the tunnel system offset the cost of the subscription and the $1.00 per ton of ore passing out the mouth of the tunnel.[xxxv]

When construction workers erected the Humphreys Mill, they graded a mine rail line to the Nelson Tunnel's surface plant, and they built a flume alongside the track which supplied part of the mill's water needs. The tunnel served as part of a large system in which ore was mined and sent directly to be milled at North Creede, on the banks of West Willow Creek.

The owners of the Commodor Mine thought that the Nelson Tunnel Company's subscription rates and toll per ton of ore were too costly, and they elected to drive their own haulage way in the late 1890s. The Commodor Mining Company hired an engineer who selected the site for a surface plant and a tunnel portal on the Manhattan claim, only several hundred feet up West Willow Creek from the Nelson Tunnel. However, the Bachelor Mine lay between the proposed tunnel site and the Commodor claim, presenting the problem of trespass. Other locations for the proposed tunnel were out of the question, due to restricted nature of West Willow Creek's canyon. The Commodor Mining Company negotiated with the Bachelor's owners and secured the right to drive the tunnel through their ground, probably for a royalty.

The Commodor interests hired a mining engineer who put a crew to work erecting a surface plant and a crew of miners to work drilling and blasting the tunnel. The surface plant consisted of a shop, an air compressor, and a return tube boiler. By 1900 miners had driven the Manhattan Tunnel, later known as the Commodor No.5, 4,000 feet to the Commodor claim, where they blocked out ore with raises and drifts. After the tunnel was complete, it served as the Commodor's principal haulage way, and the upper tunnel was abandoned, except as an entry to the upper workings.[xxxvi]

The Bachelor and Commodor companies were on good terms, which facilitated the Commodor's right of access through the Bachelor's ground. In 1900 the two companies became even closer when the Moffat Syndicate purchased a controlling interest in the Commodor. The mining industry subsequently recognized the two mines as being one entity, and miners linked the underground workings with numerous passages. As a result, the upper-most tunnel on the Commodor claim became known as Tunnel No.1, the Manhattan Tunnel became known as Tunnel No.5, the Nelson Tunnel was unofficially termed No.4, and Tunnels No.2 and No.3 pierced the ground upslope. In the combined effort to extract ore efficiently, the mine's engineer installed a Pelton wheel at the Commodor No.5, which turned a generator and an air compressor, and the top two tunnels were abandoned.[xxxvii]

The Creede district experienced steady production until 1907, when a recession forced most of the mines to temporarily close. After the economy recovered, mining continued. During this time, the application of engineering and technology had a significant impact on the population of the district. Because mining was intense between around 1896 and 1910, the towns of North Creede and Creede thrived. The need for workers at the Amethyst Mill and on the Amethyst tramway ensured that Weaver maintained a small population. However, the completion of the Nelson, Wooster, and Humphreys tunnel series rendered the surface plants on the surface above the Amethyst Vein obsolete. The Nelson Tunnel became the principal access to the mines, and the population of miners and teamsters shifted from the town of Bachelor, which included the disbursed bunk and boarding houses at the mines, down to Creede. Only a few residences up high were maintained. In 1900 approximately 1,150 people lived in Creede and North Creede, 343 people lived in and around Bachelor, and 84 lived in Weaver.[xxxviii]

Between 1896 and 1910 most of the mining companies had focused their efforts on developing and extracting the known ore deposits. By around 1910 these bodies began to show signs of exhaustion, and within several years many of the marginal mines closed. Not only did the district suffer from depleted ore bodies, but other silver-lead mining districts such as Joplin, Missouri, Leadville, Colorado, and some of those in Idaho were presenting significant competition, which kept metals prices low. As Creede's mines closed, people left the district. The populations of Creede, North Creede, and Bachelor decreased dramatically between 1905 and 1915. By 1910 Weaver became almost totally deserted.

Contrary to the trend of the implosion of mining on the Amethyst and Holy Moses veins during Creede's second boom, activity spread to several outlying areas on the fringes of the district. As the economy improved during the late 1890s and early 1900s, investors became interested once again in the prospects at Sunnyside. An unknown mining company developed the old Corsair property, and they began shipping silver ore during 1902 and 1903. Captain Free Thoman, who owned the Sunnyside Tunnel, interested investors Albert Damm, Jeff McAnelly, Perry Learnard, and M.H. Akin of Fort Collins in his operation. They supplied capital, which Thoman used to drive a tunnel 750 feet, where miners encountered a small ore vein. The Kruetzer-Sonata and Monon properties saw further exploration, and they eventually produced a little ore.

Two more promising prospects far up West Willow Creek also attracted attention around the turn-of-the-century. Miners began sinking a shaft on a promising lead on the Captive Inca property in 1903, and another company drove a tunnel on the Equity claim. The Captive Inca proved to be worthless and it was abandoned by 1912, however the Equity Mine produced ore for several years beginning in 1912.[xxxix]

The outbreak of World War I benefited Creede's faltering mining industry. The war fostered a heavy demand for industrial metals, creating a profitable environment for Creede's mining companies. While the high metals prices resuscitated mining, the renewed activity was nothing like that of years past. The need to handle greater tonnages of ore than before while cutting production costs convinced the mining operations to spend capital on advanced technology. Electrification was the most cost-effective improvement that the mining companies could effect. While Creede boasted of being served by one of West's earliest power plants, until the 1910s electric technology was not advanced enough to significantly benefit mining. However, when Creede experienced its World War I revival, the technology was sufficiently advanced.

In 1917 a new power plant was built in Creede, possibly by the Creede Tribune Mining Company, which leased the Amethyst Mine. The plant was a state-of-the-art affair, and it consisted of four Heine water tube boilers which powered a massive 500 horsepower steam engine and 225 kilowatt dynamo. A second engine and dynamo were kept on stand-by. The mining operations on the Amethyst Vein used the electricity underground to power small hoists and ventilation fans, and to light stations. The Amethyst Mine proved to be the greatest beneficiary of electricity. In 1918 the Creede Exploration Company leased the mine and installed an electric hoist and motor-driven compressor at the shaft to facilitate work above the Nelson Tunnel level.[xl]

The American Smelting and Refining Company, part of the Guggenheims' industrial metals mining and milling empire, organized the Creede Exploration Company in 1918 to lease several of the properties along the Amethyst Vein and extract what little ore remained, and to search below the Nelson Tunnel level for more deposits. During previous years the Moffat syndicate’s engineer had miners drive a central shaft within the Commodor workings, and it penetrated ground below the Nelson Tunnel level, which Creede Exploration used for deep exploration. In 1918 or 1919 miners unwatered the shaft and equipped it with a double drum electric hoist which worked two skips. After several futile years of searching, ASARCo gave up on deep ore. Uneconomical quantities had been found, but they were too poor in content. Faced with worthless properties, ASARCo sold its holdings to individual mining companies.[xli]

During the 1890s, when rich ore lay in the ground, mining companies purchased claims, hired crews of miners, and extracted ore under the umbrella of their corporate structures. The depletion of rich ore, the inefficiencies of large company structures, and high operating costs discouraged such an operating strategy after around 1900. The growing trend in Creede, as well as other Western mining districts, was for the mining companies to cease operations and lease either the entire mine to a second-party company, or lease portions of the ore body to individual miners. The payment schedule included either a royalty per ton of ore, or a flat fee. This scheme shifted the burden of minimizing operating costs from the mine's owner to the lessee. Under this system, lessees had every incentive to minimize the capital that they put into the operation since they had no allegiance to the mine itself, and they extracted the maximum ore in minimal time. While lessees were able to make a profit where large, cumbersome mining companies could not, their tactics proved problematic for the long term state of the mine. Lessees rarely conducted exploration for new ore bodies because it was "dead work", as they termed it. They also avoided investing in maintenance and the long term well-being of the mine's infrastructure. It was under this environment that mining in Creede continued during the 1910s.

During World War I mining and leasing companies were producing ore from the other mines on the Amethyst Vein. The Mineral County Mining & Milling Company extracted ore from the Happy Thought property, which they concentrated in the Humphreys Mill. A succession of lessees profitably worked the Last Chance ground, and more lessees mined the Park Regent and the Del Monte properties. In 1915 Norman Corson organized a company that did well mining the Bachelor ground. During the 1890s and 1900s the Moffat and Bowen interests had gutted their mines on the Holy Moses Vein, and interest in these properties lagged. The only mine on the Holy Moses Vein that possessed profitable ore during World War I proved to be the King Soloman. The leasing outfit William Wright & Co. profitably extracted ore and milled it at the Soloman Mill until 1918.[xlii]

The demand for industrial metals was high enough, and milling technology sufficiently advanced to make the ores at Sunnyside and at the Equity Mine, high up West Willow Creek, economically viable. After successful exploration, lessees A.B. Collins and H.R. Wheeler brought the Monon Mine into production in 1916. In 1918 the Manitoba Leasing Company took over operations at the Monon and profitably extracted ore until 1921. The Creede Equity Mining Company began drilling and blasting ore in the Equity Mine in 1918 and quit in 1919.[xliii]

Decline

The declaration of armistice in 1918 halted war-related industrial production, which caused metal prices to tumble. Mining at Creede once again became unprofitable, and the district fell on hard times. The end of the war proved to be the death knell for the marginal properties, and the end of surface prospecting along the Amethyst and Holy Moses veins. By 1920 all mines but the Bachelor had become completely quiet, many never to be worked again. With the subsidence of activity, irreversible decay set in. The surface plants of nearly all mines fell into total disrepair, and shafts and tunnels became unstable, except for the Nelson, Commodor, and Bachelor operations.

The few miners that remained in Creede glimpsed a ray of hope in 1922. Western senators has passed the Pittman Act, which mandated that the federal government purchase silver at $1.00 per ounce, in hopes of bolstering a failing Western mining industry. The principal mining operations in Creede geared up for production, and activity at the Bachelor, Commodor, Del Monte, Happy Thought, Last Chance, and New York properties resumed with vigor. All work was conducted through the Nelson and Commodor No.5 tunnels. The Ethel Leasing Company reopened the Soloman on the Holy Moses Vein. The high price for silver stimulated some prospecting, and knowledgeable district residents searched new ground. A find was made near Windy Gulch northwest from Creede, and local interests concluded that it was lead-silver-zinc vein missed by the prospectors of years past. The Pittman Act expired in 1923, and Creede entered another dark period. Some mining activity continued, however. The Commodor Mine continued to produce, and lessees spent a short time in 1925 exploring the Bachelor ground. In 1925 E.J. Lieske, Dr. Thomas Howell, and C.N. Blanchett formed the Bulldog Leasing, Mining, and Milling Company to explore and develop the new vein discovered above Creede. The property already featured a tunnel 1,050 feet long, which they drove further. The operation collapsed in 1926.[xliv]

The last significant mining endeavor of the 1920s occurred at the Amethyst Mine. The company's leading engineer determined that economic ore still lay in the upper levels of the Amethyst and surrounding properties. Hauling the ore out, however, would have constituted a great cost. After years of neglect, the Nelson Tunnel and the raises and chutes necessary for transferring the ore needed expensive improvement. The surface plants and shafts of the Amethyst, Last Chance, New York, and Happy Thought mines were in a hopeless state. The engineer elected to drive a new haulage tunnel from the company's property at Weaver on West Willow Creek, instead of effect the required improvements. In 1928 miners began work on what then they named the Sloane Tunnel, later known as the Amethyst Tunnel. The passage provided easy access to the Amethyst and surrounding properties, and it permitted mining of low-grade ore shunned by earlier operations as being uneconomical. The tunnel saw only two years of service before mining at Creede once again ceased.[xlv]

Paradox: Boom During the Great Depression

Ironically, under the presidency of one of the World's greatest mining engineers, Herbert C. Hoover, the Crash of 1929 brought the nation to its economic knees. The subsequent Great Depression destroyed what little was left of mining in Creede. The victory of Franklin Delano Roosevelt over Hoover in 1932 for U.S. President set in motion a chain of events that spelled a revival of mining in the West, including Creede, on a scale not seen since the close of the Gilded Age. In an effort to devalue the U.S. dollar, in October of 1933 Roosevelt enacted a plan in which the Federal Government bought gold at relatively high prices. When price declines began to interfere which this scheme, Roosevelt and Congress passed the Gold Reserve Act early in 1934, which set the minimum price for gold at $35.00 per ounce. In 1934 Roosevelt signed the Silver Purchase Act into law, which monetized silver and set the price for the metal artificially high. Creede experienced a boom unlike anything seen since the Gilded Age. Most of the principal mines on the Amethyst Vein, the Soloman Mine on the Holy Moses Vein, and the few producers at Sunnyside underwent further exploration and production.[xlvi]

Lessees began exploring the Bachelor, Commodor, and Amethyst mines, and they initiated production shortly afterward. Miners accessed these three properties through the Bachelor tunnels, through the Commodor No.5, and the new Amethyst Tunnel, respectfully. The Nelson Tunnel, which was long-neglected, was no longer used. Miners began drilling and blasting pockets and small stringers of ore in the gutted Amethyst Vein's hanging wall. Because capital remained scarce during the Depression, miners working deep underground revived the old practice of hand-drilling, while miners working for the large operations, such as at the Commodor and Amethyst mines, had the luxury of using mechanical rockdrills. Miners completed nearly all other work underground with hand-labor. In addition to work underground, small companies leased the rights to sort through the waste rock dumps associated with the large mines for low-grade ore tossed out by earlier operations as uneconomical.

When miners had proven that ore still existed in these mines, investors eager for profit began a campaign to acquire the principal mines on the Amethyst Vein. In 1935 the Emperius Mining Company purchased the Commodor and Bachelor mines and the Nelson Tunnel. In 1937 Emperius leased the Last Chance and New York properties, and in 1939 it completed its game of Monopoly when it purchased the Amethyst Mine. Ore extracted from the upper levels of the New York and Last Chance were hauled through the Last Chance No.2 Tunnel, located near the abandoned Amethyst Shaft. Miners brought ore extracted from the lower levels of the above two properties through the Amethyst Tunnel.[xlvii]

Table 5.1: Summary of Mining on the Amethyst Vein

Mine Name	Relative Size	Location on Vein	Operating Years of Surface Plant	Operating Years of Property
Amethyst	Very Large	Central	1891-1920	1891-1920; 1928-1929; 1934-1950s.
Annie Rooney	Small	Central-South	1891-1892	1891-1892
Bachelor	Very Large	South	1878; 1885; 1891-1893; 1895-1923; 1925-1929; 1934-1940; 1944	1878; 1885; 1891-1893; 1895-1923; 1925-1929; 1934-1940; 1944
Commodor	Very Large	South	1891-1893; 1895-1910s; 1916-1920; 1923-1929; 1934-1940; 1944-1983	1891-1893; 1895-1910s; 1916-1920; 1923-1929; 1934-1940; 1944-1983
Del Monte	Medium	South-Central	1891-1893; 1890s	1891-1893; 1895-1900s; 1916-1923
Happy Thought	Large	Central	1891-1893; 1894-1907	1891-1893; 1894-1917; 1922-1923; 1928
Last Chance	Very Large	Central	1891-1893; 1895-1896; 1898-1910s	1891-1893; 1895-1896; 1898-1920; 1923; 1937
Nelson Tunnel	Very Large	South	1892-1893; 1896-1929; 1935	1892-1893; 1896-1929; 1935; 1945-1950s.
New York	Medium	South-Central	1891-1893; 1895-1902	1891-1893; 1895-1900s-1915; 1923; 1934-1940
Park Regent	Medium	North	1892-1893; 1895; 1898-1912	1892-1893; 1895; 1898-1912; 1916-1917
Sunnyside	Small	South-Central	1892-1893	1892-1893
White Star	Small	North	1892-1893; 1890s	1892-1893; 1890s-1917

Table 5.2: Summary of Mining on the Holy Moses Vein

Mine Name	Relative Size	Location on Vein	Operating Years of Surface Plant	Operating Years of Property
Holy Moses	Very Large	Central	1891-1893; 1895-1910; 1934; 1953-1958	1891-1893; 1895-1910; 1934; 1953-1958
King Soloman (Soloman)	Large	South	1891-1893; 1895-1918; 1922-1923; 1934; 1945; 1950-1952	1891-1893; 1895-1918; 1922-1923; 1934; 1945; 1950-1952
Outlet Tunnel	Medium	North	1890s; 1956-1958	1890s; 1956-1958
Phoenix	Small	North	1891-1893; 1900; 1951-1960s	1891-1893; 1900; 1951-1960s
Ridge	Medium	South	1891-1893; 1890s-1900s; 1943-1949	1891-1893; 1890s-1900s; 1943-1949

Table 5.3: Summary of Mining on Upper West Willow Creek

Mine Name	Relative Size	Location on Vein	Operating Years of Surface Plant	Operating Years of Property
Captive Inca	Medium	South	1902-1905	1902-1905
Equity	Medium	North	1900s; 1912; 1918-1919; 1927-1929; 1953	1900s; 1912; 1918-1919; 1927-1929; 1953

Table 5.4: Summary of Mining on the Alpha-Corsair Ore System

Mine Name	Relative Size	Location on Vein	Operating Years of Surface Plant	Operating Years of Property
Corsair	Medium	South	1883; 1901-1904; 1922; 1925; 1933-1934; 1939	1883; 1901-1904; 1922; 1925; 1933-1934; 1939
Kreutzer-Sonata	Medium	North	1892-1893; 1926	1892-1893; 1926
Monon	Medium	South	1890s; 1916-1921; 1925; 1938-1940; 1953	1890s; 1916-1921; 1925; 1938-1940; 1953
Sunnyside Tunnel	Medium	Central	1892-1893; 1901	1892-1893; 1901

Within a year Emperius invested capital to locate additional ore veins, which the company's engineers were sure lay to either side of the Amethyst Vein. During the following years miners in fact encountered new ore, which ensured the company's continued profitability. Then, in 1938 Emperius miners discovered the OH Vein, which was the most significant find since the initial discoveries of ore in the district. Previous mining companies on the Amethyst Vein shortchanged themselves by focusing time and effort on gutting the known ore bodies and neglecting exploration, leaving the discovery of the OH ore body to miners drilling and blasting four decades later.[xlviii]

Because Creede's ores possessed a lower value than times past, Emperius continued to emphasize production in economies of scale. The company ensured that the surface plants at the Commodor and the Amethyst mines were fully equipped. Miners working underground used rockdrills when driving exploratory workings in hardrock, and they drilled by hand when working in softer ores. Miners used other pieces of power equipment such as electric and compressed air hoists at winzes and to scrape blasted ore out of stopes with drag lines. Mules, which were inexpensive to maintain, pulled trains of ore out of the Commodor and Amethyst tunnels. The surface plants of both of these operations, and the Last Chance No.2 Tunnel, included large ore sorting houses where mine workers manually concentrated the ore and separated out waste.

Like times past, mining men in Creede sought to mill the ores locally in hopes of saving the shipping and processing fees associated with exporting payrock to distant smelters. In 1937 T.P. Campbell, W.B. Jacobson, and a man named Mr. Weber organized Creede Mills, Incorporated, which erected a flotation mill south of the town of Creede. While the flotation process was not new to mining in 1937, Creede's past mills had not applied the concept. The process reduced the ore to a slurry, as other mills had done, and it relied on oils and foaming agents in tanks to "float" the pulverized metalliferous fines away from the waste. The mill proved successful, and Emperius added it to its Creede empire in 1940.[xlix]

The resurgence of mining stimulated by FDR's programs reversed the trend of the exodus from the dying Creede district. In 1930 the town's population dropped to around 334, and during the following decade it increased to 587. The proliferation of the automobile and truck permitted miners in the 1930s to live in Creede and commute to the centers of activity at the Commodor and Amethyst tunnels. Except for a few isolated residences, the townsites of Bachelor and Weaver had been long-abandoned. The Creede business district experienced another fire in 1936, which would have probably precipitated the town's final abandonment, were it not for the profitable mining.[l]

Unlike World War I, the outbreak of World War II curiously did not foster a district-wide resurgence of mining in the Creede district, despite the need for war-related industrial metals, but interest increased, none-the-less. On the Amethyst Vein, Emperius miners continued drill and blast ore deep within the Commodor, Bachelor, and Amethyst properties, and they may have continued to work the lower levels of the Last Chance ground through the Amethyst Tunnel. In response to anticipated production, in 1943 Emperius invested much capital reconditioning unsound portions of the Commodor No.5 Tunnel, and in 1945 the company did the same to the Nelson Tunnel, which had been neglected for decades. In 1945 the New Ridge Mining Company reopened the old King Soloman, after 11 years of inactivity, and another group of lessees reopened the Ridge Mine in 1943. Reopening both properties on the Holy Moses Vein required considerable capital, because the King Soloman had been idle since 1934, and Ridge was abandoned in the 1910s. The mines that were active at Sunnyside during the Great Depression had closed in the 1930s, probably due to the exhaustion of economic ore. In 1940 the partnership of Larson & Soward leased the mine, conducted some exploration, extracted a little ore, and shut their operation down.[li]

Table 5.5: Population of the Creede Mining District, 1890-1960

Population Center	**1890**	**1892**	**1900**	**1910**	**1920**	**1930**	**1940**	**1950**	**1960**
Mineral County	Not Extant	Not Extant	1,913	1,239	779	640	975	693	424
Creede	1,000	8,000	938	711	500	334	587	433	424
North Creede	Part of Creede	Part of Creede	235	122	Part of Creede	Part of Creede	Part of Creede	Part of Creede	Part of Creede
Bachelor	0	0	343	179	0	0	0	0	0
Weaver	0	0	84	0	0	0	0	0	0

(Data collected from: Schulze, 1976 and from Nolie, 1947:59)

The Last Boom-Bust at Creede

Mining at Creede experienced a boom-bust cycle yet again following the end of World War II. War-related production slowed, and the price for industrial metals sagged. The ore bodies in the old mines were becoming truly exhausted and exploration conducted by both Emperius and by partnerships failed to discover new ore. The end of mining at Creede seemed to be in sight. However, the economic boom of the 1950s created a strong market for industrial metals once again, and improved milling technology made ores of even lower grades economical. Not only did this prolong the lives of Creede's active mines, but a wave of partnerships and lessees closely examined many lifeless but formerly productive properties.

During the late 1940s the Emperius Mining Company was the only significant operation active at Creede. In times past Emperius extracted ore from various levels in the Commodor, Bachelor, Amethyst, and Last Chance properties. Following the post-war slump in metals prices, the company curtailed its operations and used only the Commodor, Nelson, and Amethyst tunnels. The company abandoned all other surface facilities.

The wave of interest in Creede's mines began rising in 1950. The long-idle mines on the Holy Moses Vein attracted the most attention. In 1950 the Mexico Mining Company leased the King Soloman property and conducted underground exploration. The TOC Development Corporation assumed the lease and produced $20,000 in ore by 1952. In 1951 the Outlet Mining Company reopened the Phoenix Mine, conducted exploration, and by 1956 had extracted an impressive $500,000 in lead and silver. In 1953 the Sublet Mining Company leased the Holy Moses Mine, and it leased the Outlet Tunnel in 1956, where the outfit conducted underground exploration. The lessees began shipping ore from the Holy Moses in 1954. In light of the success miners were experiencing with some of the district's long-abandoned properties, lessees and investors became interested in the prospects at Sunnyside and those on upper West Willow Creek. Lessees reopened the Equity Mine in 1953, which lay abandoned since 1929. They proved unsuccessful and the mine closed permanently. Another group of hopefuls reopened the Monon Mine also in 1953. They encountered small veins which were rich enough to pique their interest, but not sufficient enough to be profitable. The lessees chased the ore stringers for the next five years before they finally gave up.[lii]

Mining in Creede experienced one last contraction in the late 1950s. All of the operations that were active during the 1950s shut down permanently, except for the Outlet Mining Company which continued underground exploration at the Phoenix Mine, and the Emperius Mining Company which continued to profit from the seemingly endless bodies of ore under the Commodor and the Amethyst properties.

During the 1960s the culture of the Creede Mining District entered a dichotomous state. The people, the economy, and the physical landscape retained characteristics derived from 70 continuous years of underground mining based on traditional Gilded Age methods, while the modern world was beginning to exert a substantial influence. The Emperius Mining Company continued to work the Commodor and the Amethyst properties, and the Bulldog Mine, long idle, began production. Improved technology permitted a greater tonnage of ore produced per miner, but both mining companies continued to drill and blast using traditional methods. Both mining companies began to use heavy equipment, such as bulldozers and front-end loaders, instead of hand-labor on the surface. On the other hand, Creede's economy began to enjoy a higher income from tourists that in times past, and the culture began changing to accommodate the passers-through. During the 1960s a movement began in which tourists ventured from urban and suburban centers to historic mining towns to commune with the material culture of the American West. Creede, with its dozens of intact historic mine sites and ghost towns, was well prepared to satisfy the waves of tourists. The transition from mining to tourism accelerated during the 1970s.

The end to mining in Creede finally came in the 1980s. After almost a century of mining, all of the mines shut down. Exhaustion of ore was partly to blame, the skyrocketing costs of underground operations were heavily at fault, and competition from mining operations in other countries and the associated low metals prices contributed heavily. Mining constituted a significant portion of Creede's cultural fabric, and the closing of the mines was a hard blow to the area. However, Creede survived well because tourism continued to grow, and the town served as the region's commercial and economic hub. Despite Creede's transition from one of America's greatest silver mining districts to a historical destination that draws tourists from across the West, the cultural fabric created by almost 100 years of mining remains intact. The heritage that is Creede's, as well as that of a special time and place in American history, lives on through the people, the town of Creede, and the surrounding historic mine sites.[liii]

Previous Cultural Resource Work

During the early 1990s the Abandoned Mine Lands Division of the Colorado Department of Minerals and Geology recorded some of the historic mines included in this selective survey. For a summary of work, see the table below. Of note, the AML survey included the Bachelor Mine, the Commodor Tunnel No.5, and the Sunnyside Claim in Site 5ML80. The survey included the Happy Thought and White Star mines within Site 5ML202. The cultural resource work conducted by the AML consisted of a one-page form and a photograph. The AML produced no maps, artifact tabulations, feature descriptions, reports, or archival research. The AML survey found many of the sites ineligible, which this survey (*Mining the Amethyst Vein*) has reversed.

Table 5.6: Previous Cultural Resource Work

Site Number	Mine Name	Recorders	Date
5ML247	Amethyst Tunnel	Robert Kirkham and Martha Poley	1993
5ML80	Bachelor Mine, Commodor No.5 Tunnel, Sunnyside Claim	Robert Kirkham and Leanne Sander	1990
5ML204	Del Monte Mine	Robert Kirkham and Leanne Sander	1990
5ML202	Happy Thought and White Star mines	Robert Kirkham and Leanne Sander	1990
5ML209	Park Regent Mine	Robert Kirkham and Leanne Sander	1990

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CHAPTER 5 OBJECTIVES AND RESEARCH DESIGN

Objectives

- To determine eligibility of the sites to the National Register of Historic Places based on physical integrity, application of the National Register Criteria, and the cultural resources possessed by each site.

- To characterize the extant remains of each mining operation in light of possible impacts to each site by future environmental remediation efforts.

- To determine the nature of the principal historic mining operations on the Amethyst Vein, and viewing these operations in the context of conventional Gilded Age and Depression-era mining.

- To characterize the residents that lived at each mining complex.

- To obtain information for use in a future publication on the history of the Creede Mining District detailing mining from the district's discovery up to end of operations.

Hypotheses

In light of the above objectives, information was collected to address several hypotheses.

Mining Operations

- The principal mining operations on the Amethyst Vein relied on mining technology as it was conventionally applied in the West.

- The most productive and heavily capitalized mining operations, owned by prominent investors, were equipped with advanced surface plants capable of supporting intensive underground operations.

- When the price of silver declined following the Silver Crash of 1893, the mining companies equipped their surface plants to produce ore in economies of scale. The increased tonnages permitted the operations to continue to profit in light of lower silver prices.

- Mining activity contracted at the close of the Gilded Age, and it increased following the institution of the Silver Purchase Act in 1934, despite the poor economy associated with the Great Depression.

- The capital-scarce times of the Great Depression discouraged heavy investment and development of advanced surface plants.

Residential Occupation

- Completion of the Nelson Tunnel, which undercut the Amethyst Vein's principal mines, caused the population in that portion of the mining district to shift from settlements located around the historic surface plants down to Creede.

- The population that lived in housing provided by the companies consisted of single men, and few if any women and children. Further, the population, fed en masse in dining halls, consumed a typical Victorian diet. The foods served during the district's early era consisted of preserved foods, while fresh food became more available as transportation systems developed in the district.

CHAPTER 6 FIELD METHODS

Archival Research

Prior to the initiation of fieldwork, Mountain States Historical conducted extensive archival research. It was hoped that information pertaining to the operators, the owners, the miners, and the physical makeup of the historic mines would be encountered. Mountain States Historical examined archives and publications at the Colorado School of Mines, the U.S. Geological Survey, the Archives at Norlin Library on the CU Boulder campus, the Colorado Historical Society's Stephen S. Hart Library, Colorado State Archives Mine Inspectors' Reports, Denver Public Library, and Boulder Public Library. Only a paucity of information was found on the Creede district in general, and less was located on the specific mine sites. The most informative reference sources included geological reports, general histories of the Creede district, manuscripts, Sanborn insurance maps, and district summaries in the *Engineering & Mining Journal* and *Mining & Scientific Press*.

Field Methods

Each mine complex was defined as the archaeological features, standing structures, and artifacts directly associated with a particular shaft, tunnel, and adit. Historically, these collections of facilities supported work underground, and the mining industry recognized them as a *surface plant*. Some of the sites also included directly associated residential complexes where mine crews were housed and fed.

The surface plants and residential complexes associated with the principal historic mine sites on the Amethyst Vein were recorded in a manner surpassing the *Class III* procedures defined by the U.S. Department of the Interior and by the Colorado State Historic Preservation Office. Mountain States Historical *recorded* each site with the intent of gathering sufficient information to reconstruct and interpret the histories of the mining operations and their residents. First, the surface plants and associated residential complexes were identified. The remains, documented individually as *features*, ranged from physical evidence suggesting the former existence of a plant facility or activity area to standing structures. The mine sites and their constituent features were mapped using a pocket transit. Each feature was assigned a number, then described with text. The artifacts associated with each feature were tabulated with the descriptions. Standing structures were subjected to additional documentation. In addition to detailed descriptions, Mountain States Historical drew scaled floor plans, it completed Historic Architecture and Building Survey forms, and conducted photography of the exteriors, and when appropriate, the interiors. Overview photographs were taken of each site for context. Where possible, archival data was consulted to help guide examination and interpretation of the remains encountered at the mine sites.

CHAPTER 7 SITE SUMMARIES AND ANALYSES

Chapter 7 consists of summaries of the seven principal historic mines and the four selected prospects recorded on the Amethyst Vein. The material within the chapter is organized by mine. Each mine is discussed in terms of being a single operation. In the cases where the mine featured two openings, the associated surface plants are discussed individually, then as being part of a whole. Archival information and field data have been interwoven to produce complete histories of each operation, and each summary is concluded with an analysis and interpretation. While the summaries allude to site condition and assessment of potential threats, these topics are covered in greater detail in Chapter 8, where they factor into the sites' historical integrity.

Amethyst Mine
Sites 5ML247 and 5ML349

The Amethyst Mine, located on the Amethyst Vein's central portion, was probably the Creede district's richest metals producer. The mine consisted of a maze of underground workings originally accessed through several shafts, and later by the Amethyst Tunnel. The Amethyst Tunnel (Site 5ML247) lies in West Willow Creek's canyon a quarter mile north of the Weaver townsite, and the shaft (Site 5ML349) is located directly upslope on the flank of Bachelor Mountain. In terms of physical setting, the Amethyst Tunnel site occupies a wide area in West Willow Creek's canyon bounded on all sides by steep, rocky, and hostile terrain. The site is vegetated by a mixture of ponderosa pines, riparian trees and shrubs, and grasses. The Amethyst Shaft site is located on a steep east-facing slope partially vegetated by a second-growth pine and aspen forest, and partially covered by waste rock and scree.

In terms of character, the Amethyst Shaft site consists of the remains of a large shaft operation, while the Amethyst Tunnel site encompasses both the remains of one of the Creede district's largest tunnel operations, and the foundations for the Amethyst Mill. The tunnel site retains a high degree of historic integrity and it possesses a unique ambiance. Earth moving, mining, and shaft closure activities within recent decades has severely impacted the shaft site. Both sites feature intact structures and archaeological deposits.

Mining Operations

In 1889, Nicholas C. Creede, E.R. Taylor, and G.L. Smith began prospecting the area that became known as the Creede Mining District. In May of that year, the party located the Holy Moses claim on Campbell Mountain, and the party of prospectors interested an investment syndicate including mining and railroad magnate David H. Moffat, U.S. Army Captain L.E. Campbell, and Denver & Rio Grande Railroad general manager Sylvester T. Smith. Enticed by Nicholas Creede's success at finding ore and his knowledge of the area, the business trio not only supplied capital to develop the Holy

Moses, but they hired Creede to serve as their professional prospector. Their decision to retain Creede proved wise, because in 1891 he located the fabulous Amethyst Mine.

The Moffat syndicate formed the Amethyst Mining Company to work Creede's spectacular find. During the mine's early operating period, Senator Thomas Bowen and L.D. Roudebush bought into the company. The syndicate hired a capable mining engineer who followed standard convention when he developed the property, and they supplied him with ample capital. Shortly, miners drove an adit on the claim to examine the vein at depth.

The engineer had miners sink two shafts on the vein approximately 350 feet apart. The northern shaft became known as Shaft No.3 and the southern shaft was known as Shaft No.2. Each shaft was equipped with a sinking-class surface plant, which the engineer upgraded once miners had blocked out sufficient ore. In 1892 the engineer focused activity at Shaft No.3, and he had mine workers erect a large shaft house enclosing a new steam hoist and an 80 horsepower return tube boiler. The shaft house also sheltered blacksmith and carpentry shops. The surface plant at Shaft No.2 changed little, and it included a small hoist powered by a locomotive boiler.[1]

By this time miners were producing 35 tons of ore per day, and to accommodate this, and the greater volumes of ore anticipated, the mining company financed the construction of an innovative and efficient ore handling system. Miners input raw ore from the mine into an ore sorting house on the surface. There, workers separated waste and deposited the concentrated ore into several holding bins. An aerial tramway transported the ore from the ore sorting house across 2 miles of the most hostile terrain down to another set of holding bins serviced by the D&RG RR at North Creede. This ore handling system permitted the mine to produce ore in economies of scale.[2]

The remains of several early plant components constructed by the Amethyst Mining Company during mine's initial operation are currently represented at the site. The first development adit and the associated waste rock dump (Features 15 and 16) that miners drove shortly after the Moffat syndicate purchased the claim lie on the site's north edge. As was common, miners erected hewn log cap-and-post timber sets to support the adit's portal. The timbering rotted, and the portal collapsed.

The site includes the shaft house platform, the boiler setting remnant, and the clinker dump associated with the production-class hoisting system installed by the Moffat syndicate in 1892. Mine workers constructed the shaft house platform (Feature 8) with cut-and-fill methods, and they erected a hewn log retaining wall to buttress the platform's cut-bank. The boiler setting remnant (Feature 9) is superimposed over the north portion of the shaft house platform, and it consists of a mound of red bricks. It has been disturbed to such a degree that determination of the boiler size is impossible without excavation. When the Amethyst Shaft was in operation, boiler tenders cleaned fuel residue (clinker) out of the boiler's firebox, and they ejected it downslope. The buildup of clinker created a broad dump (Feature 10), to which later operations also contributed.

[1] Sanborn Map Company *Creede: Hinsdale & Rio Grande Counties, Col.* Sanborn Map Company, Brooklyn, NY 1893.

[2] *EMJ* 2/12/92 p212; *EMJ* 7/23/92 p86; *EMJ* 9/10/92 p252; *EMJ* 10/29/92 p421.
Smith, Duane A. *Song of the Hammer and Drill: The Colorado San Juans, 1860-1914* Colorado School of Mines, Golden, CO 1982 p91.

Miners dumped waste rock south of and downslope from the shaft house platform. They graded the resultant dump s top surface flat, and used the area for utilitarian purposes.

Figure 7.1 In 1892 the Moffat syndicate financed the erection of a production-class surface plant at the Amethyst Shaft. In the view, which faces south, workers are in the midst of constructing the mine s hoisting system. Workers have completed a return tube steam boiler, visible at photo-center, and they are preparing to assemble the steam hoist. The hoist s components lie to the left of the boiler, and it appears as if workers are constructing a hoist foundation adjacent to and left of the boiler setting. After the workers installed the machinery, they enclosed the facilities in a shaft house, which occupied most of the flat area. Note the log cribbing retaining the platform s fill material. Today, the platform manifests at the site as Feature 8. The mine s aerial tram terminal, visible in the background left of center, is also under construction. The Last Chance Mine is the complex of buildings at the upper left, and the New York Mine is at top center. Courtesy of Colorado Historical Society (S0025678).

Figure 7.2 By 1895 the Amethyst Mining Company had upgraded the surface plant that served Shaft No.3, the mine s main entry, into a production-class facility. Compare this photo, taken from a similar vantage point, with Figure 7.1. The shaft house, visible at lower left, features six smokestacks, indicating that the mining company installed several steam boilers. The remains of the boilers brick setting manifests at the site today as Feature 9. The mining company installed a new hoist and enclosed it in the low hoist house visible above and right of the massive shaft house. The hoist foundation and the hoist house platform are represented today by Features 4 and 3. The covered carway and the aerial tram terminal can be seen immediately above the hoist house. The assay shop and office building, represented today by Feature 11, stands right of photo-center. Note the stacks of cordwood fuel for the boilers, and the women and children at lower right. The Large mine at upper right is the Last Chance, and the New York Mine is visible at far upper right. Courtesy of Colorado Historical Society (F-1134 S0025676).

Figure 7.3 The remnant of the Amethyst Shaft's surface plant as it appears today. Compare this photo with the two upper views. The coal bin remnant (Feature 7) is right of center, and the ore sorting house erected during the 1910s (Feature 14) can be seen above center. Author.

Figure 7.4 The Amethyst Shaft complex occupies the mid portion of the photo. The ore sorting house at lower right is associated with the Amethyst Tunnel site. The tunnel is located behind the structure. Author.

By 1893 the Amethyst Mine had produced half of the silver taken out of the Creede district, and miners had proven that much more ore lay in the ground. The mining company continued to profit handsomely until disaster struck. Toward the end of the year the Silver Crash ruined the value of the white metal, and what was once perceived as bonanza ore suddenly became worthless. The Amethyst Mine, like the other outfits in the Creede district, laid off its miners and suspended operations. The Moffat syndicate was adept at the mining game, however, and it knew that the price of silver would recover at some point. Under orders from the company directors, the Amethyst Mine resumed low-level operations with a crew of 70 workers early in 1894, and miners focused on extracting the most accessible and richest ore to pay for operations, and they developed the vein in preparation for an increase in production.[3]

Development continued until August, when a devastating accident occurred. Somehow, a fire began at the surface plant that served Shaft No.3, and within a short time the fire had spread to all of the buildings. The shaft house became engulfed in flames, and the fire was so intense that the hoist cable burned through and parted, sending a skip hurtling to the bottom of the shaft where it crushed a crew of miners. With the surface machinery destroyed, the dewatering pumps stopped working, and the shaft subsequently flooded. The cataclysm set the Amethyst Mining Company back considerably, and the plant was not rebuilt for some time. And this was not the only disaster to impede operations at the mine. In December of 1893 the hanging wall in the stopes collapsed, from ground-surface down to Level 3, wrecking the underground workings.[4]

By 1895 mining resumed with vigor at the Amethyst property. The price of silver had recovered somewhat, the demand for industrial metals had risen, and the Moffat syndicate was intent on producing ore in economies of scale. To support the increased production, the mining company improved the Amethyst Shaft's surface plant. Mine workers constructed a shaft house much like the one that burned in 1894. A frame carway covered the track that extended south to the aerial tram terminal, and a second blacksmith shop stood between the main shaft and Shaft No.2. At this time, the mining company relegated Shaft No.2 to serve as an entry into the workings and to facilitate natural ventilation. The hoist and boiler, installed in 1892, had been removed. In addition, an assay shop and office was erected west of the shafts. Thirty workers staffed the Amethyst operations.[5]

The Amethyst company upgraded the surface plant that served Shaft No.3 once again during 1899 and 1900, when the Creede district was experiencing a second boom. By this time, the Amethyst Mine had resumed its stature as Creede's best producer. First, under direction of superintendent Cyrus Miller, mine workers installed a new 75 horsepower steam hoist and a second locomotive boiler, and they erected a large frame hoist house to enclose the machinery. The hoist house stood approximately 50 feet south of the shaft house. The company expanded the blacksmith shop and connected it to the hoist house.[6]

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[3] *EMJ* 6/30/94 p613.

[4] Bennett, Edwin Lewis and Spring, Agnes Wright *Boomtown Boy in Old Creede, Colorado* Sage Books, Chicago, Ill, 1966 p23.
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[5] *EMJ* 7/9/98 p46.
Sanborn Map Company *Creede: Hinsdale & Rio Grande Counties, Col.* Sanborn Map Company, Brooklyn, NY 1898.

[6] *EMJ* 6/23/00 p748.
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AMETHYST SHAFT
PLAN VIEW
CREEDE MINING DISTRICT, MINERAL COUNTY, COLORADO

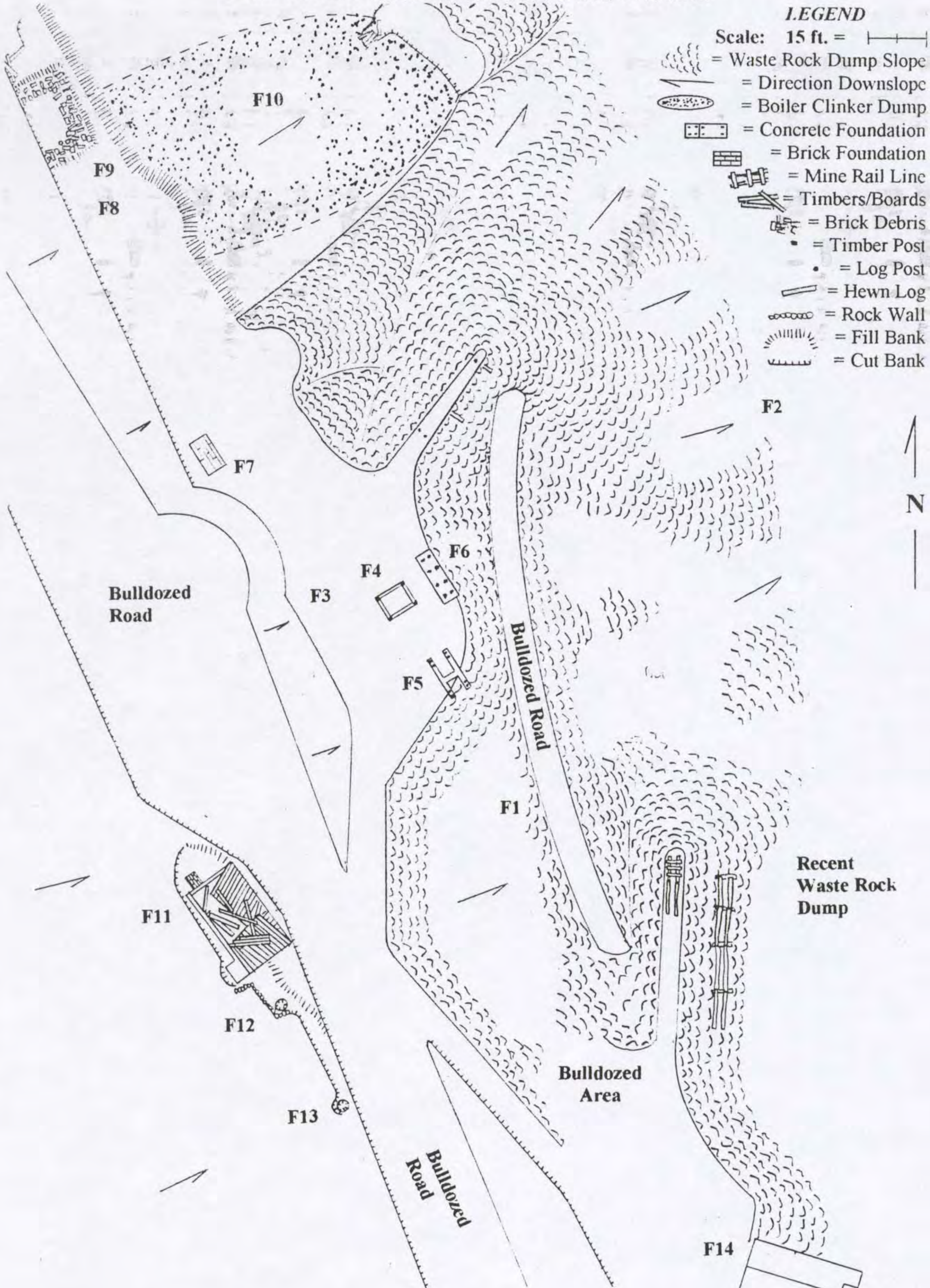


Figure 7.6 Sanborn's 1893 map of the surface plants associated with shafts No.2 and No.3. To scale with the archaeological map.

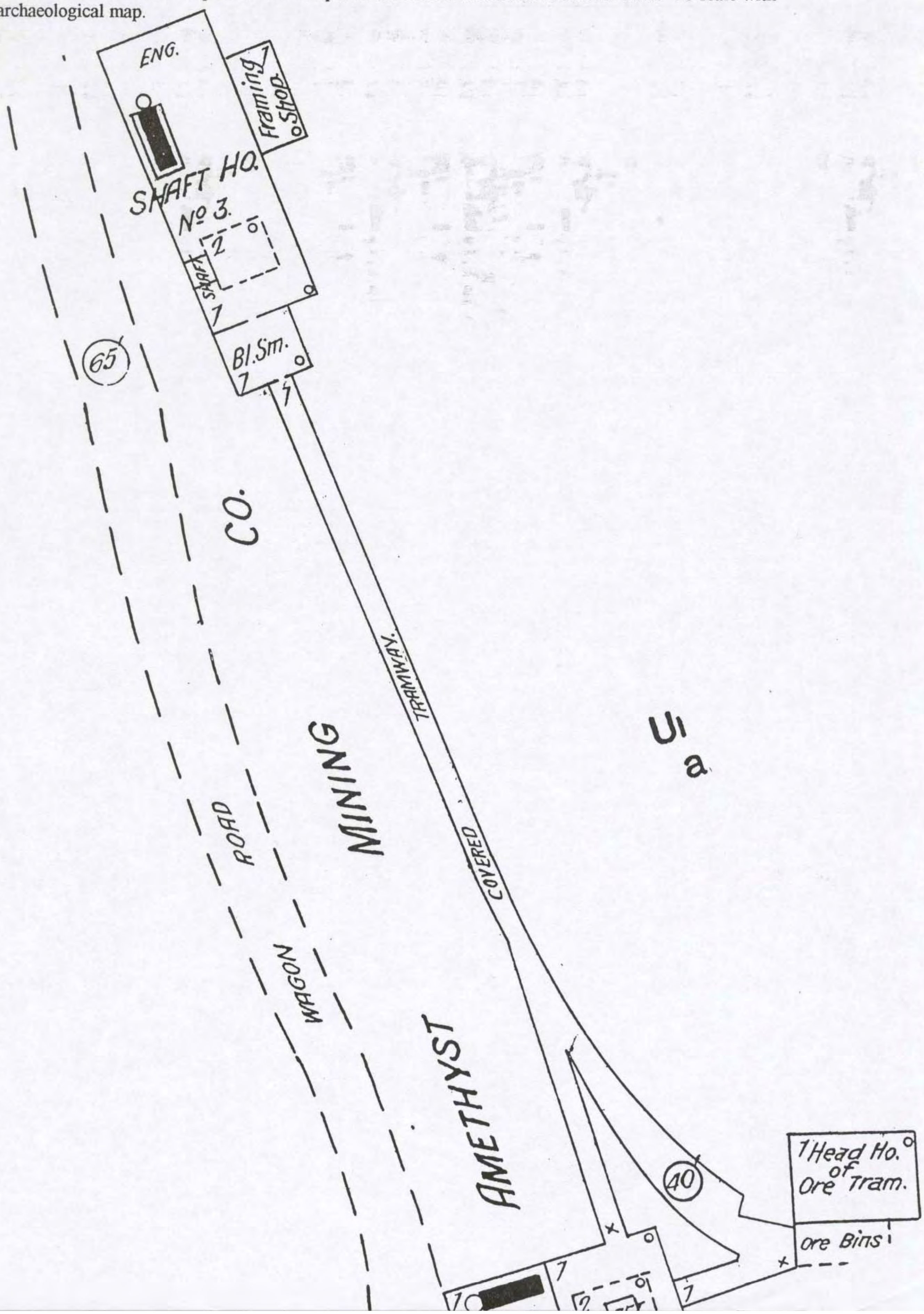


Figure 7.7 Sanborn's 1898 map of the surface plants associated with shafts No.2 and No.3. Note that the machinery for Shaft No.2 has been removed, and that a hoist house and shops have been added to the plant for Shaft No.3. To scale with the archaeological map.

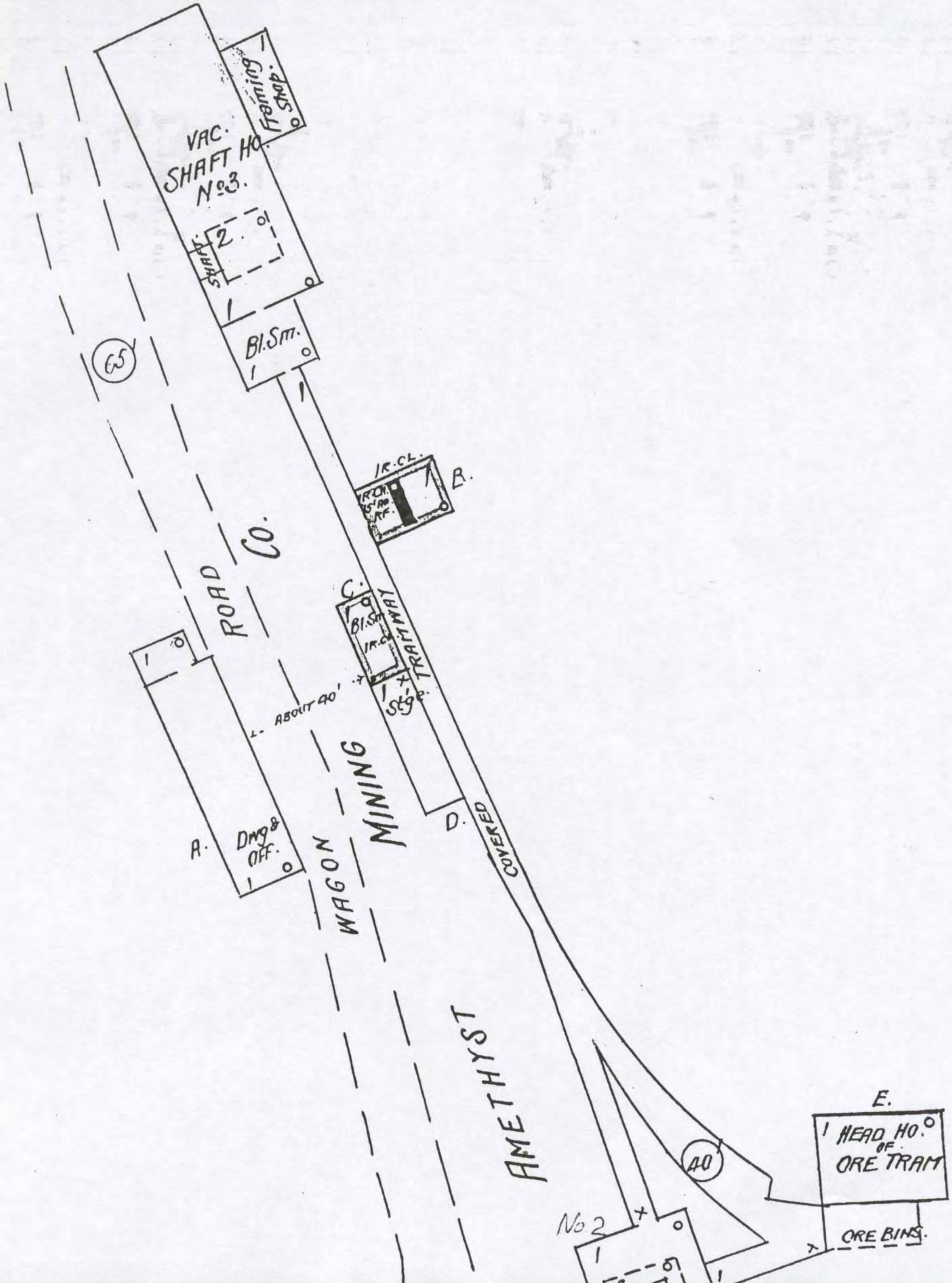
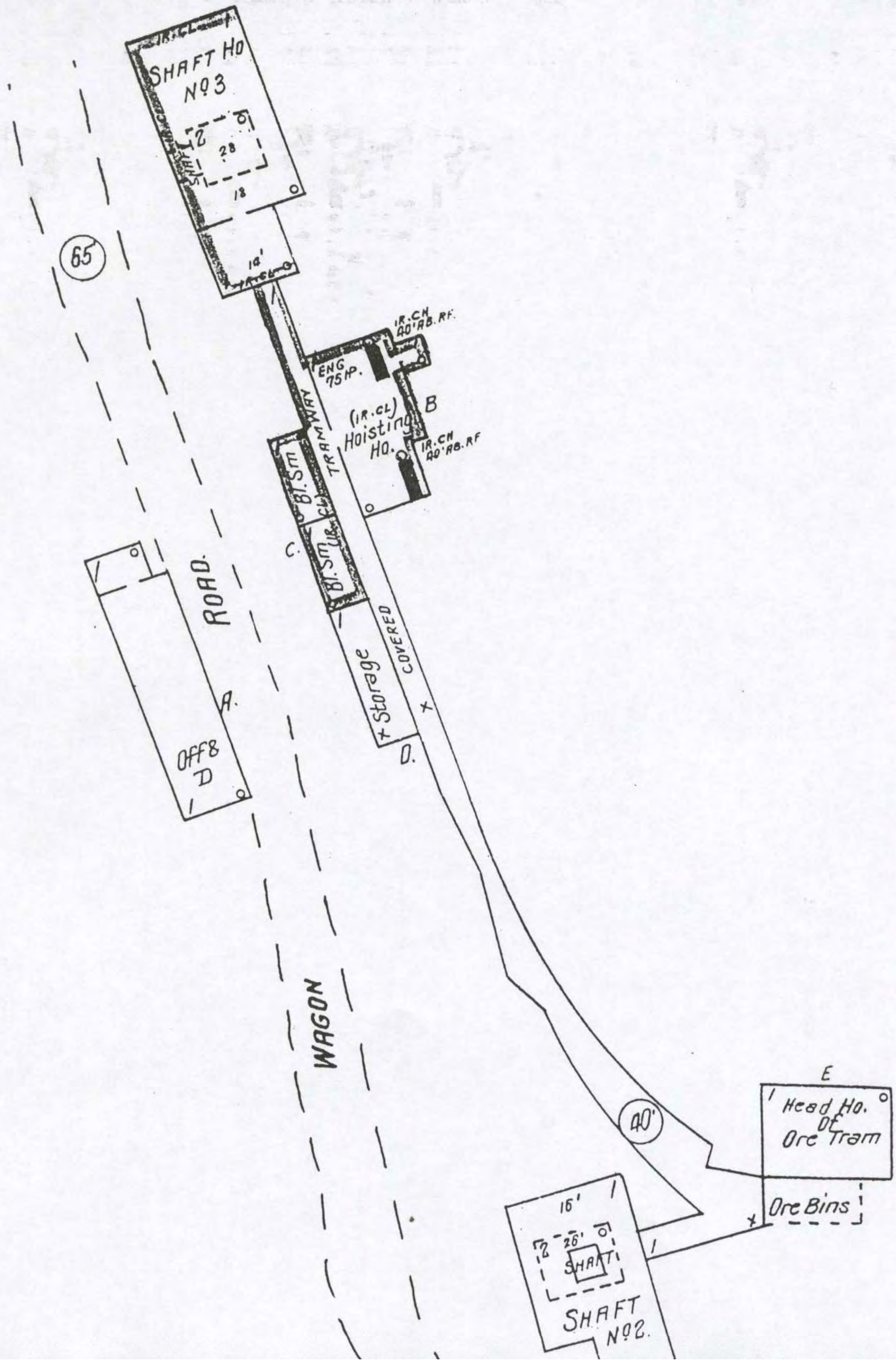


Figure 7.8 Sanborn's 1904 map of the surface plants associated with shafts No.2 and No.3. The hoist house and shops for Shaft No.3 have been enlarge. To scale with the archaeological map.



When the Amethyst company expanded the surface plant in the late 1890s, mine workers removed or buried many of the facilities associated with the original shaft house. The original hoist foundation, the blacksmith and carpentry shop areas, the rail line, and shaft house foundations are missing from extant remains.

The remains of several of the surface plant components erected by the Amethyst company in the late 1890s and early 1900s are evident. Specifically, a foundation for the hoist, a compressor foundation, and a coal bin are superimposed over the hoist house platform (Features 4, 6, 7, and 3, respectively). Mine workers created the platform by cutting an area out of the hillside adjacent to the waste rock dump and using the fill material to grade a broad flat area. The hoist foundation, constructed of timbers, supported an 8 by 9 foot single drum steam unit. While the foundation is temporary-class in nature, the hoist met production-class criteria. The coal bin, 7 by 14 feet in area and 7 feet deep, held anthracite coal for the new blacksmith shop. The bin contained a considerable quantity of coal, reflecting sustained and intensive shop work, much of which involved sharpening dull drill-steels.

The Amethyst company's late 1890s plant upgrade included a compressed air system which is reflected in the remains and artifacts associated with the hoist house platform. A compressor foundation stands on the platform, and it supported a 5 by 14 foot straight-line steam-driven compressor. The air powered piston drills that miners used to bore blast-holes underground, which increased production. Numerous piston drill parts lie downslope from the hoist house platform, and on the boiler clinker dump (Feature 10). The compressor, its foundation, and the use of rockdrills to expedite the blasting process met production-class criteria.

The hoist house platform currently features a heavy density of artifacts, most of which are industrial and mining in nature. According to the dateable items mixed in with the assemblage, the refuse was deposited between around 1900 and 1910, which mirrors the hoist house's most intensive period of use. In addition to small items, the artifact assemblage includes a portable Pennsylvania boiler lying out of context on its side. The boiler probably was one of the two units documented on Sanborn's 1904 map of the shaft complex.

The late 1890s plant upgrade included a frame assay shop and office building. The remains of this structure currently lie on a cut-and-fill platform upslope and west of the shaft complex. The assay shop and office remnant stands on a cut-and-fill platform upslope from the main portion of the Amethyst Shaft complex. The remnant consists of structural remains including a standing west wall, and articulated north, east, and south walls that have collapsed over a plank floor. The foundation for a large brick chimney, 6 by 3 feet in area, is situated against the building remnant's west edge. The building featured several rooms. The assay facility was housed in the building's north portion, and the office was occupied the south portion. The building's support system consisted of a 2x4 post-and-girt frame and 2x4 common rafter roof. The exteriors and interiors of the walls of the assay office were sided with one layer of planks each, and the roof was clad with corrugated iron. The exterior of the office was sided with clapboards, and the interior was sided with one layer of boards and white ribbed paneling. A large iron safe lies amid the structural debris in the building's assay shop. Associated domestic artifacts suggest that the building may have included a small residence.

In 1899 the Amethyst Mine became a link in an amazing tunnel system which greatly benefited the company. When the district was enjoying its first boom in the early 1890s, Charles F. Nelson, who discovered the Soloman Mine, organized the Nelson Tunnel Company with the intent of driving a deep haulageway along the Amethyst Vein. Nelson claimed that his great bore would offer deep drainage and improved ventilation of workings, and it would serve as a haulageway, thereby negating the need to hoist ore from the depths of the mines on the Amethyst Vein. Nelson argued that the savings that the mining companies would enjoy greatly offset the subscription rates and fees he proposed levying per ton of ore hauled through his tunnel. The Moffat syndicate, which owned several large operations on the vein agreed to the terms. Technically, the Nelson Tunnel terminated underneath the Bachelor Mine, however, in 1897 the Wooster Tunnel Company formed to drive a drift north to the Last Chance, New York, and the Amethyst properties.

Using 4 heavy piston drills, miners advanced the tunnel 6 feet per shift, and in 1899 they first reached the Last Chance workings, then the Amethyst workings. Even though the Wooster Tunnel had reached the vicinity of the Amethyst and Last Chance properties, the company required time to make the final connections. Because water was very costly to pump from deep workings, the Amethyst and Last Chance mines allowed the lower passages to flood in years past. This presented the Wooster engineers with a problem. To avoid a life-taking inundation in the tunnel upon breakthrough, the water in the deep workings had to be drained. An engineer had the bright idea of using diamond drills, which were in the developmental stage in the late 1890s, to bore long-holes into the sumps of the Last Chance and the Amethyst shafts. In 1900 trained drillers from the Sullivan Drill Company arrived and began boring holes toward the Last Chance Shaft. Once they had proven that the experiment was successful with the Last Chance shaft, they repeated the process for the Amethyst Shaft.[7]

The Amethyst Mining Company profited handsomely between 1900 and 1910. Unlike many of the Amethyst Vein's small mining operations, the Amethyst Mine continued to rely on its shaft to maximize production. Most other mines on the Amethyst Vein abandoned their shafts and associated surface plants in favor of using the Nelson Tunnel. However, the Amethyst's miners continued to drill and blast ore in the mine's upper levels where the best ore lay, which were served by the shaft, while company miners working at depths as low as 1,200 feet underground found that the Nelson Tunnel served their needs. The company maintained Shaft No.2 as a manway and to facilitate ventilation.

In addition to facilitating the production of greater tonnages of ore, the Amethyst Mining Company sought savings by milling its ore locally. Around 1900 the company erected small ore reduction mill downslope near the townsite of Weaver. The idea behind milling the ore was not to produce refined silver bullion, but to reduce and concentrate the metals content, and ship the concentrates to a smelter. By concentrating the ores on-site, the Amethyst company saved a portion of the processing fee levied by smelters, and it saved shipping costs, because the heavy, worthless waste rock was removed. Engineers sited the Amethyst Mill on the south side of West Willow Creek because it would be adjacent to the mine's aerial tramway. In keeping with such an ore

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[7] Colorado Historical Society Records, MSS Box 640, v24:7.
EMJ 10/21/99 p496.

delivery system, the head of the mill featured ore receiving bins and an ore sorting house.[8]

The Amethyst Tunnel site (5ML247) currently encompasses the foundations and other features associated with the Amethyst Mill. The foundation manifests as a series of 6 concrete terraces flanked by several platforms. The terraces (Features 28-33), enclosed by a single large frame building, supported facilities associated with typical mechanical ore reduction processes.

The ore receiving bin platform constitutes the first and upper-most terrace, and it supported ore receiving bins and a rock crusher. The ore bins received raw ore from the mine, and a mill worker fed the rock contained by the bins into a crusher. The pulverized rock proceeded from the crusher to a stamp battery, located on the next platform below, for further reduction. Several batteries of stamps, which crushed ore, stood on the mill's second platform. Mill workers fed ore fractured by the rock crusher to the stamps for further reduction. The third platform supported screens designed to classify the slurry generated by the stamp batteries, located on the upslope platform. The slurry passed across slotted iron screens, and material incapable of passing through returned to the stamps via a bucket line consisting of small pans on a canvas belt. Material that passed through the screens proceeded to the grinding and recovery platforms below. The grinding platform is located at the foot of the screening platform. It features two heavy timber foundations that probably anchored grinding apparatuses such as Cornish rolls, which further reduced the slurry. Each foundation is 4 by 12 feet in area and 4 feet high. They consist of a 12x12 timber framework bolted to 6 12x12 posts set in stone masonry, and the timbers are studded with 6 1¼ inch anchor bolts. The recovery platform is located at the foot of the grinding platform, and it constitutes the mill's fifth terrace. The platform supported machinery that separated metals from gangue. Wilfley tables were included in the separation machinery, as indicated by machine parts scattered on the platform. The function of the mill's lowest visible platform is unknown. The platform features two heavy machine foundations and an iron basin encased in concrete. Each machine foundation is 7½ by 7½ feet in area and features an outboard shaft bearing mount. The foundations, identical in size and form, are different in construction, suggesting that mill workers added one at a later date. The eastern foundation consists of a 12x12 timber frame bolted over a natural concrete footing. It features 8 1¼ inch anchor bolts symmetrically placed in the timbers, and two more in the center. The western foundation possesses the same pattern, and it consists of a solid bed of 12x12 timbers. A belt pulley rotated between the machines and their outboard bearing pylons.

A machine shop and a blacksmith shop served the Amethyst Mill. The facilities stood on cut-and-fill platforms (Features 34 and 35, respectively) flanking the extant foundation to the west and east. The machine shop is accompanied by an artifact assemblage that consists of machined metal turnings and parts, and the blacksmith shop is accompanied by an artifact assemblage consisting of typical blacksmithing refuse.

The recession of 1907 hit the Creede district's mines, and the Amethyst company temporarily suspended operations. Miners resumed work by the end of the year, but the Amethyst's economic situation had darkened. During the last 15 years the Amethyst's

[8] Bennett, Edwin Lewis and Spring, Agnes Wright *Boomtown Boy in Old Creede, Colorado* Sage Books, Chicago, Ill, 1966 p23, 157.

directors had their miners concentrate on extracting proven ore to maximize profits, and they neglected to explore the ground to both sides of the mighty vein for additional ore bodies. As a result, by 1910 the main stopes were showing signs of exhaustion, and like many other mines, the Amethyst company found it to be more economical to subsequently lease the mine to independent miners.

In 1912 the Creede Tribute Mining Company assumed operations and focused on extracting ore from the formerly rich upper levels. The outfit used the surface plant erected years ago by the Amethyst Company, and it rehabilitated the aerial tramway. The Creede Tribute company probably operated the mine for several years afterward, and it may have ceased work around 1916. In the following year the Creede Exploration Company, a subsidiary the Guggenheims' Atlantic Smelting and Refining Company empire, took a lease on the property in hopes of accomplishing what earlier operations had neglected. Creede Exploration undertook a campaign to search for ore below the Nelson Tunnel level, and it paid for the costs by extracting payrock remaining in the upper stopes.

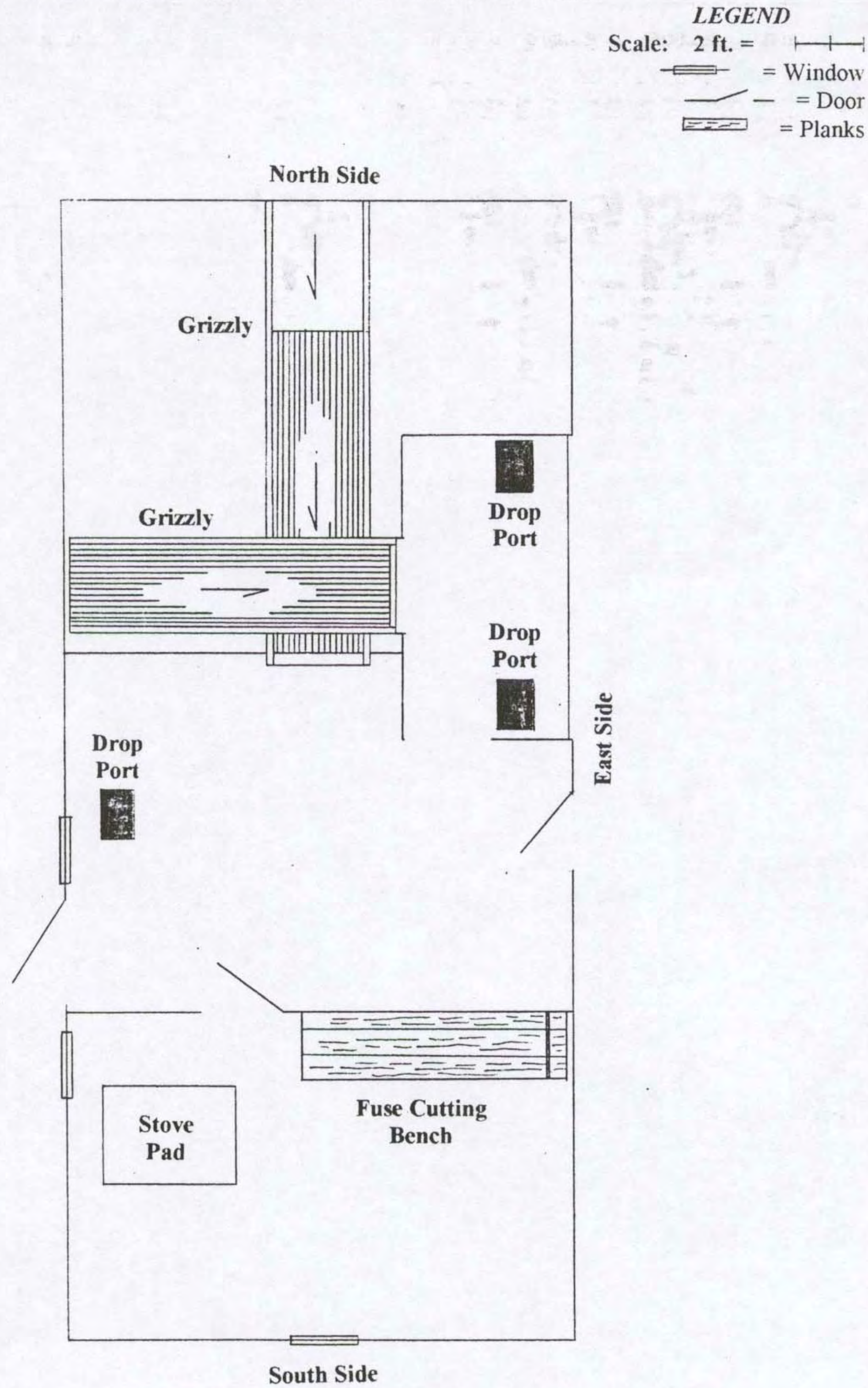
The Creede Tribute operation may have erected the ore sorting house currently standing at the site (Feature 14) as part of its efforts to rehabilitate the tramway. The ore sorting house stands adjacent to the mine's tram terminal where a larger, and older, structure stood. The current ore sorting house appears to post-date the 1900s. The structure is small and capable of handling limited quantities of ore, suggesting that lessees erected it after the mighty Amethyst company ceased work at the mine.

The sorting house, a side-gabled frame building, features two floors. The bottom floor consists of an ore bin based on a heavy post-and-girt frame. The top floor features a sorting area, and is enclosed by 2x4 balloon frame walls sided with corrugated iron, and covered by a 2x4 common rafter roof also sided with corrugated iron. Two ore sorting stations and a warming room occupy the top floor. One of the sorting stations is located in the floor's center, and the other is situated along the east wall.

Miners input ore into the structure by dumping it into one of two receiving chutes that descend through the building's roof. The ore rolled across grizzlies, and the metal-bearing fines pass through and dropped into a holding bin below. The waste-laden cobbles rolled across the grizzlies and collected on the floors of the sorting stations. Due to the building's limited floorspace, one chute passes underneath the other. Specifically, the chute extending through the south wall passes under the chute extending through the west wall. Mine workers tossed recovered ore into the bin below through ports in the floor.

The warming room, 10 by 15 feet in area, features a stove pad and a fuse-cutting table where explosive charges were prepared. The remains of a small aerial tram terminal are located along the base of the building's east wall. Tram buckets were loaded from ore chutes extending out of the sorting house's east side. The structure is in deteriorated condition, and slumped earth and waste rock have severely damaged the tram terminal. Due to the damage, the nature of the tramway and ore transfer system could not be determined.

AMETHYST SHAFT
PLAN VIEW
ORE SORTING HOUSE
CREEDE MINING DISTRICT, MINERAL COUNTY, COLORADO



In 1917 the Creede Exploration Company built a new power plant in Creede to power machinery at the mine, and to sell surplus power to other mining companies. In 1918 Creede Exploration installed an electric hoist and a motor-driven compressor at the shaft. The exploration effort proved a failure, and the outfit's miners encountered only uneconomic ore bodies. The mining company removed the new machinery, leaving the shaft without a hoist and compressor.[9]

Some of the remains existing at the Amethyst Shaft today are left over from the Creede Exploration operation. Specifically, the electric hoist foundation (Feature 5) anchored the electric hoist that the company installed in 1918, and many of the artifacts deposited downslope from the hoist house platform and on the boiler clinker dump are left from this time. The hoist foundation anchored a 8 by 12 geared electric hoist. The hoist's size and the foundation's H-shaped footprint are unusual for electric equipment used during the 1910s.

Creede Exploration gave up operations in 1920, and the Amethyst Leasing Company took over mining activity. Since the surface plant associated with the shaft was without machinery, the outfit's miners used the Nelson Tunnel for access, and for hauling out ore. They primarily worked the 800 Level, and drilled with air piped through Nelson Tunnel. The Amethyst Leasing Company continued to work the property through most of the 1920s. In addition to drilling and blasting ore, miners conducted exploration in the hanging wall over the Amethyst Vein, where they found a good ore body.[10]

Considering that the old stopes still contained economic ore, and that several new ore stringers had been discovered during the 1920s, lessees remained interested in the Amethyst property. Ore in the lower levels, which was marginal to begin with, was exhausted, but the upper levels still held promise. In 1928 a leasing outfit, probably the Amethyst Leasing Company, decided to drive a new tunnel into the mine's old, upper levels. By this time, the Nelson Tunnel had fallen into disrepair and was not a viable haulageway. Work began on the Sloane Tunnel, which miners drove from the banks of West Willow Creek near the abandoned townsite of Weaver. Within the year miners made the necessary connections, and the mining company began hauling out ore in small trains pulled by mules. The surface plant associated with the tunnel was small, consisting of a shop, ore bins, a barn, and a portable Ingersoll-Rand compressor. The onset of the Great Depression in 1929 brought operations to a halt.[11]

In 1934 President Franklin Delano Roosevelt signed the Silver Purchase Act into law, which boosted the value of the metal. Mining at the Amethyst resumed, and the Sloane Tunnel, later known as the Amethyst No.5 Tunnel, served as the point of entry. Operations continued until 1939, when the Emperius Mining Company purchased the property. Emperius assumed work at the mine, and upgraded the surface plant by erecting a compressor house, timber sheds, a change house, a generator, and a snow shed

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[9] Colorado State Archives, Mine Inspectors' Reports, Box 104053: Amethyst.
Colorado State Archives, Mine Inspectors' Reports, Box 104053: Creede Exploration Co.
Emmons, William H and Esper, Larsen S. *USGS Bulletin 718: Geology and Ore Deposits of the Creede District, Colorado* U.S. Geological Survey, U.S. Government Printing Office, Washington, DC 1923, p159.

[10] Colorado State Archives, Mine Inspectors' Reports, Box 104053: Amethyst.
Larsen, E.S. "Recent Mining Developments in the Creede District: *USGS Bulletin 811: Contributions to Economic Geology* U.S. Geological Survey, U.S. Government Printing Office, Washington, DC 1929.

[11] Colorado State Archives, Mine Inspectors' Reports, Box 104053: Amethyst.

AMETHYST TUNNEL
PLAN VIEW
CREEDE MINING DISTRICT, MINERAL COUNTY, COLORADO

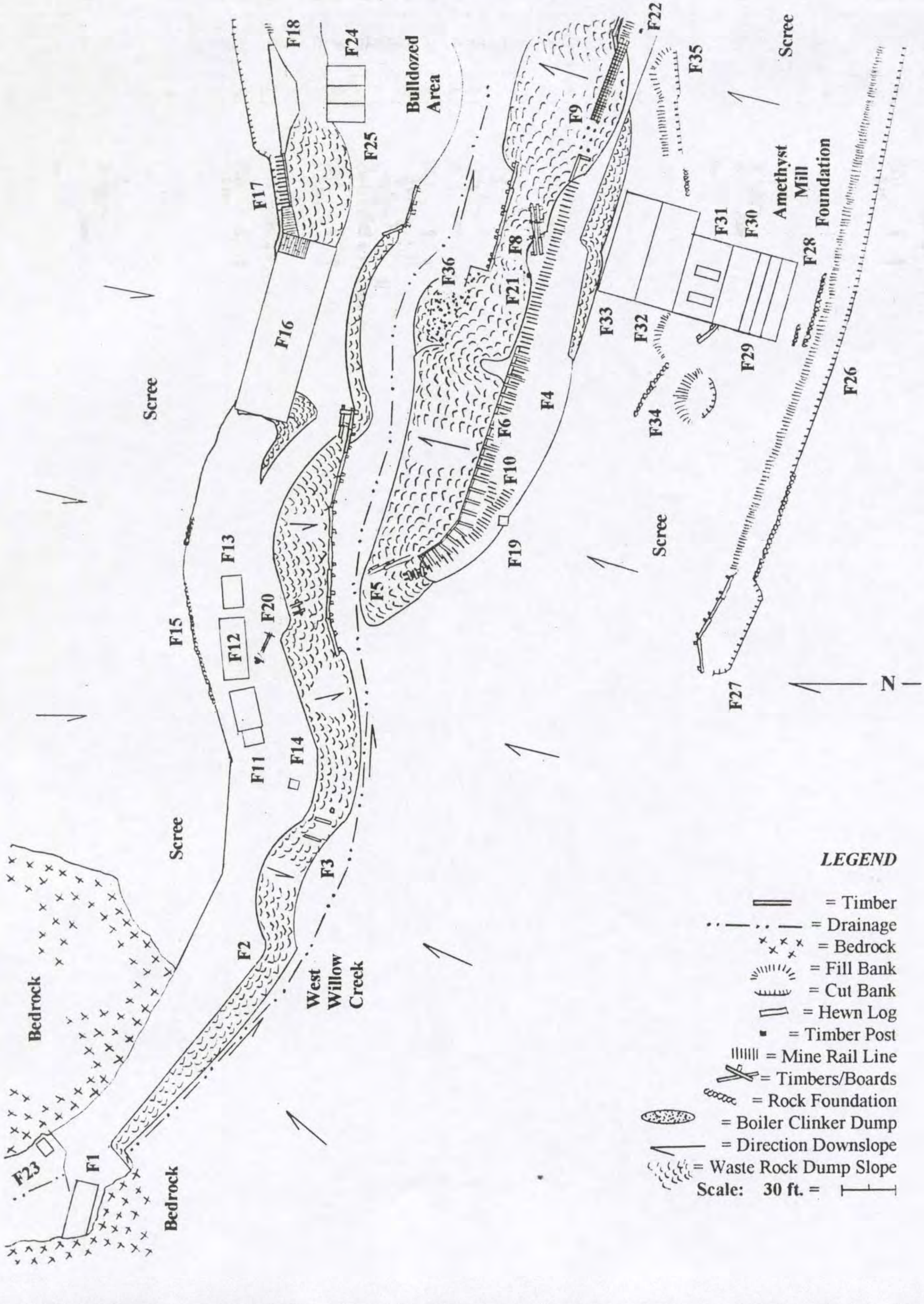


Figure 7.11 Overview east of the Amethyst Tunnel complex. The series of buildings near photo center consists of, top to bottom, the ore sorting house, the original compressor house, a new compressor house, and the barn (Features 16, 13, 12, and 11, respectively). West Willow Creek flows through the center of the photo, and waste rock dumps (Features 2 and 4) flank the creek. Bachelor Loop road traverses the photo above the buildings. Author.

Figure 7.12 View west of the Amethyst Tunnel complex. West Willow Creek is visible in photo center, and it extends between the mine's northern and southern waste rock dumps (Features 2 and 4). The trestle in the foreground (Feature 9) extends to the east end of the southern dump, located behind the camera. A portion of the Amethyst Mill foundation is visible at the far left, and the explosives magazine (Feature 19) stands in the left background. The ore sorting house is the prominent structure on the right, and the cluster of buildings in the right background includes the mule barn, the recent building, and the compressor house (Features 11, 12, and 13, respectively). Author.

over the tunnel. Emperius continued to extract ore from the Amethyst Mine's upper workings as late as the 1950s, when it shut down operations.[12]

The Amethyst Tunnel site (5ML247) currently features the remains of the surface plant components left by the succession of operations. Several facilities existing today date to the first activity at the tunnel. The site's northern waste rock dump (Feature 2), bounded by West Willow Creek, was generated when miners drove the tunnel beginning in 1928, and they erected a barn (Feature 11) to house the mules which pulled ore trains out of the mine. Before the mine workers erected the barn, they built a dry-laid masonry wall (Feature 15) to retain scree off the building area. Missing from site are the shop and the ore bins.

Several of extant surface plant components appear to have been constructed by the 1934 operation. Specifically, the operation may have erected a portion of the ore sorting house (Feature 16) that currently stands at the mine. The structure was constructed in several episodes. Mine workers built the core first, which is 43 by 30 feet in area. The sorting house originally featured two sorting stations, and a later operation added two more sorting stations to the building's west end, and another sorting station to the east end. Because the ore sorting house's top floor included a blacksmith shop, the mine's first shop facility constructed in 1928 may have been abandoned.

The ore sorting house functioned like similar facilities erected in the Creede district in decades past. A mule pulled loaded ore cars into the building's top floor, where miners discharged the payrock into one of two receiving chutes. The ore slid across a grizzly, the metal-bearing fines passed through and accumulated in holding bins below, and waste-laden cobbles rolled onto one of the sorting stations. There, mine workers used hammers to knock off waste rock, they dropped the recovered ore into the holding bins below, and shoveled the waste into ore cars parked adjacent. Each sorting station featured a heavy timber table flanked by platforms for the workers. When they had filled the ore cars with waste, workers pushed the cars across the track and out of the building.

The Amethyst Tunnel's ore sorting house was a large, drafty building which was difficult to heat in winter. Workers sorted ore despite the cold conditions, and when the temperature was too frigid, they periodically warmed themselves in a warming area equipped with benches and a wood stove, located between the sorting stations. Numerous windows and electric lights provided illumination for the workers. The holding bins, comprising the structure's bottom floor, featured ore chutes stopped with gates. A truck parked underneath the chutes, and a mine worker crept along a catwalk linking the chutes and opened the gates to permit the ore to flow out.

In 1939 the Emperius Mining Company effected several additions the tunnel's surface plant. They erected a compressor house (Feature 13) east of the barn. The structure currently features a concrete foundation, and its footprint indicates that it anchored a V-cylinder compressor. Emperius also conducted underground exploration and development of the mine's ore bodies, which generated a considerable volume of waste rock. Mine workers erected a trestle spanning West Willow Creek (Feature 5) and deposited the rock on the creek's south bank, resulting in a massive dump (Feature 4) which partially buried a portion of the Amethyst Mill foundation. To facilitate the transportation and dumping of the rock, miners constructed a rail line supported by a

[12] Colorado State Archives, Mine Inspectors' Reports, Box 104053: Emperius.

group of trestles (Features 6, 7, 8, 9, and 10). The company also constructed an explosives magazine (Feature 19) on the dump, and it stands well-removed from the remainder of the surface plant. The magazine is similar in construction and workmanship to another magazine of the same vintage located at the Bachelor Mine's upper tunnel.

The Emperius company installed a power system to provide electricity to run mine machinery and for lighting. The system included a substation (Feature 20), and lighting poles (Features 20 and 21) on the south waste rock dump.

Because Emperius increased ore production in 1939, it made additions to the ore sorting house erected around 1934. Specifically, mine workers added the aforementioned sorting stations to the west and east ends of the building. The west addition included two sorting stations, and the east addition included one sorting station and another warming room. The additions were stylistically similar to the building's core.

The Amethyst Tunnel site includes numerous plant components that appear to post-date the 1950s, indicating that either the Emperius Mining Company, or another operation, continued to work the mine into the 1970s or early 1980s. The late operation converted the barn into a shop, it converted Emperius' compressor house into a change house, and it erected another compressor house (Feature 12). The original ore sorting house may have been abandoned in favor of another facility constructed east. The new ore sorting structure consisted of a deck with a receiving port in its center. Mine workers pushed ore cars across a track (Feature 17) leading through the original sorting house, and dumped payrock into the port. The ore slid down a chute and collected in wood-sided stalls below (Feature 25). There, front-end loaders scooped the material into parked dump trucks. The mine's late operation also constructed a pump house (Feature 23) near the tunnel portal, and it bulldozed the waste rock dump around the sorting area.

Residence

No residential complexes directly associated with the either the shaft or the tunnel could be identified. Miners who worked at the Amethyst Shaft lived in two areas that were separate from the site. The first settlement, known as Stumptown, grew around the cluster of mines including the Last Chance, the Amethyst, the New York, and the Happy Thought. The second settlement, Weaver, consisted of a cluster of cabins in West Willow Creek's canyon, near the mill. The populations of both settlements were not dedicated to serving any single mine.

Amethyst Mine Site Analysis

The Amethyst Mine experienced a long, highly productive life. Despite the heavy disturbance at the shaft complex, the site speaks of a well-engineered, large, heavy producing mine backed by substantial capital. The Amethyst Mining Company began developing the mine with a sinking class plant, and once miners proved significant ore reserves, the company upgraded the plant with production-class components. The remains comprising the site reflect long-term operations. The mining company generated the immense clinker dump only through intensive and sustained use of the boilers to generate steam power. The heavy density of durable industrial items and the relatively high number of domestic artifacts at the shaft complex reflect long-term operation, and a reliance on mechanization to increase production. The enormous waste rock dump indicates that the Amethyst mine workings are extensive, and were developed over a protracted length of time. The assay shop and office indicates that the mining company was organized and took painstaking efforts at tracking the quality of ore, as well as providing a check against the efficiency of the Amethyst Mill.

When the Creede Exploration Company assumed operations in 1917, it too installed production-class plant components. In particular, the large electric hoist installed by the company reflects progressive and advanced engineering.

Most of the artifacts associated with Amethyst Shaft complex date to the mine's era of peak activity, which occurred between the late 1890s and 1910. A few items reflect the pre-1893 operation, and many more appear to have been deposited during the 1910s. The artifact assemblage around the hoist house platform, and that associated with the assay shop and office remnant, include food cans and industrial items dating to the 1930s. These may have been associated with Depression-era mining at the Last Chance Tunnel No.2, located adjacent to and south of the site.

Within recent decades, earthmoving activity and mining have totally obliterated the surface plant associated with Shaft No.2. The shaft was located adjacent to and west of the existing ore sorting house (Feature 14). The same activity has impacted the waste rock dump associated with the main Amethyst Shaft (Shaft No.3), and surface plant components that lay west.

The tunnel site, which is largely intact, reflects heavy production and a modest investment of capital, which was standard during the Great Depression. The site also speaks of limited engineering. Many of the surface plant components are production-class in nature, but they are not capable of handling high volumes of materials. The site's overall artifact density is low, and the buildings are small and were constructed with salvaged materials, reflecting limited capital. The tunnel site lacks blacksmith-related items, reflecting limited use of shop facilities. However, the waste rock dumps associated with the tunnel are large, indicating that miners put great effort into exploring for and developing ore bodies. Each successive operation at the tunnel site was larger that the previous one, each invested more capital in the mine, and each increased production. Activity culminated with the Emperius Mining Company. The outfit effected additions to the ore sorting house, and installed a modern compressed air system. Further, the V-cylinder compressor it installed is characteristic of capital investment aimed at increasing production, and of progressive engineering.

Annie Rooney Mine
Site 5ML343

The Annie Rooney Mine site is one of the oldest complexes included in the survey. The site, located on the east side of Bachelor Mountain approximately 1,000 feet south of the Last Chance Mine, encompasses the remains of a tunnel operation and its associated residential settlement. In terms of physical setting, the Annie Rooney site lies on a steep scree slope sparsely vegetated by a mixture of ponderosa pines, shrubs, and grasses.

In terms of character, the site consists of archaeological features in the forms of cut-and-fill structure platforms and a privy pit, and associated artifacts. The pit contains intact buried cultural deposits. The archeological remains represent the mine's surface plant, transportation arteries, several cabins, and a boarding house. Within recent years the site has suffered minor disturbance when someone used a bulldozer to scrape down the surface of the waste rock dump, and to widen roads passing through the site. Despite the disturbance, the site retains a high degree of historical integrity and ambiance.

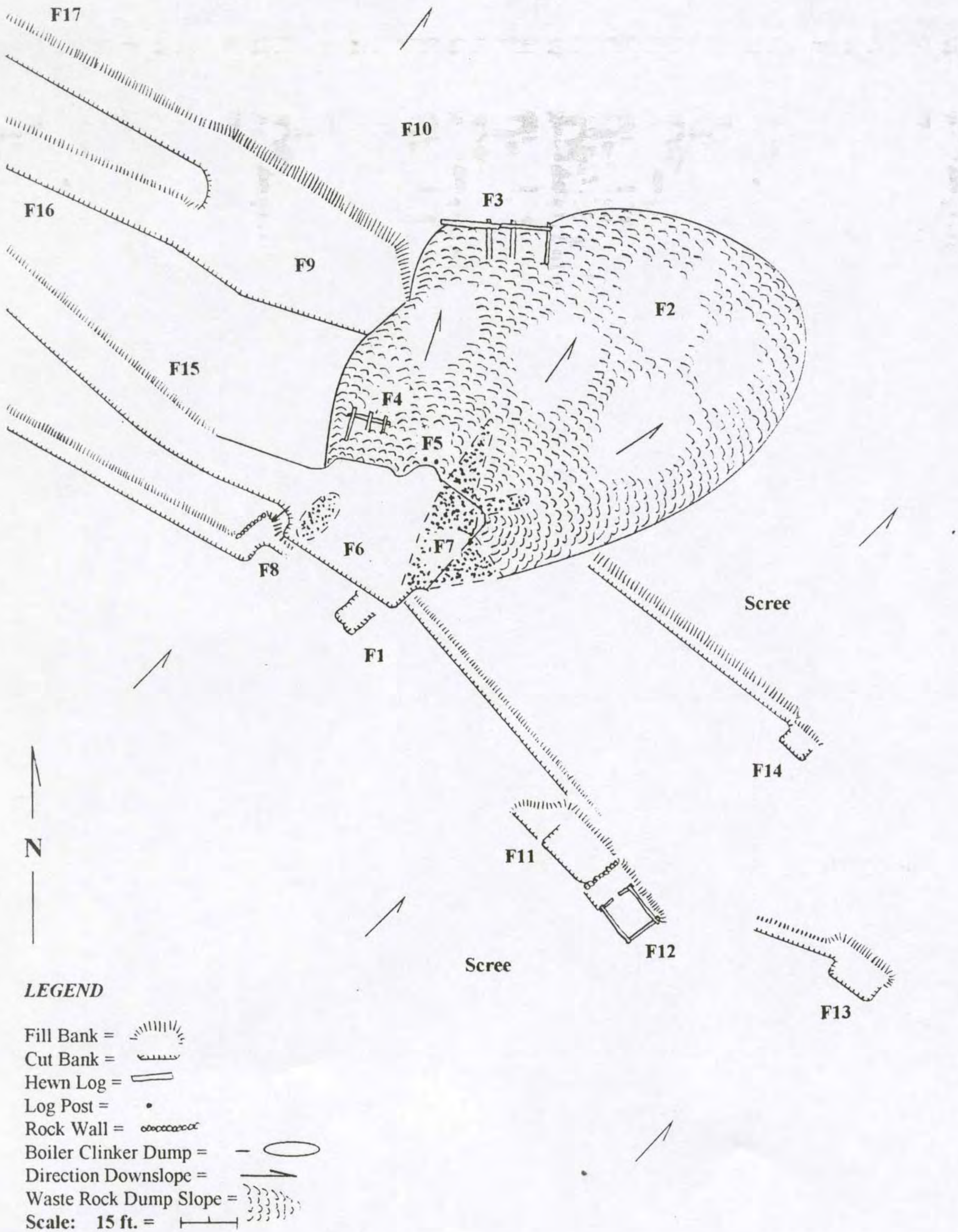
<u>Mining Operations</u>

Prospectors staked the Annie Rooney claim in 1891 when the rush to the Creede district was reaching a crescendo. Within a short time prospectors had driven an adit at least several hundred feet with the intent of striking the Amethyst Vein at depth. It is unknown whether miners struck ore. The Last Chance Mining Company, which operated a shaft 1,000 feet north, grew interested in the Annie Rooney property, and in 1892 Last Chance bought the claim. The Wolcott syndicate owned the fabulous Last Chance Mine, and it probably felt confident that the Annie Rooney claim held a significant quantity of ore. The Wolcott family made its fortune in Colorado silver through rich mines in the central portion of the Rockies, and through Colorado business and finance. Either the Annie Rooney’s first mining outfit, or the Last Chance company, upgraded the mine’s surface plant in 1891 or 1892 to facilitate deep exploration.

The remains that currently comprises the Annie Rooney site indicates that one of the mine’s operators installed a combination of temporary and production-class facilities, and erected a boarding house for the work crew. The Annie Rooney's operators spent considerable capital on an upright steam boiler, a small air compressor to power rockdrills, and a tunnel house that enclosed a shop. The surface plant may have also included a vertical steam engine and a ventilation blower. Currently, a boiler clinker dump (Feature 7) and boiler firebox grate fragments reflect the use of an upright boiler.

The site lacks foundations characteristic of compressors, indicating that the machine at the Annie Rooney was almost certainly a small portable unit on timber skids. These small *pony compressors* were able to power at most several rockdrills, and an upright boiler provided a sufficient head of steam to the small machine. Numerous rockdrill parts on-site indicate that the mining company supplied miners with heavy piston drills for boring blast-holes. The numbers of worn parts suggests that miners used several drills.

ANNIE ROONEY MINE
PLAN VIEW
CREEDE MINING DISTRICT, MINERAL COUNTY, COLORADO



The Annie Rooney company enclosed the machinery and the adit portal in a frame tunnel house, which was approximately 36 by 18 feet in area. The western portion of the tunnel house sheltered a blacksmith shop equipped with a wood box forge and hand-powered appliances. The location of the clinker dump indicates that the boiler, and probably the air compressor, stood in the east portion of the tunnel house.

The Annie Rooney Mine site includes additional features related to mining operations. The mining company constructed a pipeline to the mine to supply the steam boiler and probably the boarding house with water. The pipeline extends to the site from the Last Chance Mine. Mine workers also erected a privy southeast of the surface plant, and they graded roads northwest to the Last Chance Mine.

Residence

The mine's original operators graded three platforms south of the adit portal, which supported two residences and a small blacksmith shop. Specifically, Features 12 and 13 supported either frame or log cabins, and the shop stood on Feature 11. The shop was a very simple affair, and it consisted of basic hand tools and a free-standing pan forge for maintaining drill-steels and other equipment.

The residential platforms appear to have supported relatively small frame or log cabins. The buildings were approximately 15 by 10 feet area and probably housed two mine workers each. The associated artifact assemblages reflect the lifestyles of the occupants, and the length of their stay. The abundance of food cans and the absence of miscellaneous domestic items is representative of single miners working at a remote location. The Annie Rooney's first miners ate a diet similar to that consumed in other nascent Western mining districts. The abundance of food cans scattered downslope from the platforms reflects the consumption of preserved vegetables, fruits, and meat, which was probably supplemented by grain products. The canned food, a lack of butchered bone, and the paucity of domestic items associated with cabin platforms suggests that the mine was active at the beginning of the district's boom, before commercial services were in place, and before fresh food was widely available. Limited quantities of bottle glass indicate that the cabins' inhabitants did not openly drink much liquor or rely on medicines. Blasting cap tins lay amid the artifact scatters associated with cabin platforms. The cap tins suggests that the Annie Rooney miners stored and prepared dynamite in their cabins, which many small Western prospect operations practiced.

The artifact assemblage associated with the cabin platforms reflects a relatively brief occupation during the early 1890s. Miners used a combination of wire and cut nails to construct the cabins. These structural cut nails, packing crates assembled with additional cut nails, and the predominance of food cans made with lapped side seams over other types date to the early 1890s.

A little more than 100 food cans are associated with each platform. Assuming that two miners lived in each cabin, and that they supplemented their canned goods with grain food, salt pork, and bacon, as was common, the numbers of cans suggests that they occupied the cabins for at least two months. The cast-off articles of clothing, including workboots and felt hats, supports this conclusion. Considering that in general miners were able to drive an adit between two and four feet during a given shift, during this time they may have driven the adit between 150 and 300 feet.

When the Annie Rooney's operators expanded the surface plant and began deep subsurface exploration, the company erected a boarding house for the crew. Mine workers erected the structure on a cut-and-fill platform (Feature 9). The boarding house was probably 25 by 40 feet in area.

The boarding house residents disposed of their domestic refuse in the manner typical of Western mining camps. They threw cans, bottles, and other forms of trash behind and downslope from the building. The domestic refuse, recorded as Feature 10, consists mostly of food cans, and it extends downslope.

The artifact assemblage associated with the residential complex reflects the lifestyles of the occupants. The abundance of food cans and paucity of miscellaneous and decorative domestic items is representative of a population predominated by single miners working at a remote location.

Artifacts indicate that the Annie Rooney miners ate a hearty Victorian diet similar to that consumed in other Western mining districts. The abundance of food cans and butchered bones reflects the consumption of meals that emphasized vegetables, fruits, and fresh meats. Further, the bones consisted primarily of cuts for stews and roasts. A significant number of baking powder cans and baking utensils indicates that the cook prepared baked goods. Many cans contained milk, which mine workers may have used in coffee or tea. A great number of cans that contained institutional quantities of food, and large butchered bones, indicate that the mine crew ate communal meals in a dining hall setting. A cook prepared meals and took care of the boarding house. The trash dump lacks bottle and earthenware fragments, indicating that the mine's crew did not opening drink much liquor.

The artifact assemblage associated with the boarding house reflects an occupation between the early and mid 1890s. The set of food cans includes almost twice as many vessels made with lapped side seams as those constructed with inner rolled and soldered side seams. Bottle bases with makers' marks, few in number, include one item with an end date of 1888, and another with a manufacturing date between 1886 and around 1910. A total absence of sanitary food cans and machine-made bottles, which became popular by the 1910s, reflects total abandonment prior to World War I.

Annie Rooney Mine Site Analysis

The Annie Rooney Mine site consists of the remains of a combination of temporary and production-class surface plant components. The tunnel house, the shop, and the road network qualify as production-class plant facilities. The fact that the mining company installed a compressed air system is noteworthy. While the air system was small and consisted of relatively inexpensive and portable components, in the context of the district's poorly developed transportation network, it qualifies as being production-class. Overall, the remains of the surface plant reflect a modest investment of capital, an earnest attempt at developing the property, progressive engineering, and high optimism on the part of the mine's owners.

The absence of evidence reflecting the presence of an ore storage facility indicates that the Annie Rooney's early operators produced little if any ore. The claim may have featured ore deposits, however, which were mined through the Last Chance shaft, 1,000 feet away, after the Last Chance company purchased the property. The waste rock dump on-site is relatively small, indicating that the underground workings directly associated with the Annie Rooney adit are limited in extent.

The artifact assemblage associated with the tunnel house platform and the waste rock dump indicate that the Annie Rooney company erected the surface plant in either 1891 or 1892 and abandoned it after a relatively brief operation. Cut nails, food cans with lapped side seams, a packing crate assembled with cut nails, and dynamite box panels assembled with lock corner joints reflects an occupation spanning from the early to the mid 1890s. The modest quantity of industrial and structural artifacts on both the waste rock dump and the tunnel house platform indicate that the occupation was brief. A modest volume of boiler clinker and boiler firebox grate fragments reflect sustained use of the boiler to power the mine's machinery.

The set of residential platforms located southeast from the mine's surface plant were inhabited prior to inhabitation of the boarding house platform to the north. The southeast platforms were occupied beginning in 1891 or 1892, and the boarding house platform was occupied afterward. The platforms southeast probably saw continuous use during the mine's life. A bottle base with a maker's mark manufactured between 1905 and 1916 reflects a brief reoccupation of the site, possibly by miners reexamining the Annie Rooney's workings during the district's second boom during the 1900s.

Bachelor Mine
Site 5ML80

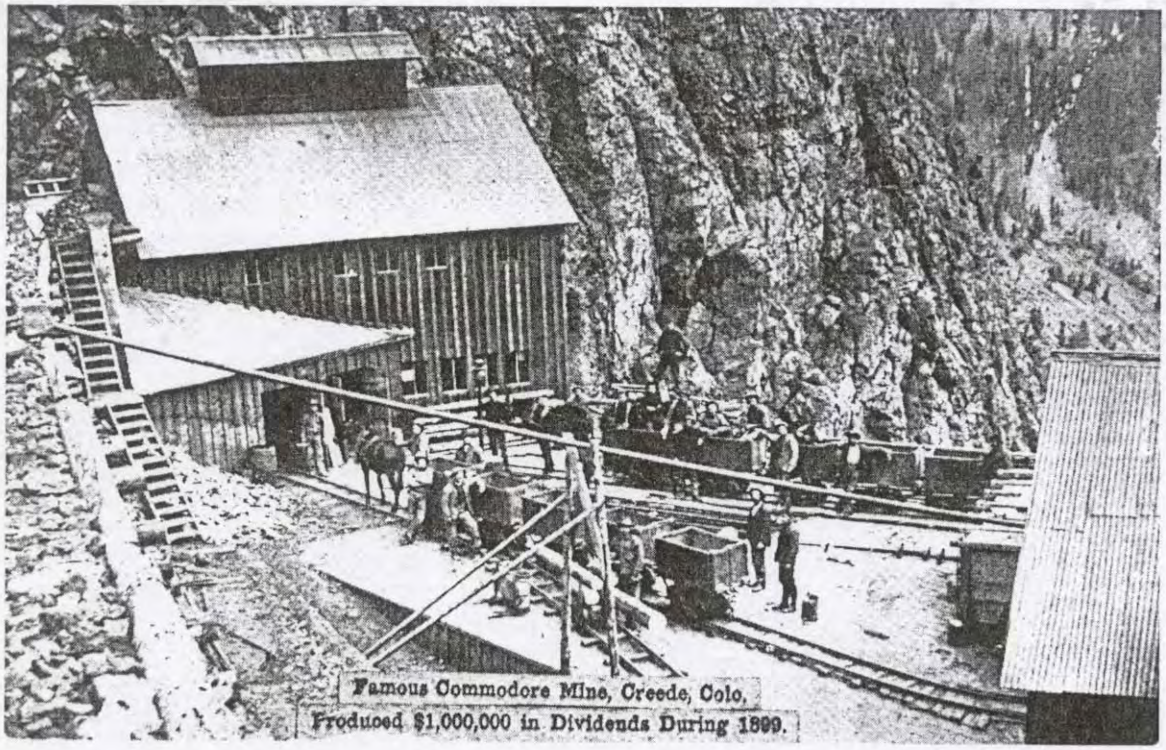


Figure 7.14 This late 1890s scene depicts miners and trains of empty cars at the entrance to the Bachelor Mine s upper tunnel. The large and complex building at left was the tunnel house and blacksmith shop. The building at right was probably a machine and carpentry shop. None of these structures remain today. Courtesy of Colorado Historical Society (S0025669).

The Bachelor Mine, located at the Amethyst Vein's south end, was one of the Creede district's oldest and richest metals producers. The mine consisted of a maze of underground workings originally accessed through two tunnels, and later by the Nelson Tunnel. The Bachelor Mine is situated on the southeast flank of Bachelor Mountain, approximately a half-mile northwest from North Creede.

The site consists of the remains of a complex multi-tunnel operation and an associated residential complex. The surface plants and waste rock dumps associated with the tunnels cover a broad area. The site retains a high degree of historical integrity and it possesses a unique industrial ambiance. Many of the site's structures and some of machinery remain at the site, and the upper tunnel complex includes privy pits which probably contain intact buried cultural deposits. The lower tunnel's surface plant is the more intact of the two complexes, and it has experienced little alteration since it was erected in the late 1890s.

In terms of physical setting, the Bachelor Mine site lies in a shallow gully bounded on the north by a tall bedrock pinnacle, and on the other sides by steep scree slopes. The upper tunnel area is sparsely vegetated by a mixture of ponderosa pines, shrubs, and grasses. The lower tunnel area is sparsely vegetated by ponderosa pines and shrubs.

Mining Operations

The Bachelor Mine holds a place of great importance to the Creede Mining District. In 1876 John C. McKenzie and H.M. Bennett examined the area that became Creede, and after considerable prospecting they discovered silver ore west of where the city of Creede would stand. McKenzie's interest in the area remained high and he continued prospecting during the next several years. In 1878 he discovered another ore body above West Willow Creek and staked the Bachelor claim, named after his marital state. Little did McKenzie suspect, as he erected his claim posts, that he was standing on one of Colorado's richest and longest ore veins. McKenzie wisely retained title to the Bachelor during the next 13 years, and in 1891 or 1892 he profited handsomely.[13]

When the Creede district began to boom in the early 1890s, David H. Moffat's syndicate purchased the Bachelor Mine from McKenzie for $20,000 and formed the Bachelor Mining Company. Miners began developing the property through a tunnel, which prospectors had driven 350 feet during the previous year or two. Miners expanded the underground workings and erected a relatively simple surface plant. The mine would become a substantial producer at a later time.[14]

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[13] Henderson, Charles W. *USGS Professional Paper 138: Mining in Colorado: A History of Discovery, Development, and Production* U.S. Geological Survey, Government Printing Office, Washington, DC 1926, p5.
Emmons, William H and Esper, Larsen S. *USGS Bulletin 718: Geology and Ore Deposits of the Creede District, Colorado* U.S. Geological Survey, U.S. Government Printing Office, Washington, DC 1923, p3.
Mumey, Nolie *Creede: The History of a Colorado Silver Mining Town* Artcraft Press, Denver, CO 1949, p6.

[14] Emmons, William H and Esper, Larsen S. *USGS Bulletin 718: Geology and Ore Deposits of the Creede District, Colorado* U.S. Geological Survey, U.S. Government Printing Office, Washington, DC 1923, p142.
MacMechen, Thomas E. "The Ore Deposits of Creede, Colo." *Engineering and Mining Journal* March 12, 1892 p301.
Mumey, Nolie *Creede: The History of a Colorado Silver Mining Town* Artcraft Press, Denver, CO 1949, p47.
Smith, Duane A. *Song of the Hammer and Drill: The Colorado San Juans, 1860-1914* Colorado School of Mines, Golden, CO 1982 p92.

Moffat's mining engineers advised that, to make the property realize its potential, the company needed to engage in two undertakings. First, the property's owners paid the high subscription demanded by C.F. Nelson for his Nelson Tunnel project, which was to be a drainage and haulage way driven deep underneath the Bachelor ground. Second, the engineers recommended that miners drive two tunnels on the claim, and link them with vertical exploratory workings. Within a short time, miners had proven the vein's amazing extent and richness, and the Moffat syndicate invested capital to increase production. Miners had made some headway developing the Bachelor claim, and the Nelson Tunnel attained a length of approximately 1,500 feet when the Silver Crash of 1893 struck. The economic blow stopped both operations.

The Bachelor Mining Company resumed exploration and ore extraction by the mid 1890s. To support work underground, engineers erected substantial surface plant facilities. Both tunnel portals featured independent surface plants that included shops, ore sorting houses, barns for the draft animals that pulled ore trains, and storage sheds. The company also financed the installation of a small electric generation and air compressor plant. The electricity went to power machinery such as ventilation blowers and for lighting, and the air powered rockdrills, which miners used to bore blast-holes underground. Because the Bachelor Mine abutted a pinnacle that towered over a steep scree slope, space at either mine portal for such facilities was limited. As a result, engineers located the generating plant on the bank of West Willow Creek below the mine. The plant was designed to be powered by a Pelton water wheel, but because the flow of West Willow Creek was unreliable, engineers supplemented the water wheel with two return tube boilers and a steam engine.[15]

By the late 1890s the claim was well-developed and producing a handsome profit. Miners had driven the two tunnels over a thousand feet along the vein, and the Nelson Tunnel had passed through the property and had reached mines located further north. Miners linked the Bachelor workings, the Nelson Tunnel, and the workings of the adjacent Commodor Mine with a maze of drifts, raises, and winzes. Miners encountered the richest ore at the level of the highest tunnel, and the stopes attained the cavernous proportions of 1,500 feet long and hundreds of feet high.

The extant surface plants at the Bachelor Mine's tunnels possess much left from the late 1890s upgrades. The upper tunnel served as the mine's principal entry, the lower tunnel was the main haulageway, and the associated surface plants reflect this. When the Bachelor Mining Company's engineers and work crews finished construction, according to the extant material remains, the plant at the upper tunnel featured production-class facilities including spacious shops, mule trammage, and a residential complex. While fires and mining during the 1930s and 1970s have impacted portions of the site, some of these facilities remain. A large building that enclosed blacksmith and machine shops, and probably carpentry and other facilities, stood on a cut-and-fill platform (Feature 3) south of the tunnel portal. Mine workers constructed a hewn log retaining wall to support the platform's cut bank. A dry-laid rock foundation (Feature 4) represents the presence of a second structure. Rubble from a concrete machine foundation, piled east of the platform, suggests that the building enclosed an advanced, heavily mechanized shop. Upright steam engines and motors used to power shop appliances required small

[15] Colorado Historical Society Records, MSS Box 640, v24:34.
Sanborn Map Company *Creede: Mineral County, Col.* Sanborn Map Company, Brooklyn, NY 1904.

foundations. The platform was scraped by a bulldozer, rendering the building's content uncertain.

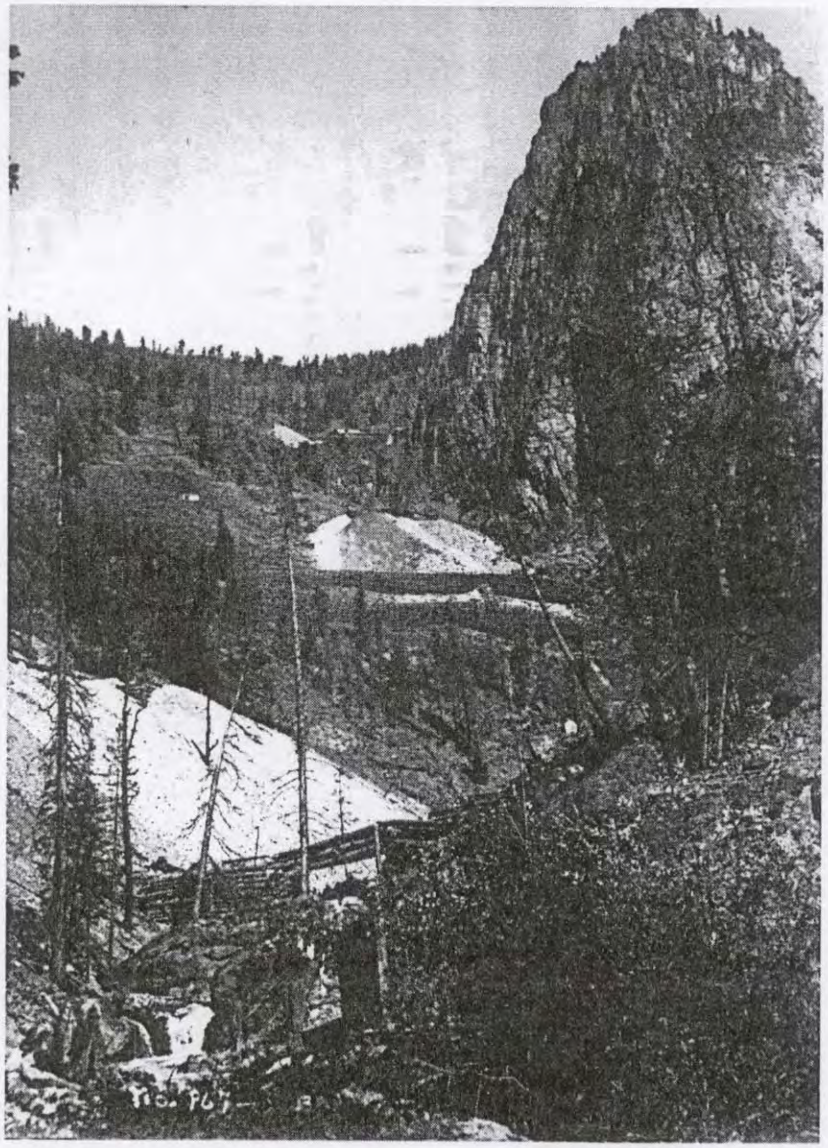


Figure 7.15 The Bachelor Mining Company developed its property through two principal tunnels. The lower tunnel, defined by the waste rock and log cribbing walls near photo-center, served as a haulageway. The upper tunnel is denoted by a small waste rock dump above. The cribbing walls still stand, and they were recorded with the lower tunnel as Features 3 and 4. The dynamite thaw house (Feature 14) is the small building standing on the scree slope at left. The lower tunnel s massive ore sorting house and tram terminal (Features 17 and 18) can barely be seen on the right edge of the large waste rock dump. The structures visible at the upper tunnel no longer remain. The waste rock dump at lower left belongs to either the Nelson Tunnel, or the Commodor Tunnel No.5. The photo was taken in the late 1890s. Courtesy of Colorado Historical Society (S0025670).

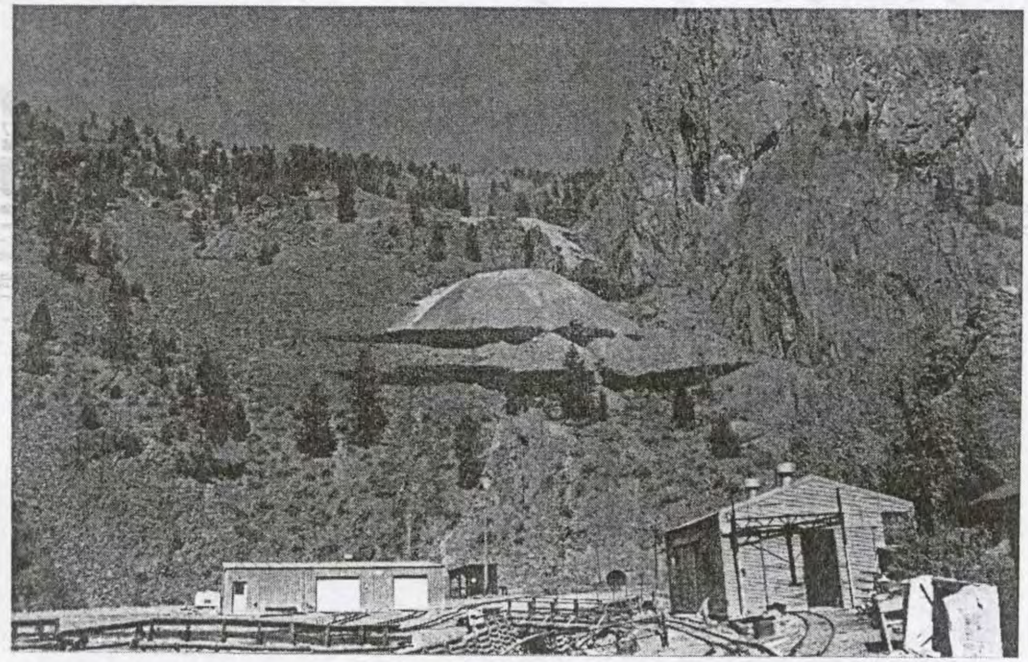
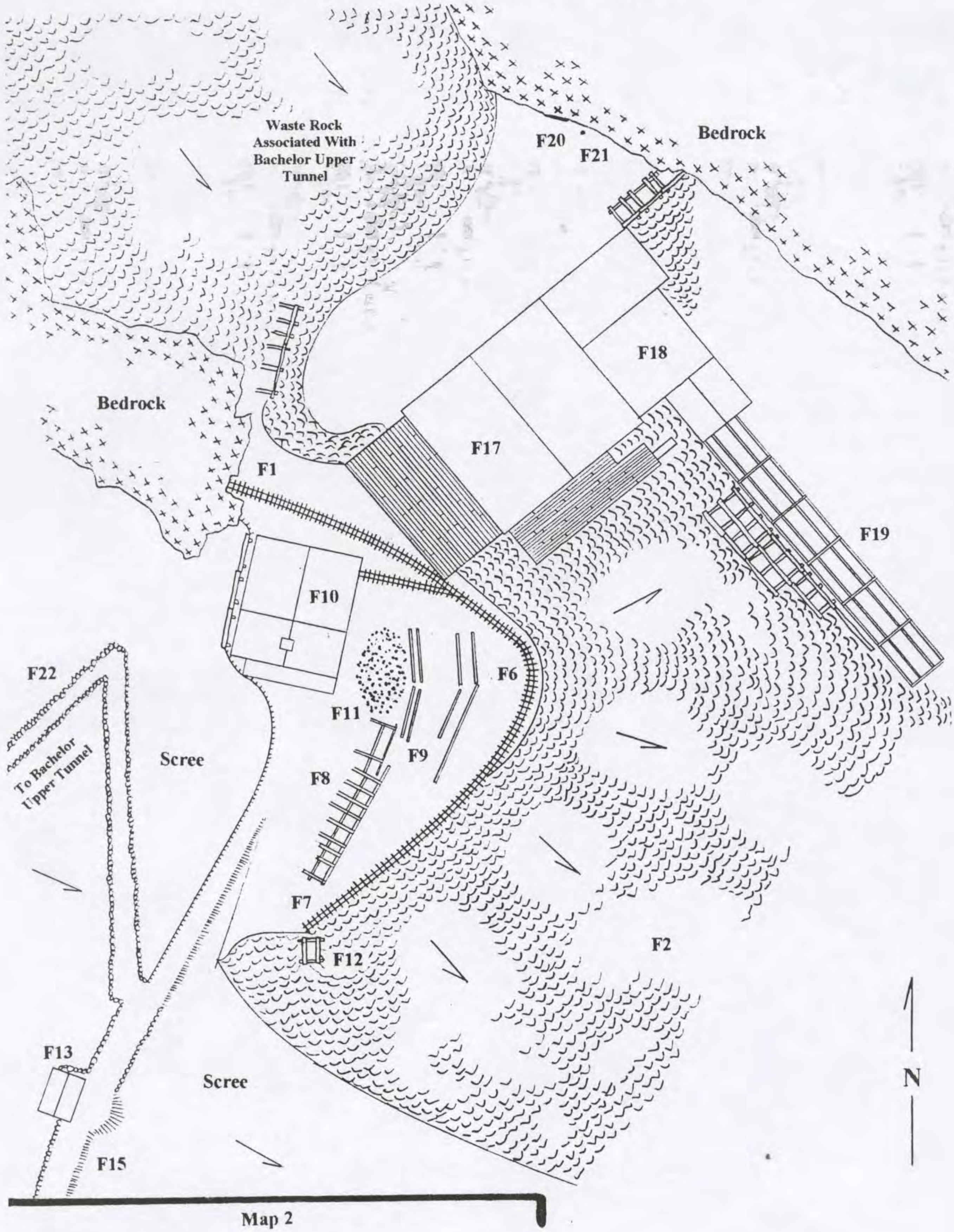
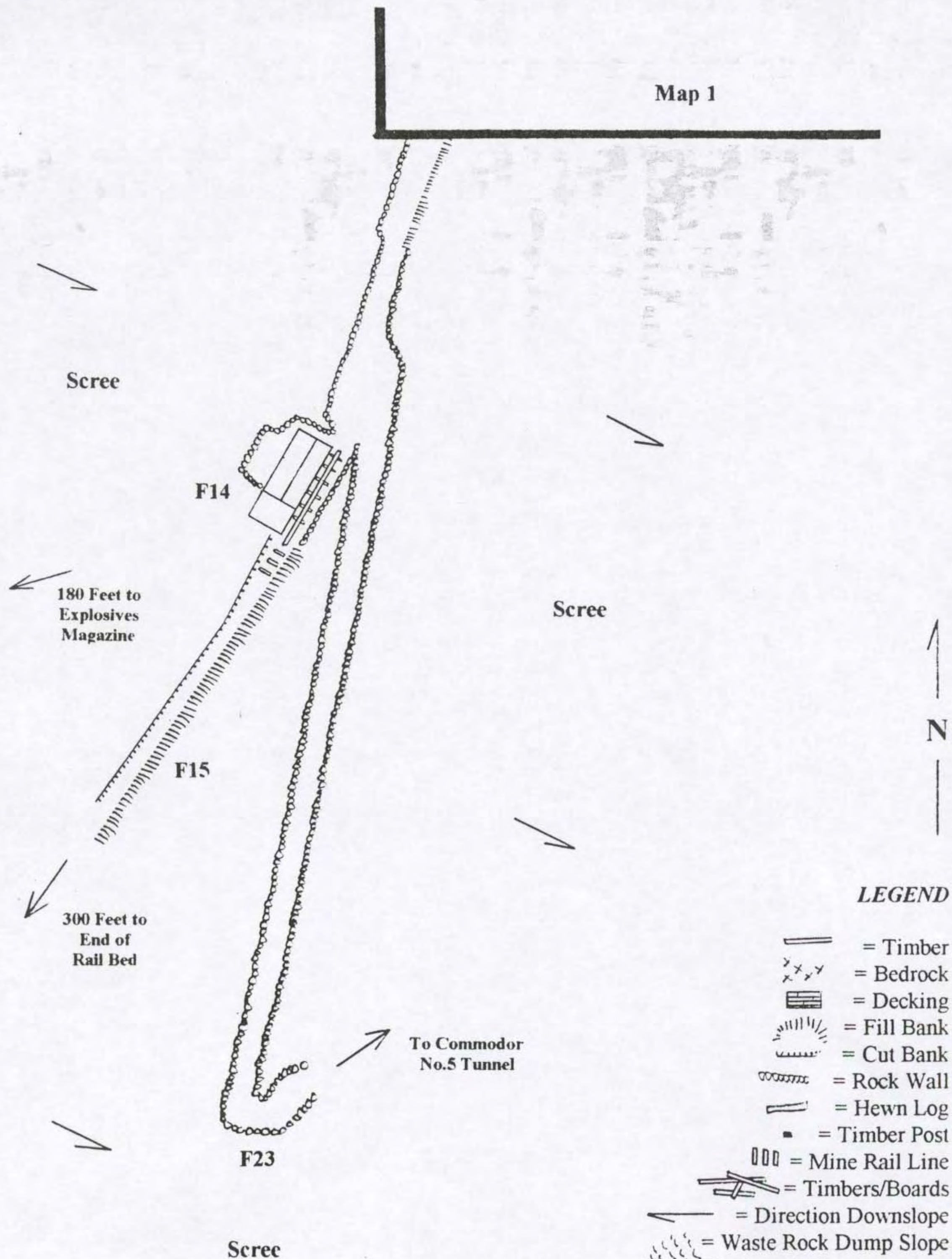


Figure 7.16 Overview of the Bachelor Mine as it appears today. Compare this view with the photo above. Little has changed. Buildings associated with the Commodor Tunnel No.5 stand in the foreground. Author.

BACHELOR MINE: LOWER TUNNEL
PLAN VIEW: MAP 1, NORTH
CREEDE MINING DISTRICT, MINERAL COUNTY, COLORADO



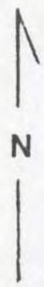
BACHELOR MINE: LOWER TUNNEL
PLAN VIEW: MAP 2, SOUTH
CREEDE MINING DISTRICT, MINERAL COUNTY, COLORADO

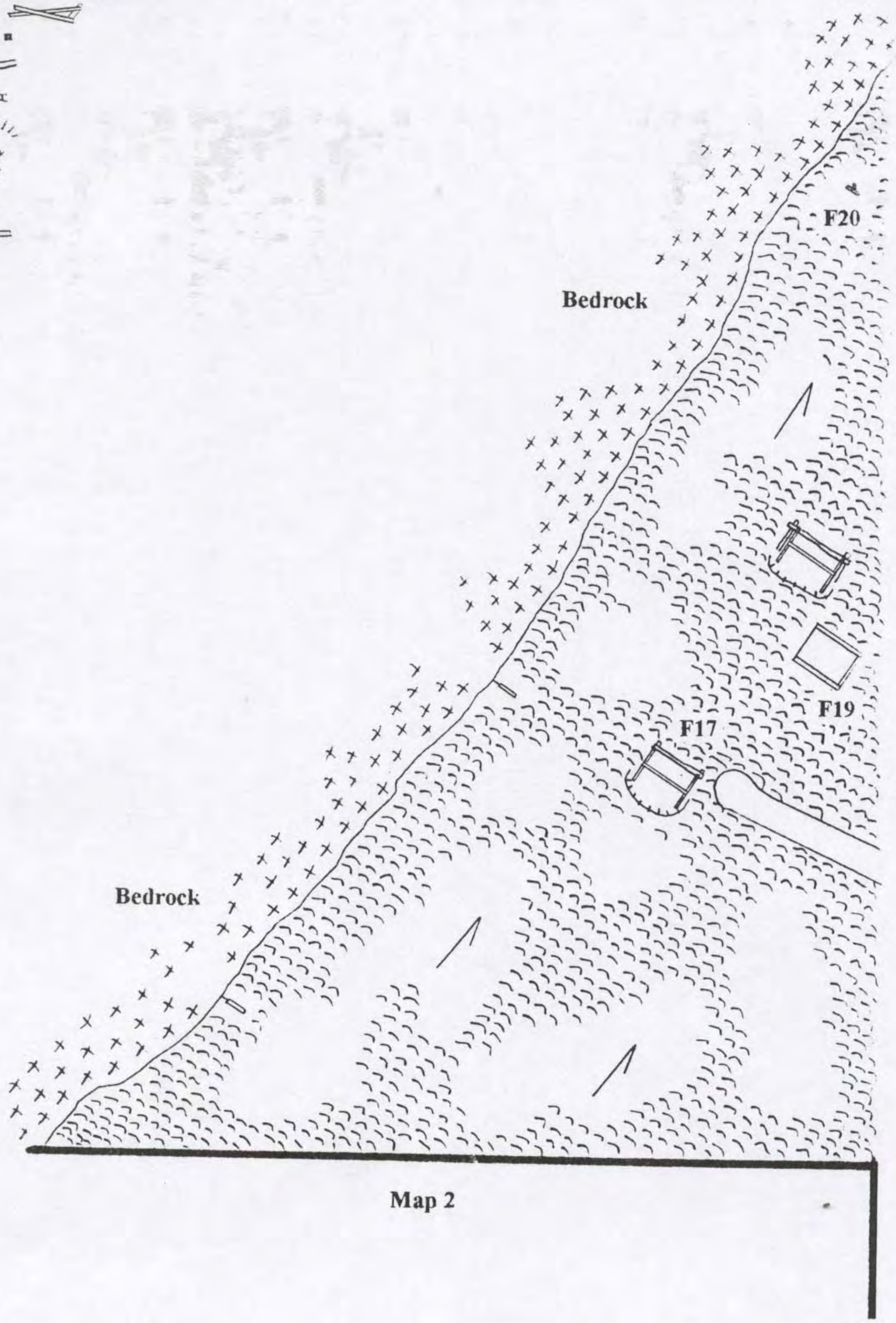


BACHELOR MINE: UPPER TUNNEL
PLAN VIEW: MAP 1, NORTH
CREEDE MINING DISTRICT, MINERAL COUNTY, COLORADO

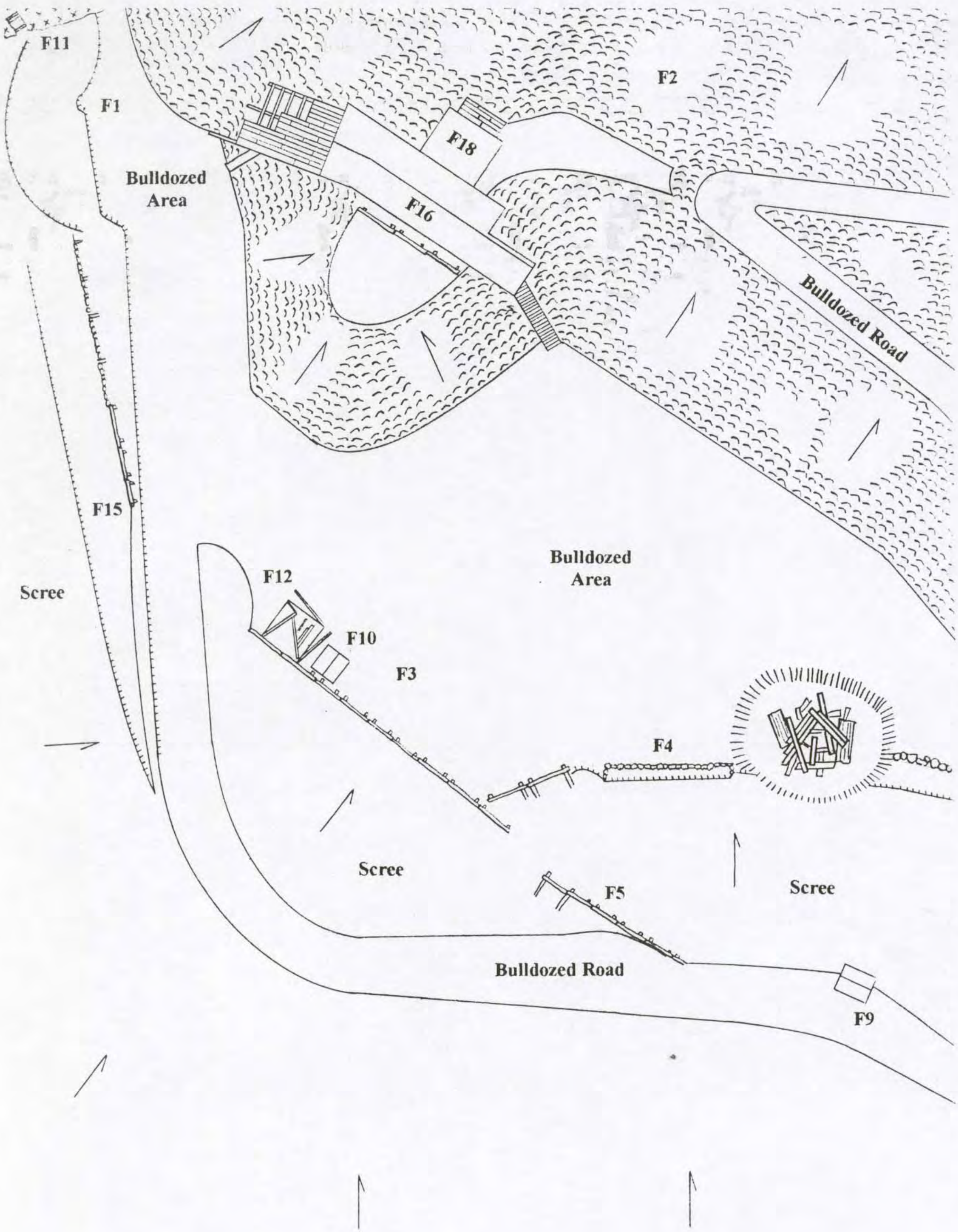
LEGEND

Scale: 15 ft =
Waste Rock Dump Slope:
Direction Downslope:
Timbers/Boards:
Timber Post:
Hewn Log:
Rock Wall:
Fill Bank:
Cut Bank:
Bedrock:
Decking:
Timber:

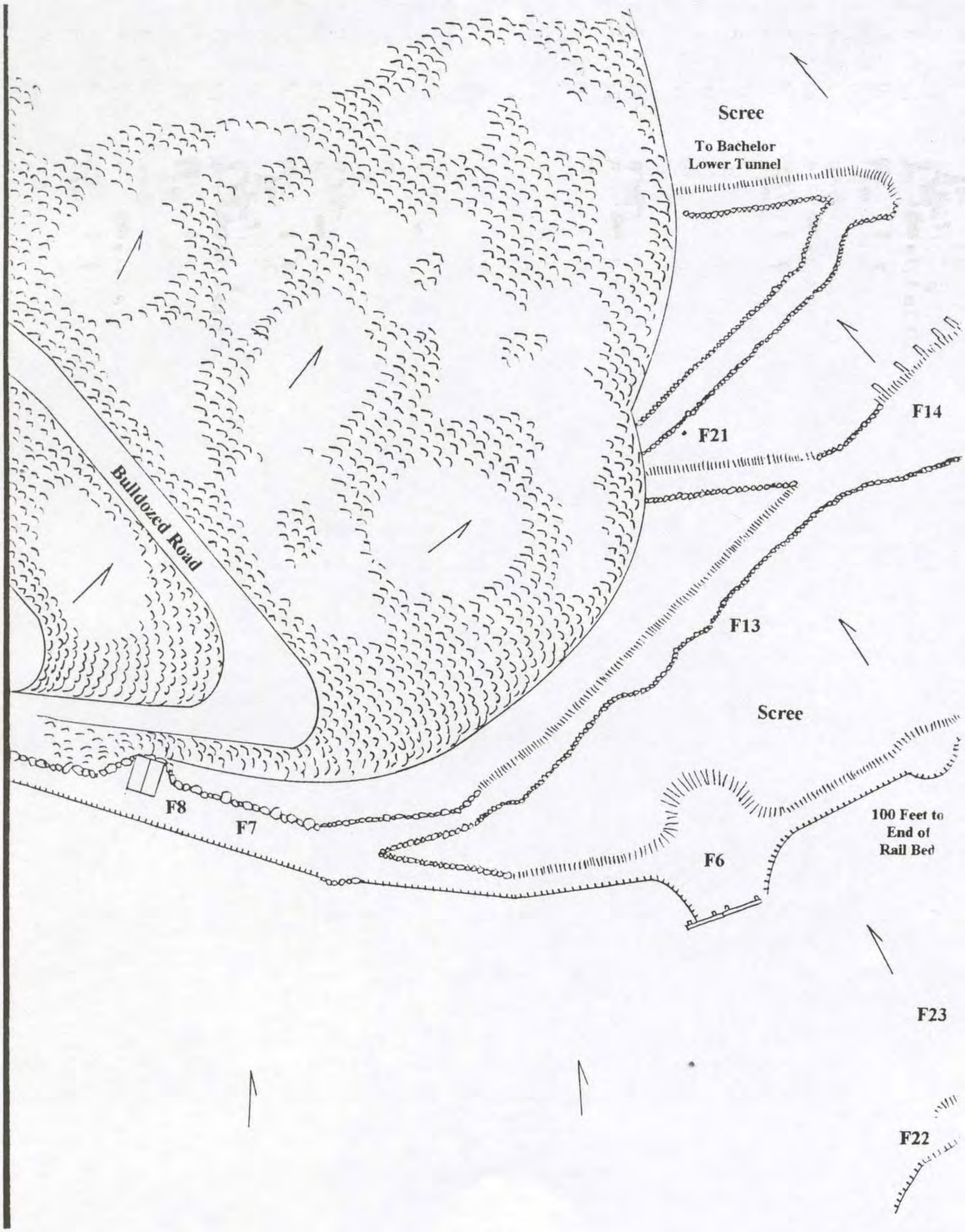




BACHELOR MINE: UPPER TUNNEL
PLAN VIEW: MAP 2, SOUTH
CREEDE MINING DISTRICT, MINERAL COUNTY, COLORADO



BACHELOR MINE: UPPER TUNNEL
PLAN VIEW: MAP 3, EAST
CREEDE MINING DISTRICT, MINERAL COUNTY, COLORADO



The site's material remains indicate that the late 1890s surface plant included an explosives magazine and a timber dressing shop. The magazine (Feature 8) still stands, and it is a well-built front-gabled structure. Mine workers erected the building, which 8 by 8 feet in area and 10 feet high, on a platform consisting of sorted gravel fill retained by a dry-laid rock wall. The structure is composed of corrugated iron siding nailed to a 2x4 post-and-girt frame.

The timber dressing shop stood on a cut-and-fill platform (Feature 6). A substantial deposit of timber cuttings lies at the end of a footpath near the platform. Mine workers used wheelbarrows to transport the cuttings from the shop to the end of the path, where they ejected the unwanted refuse. A scatter of dynamite box panels and dynamite thawer parts lies immediately downslope from the platform. The deposit indicates that during the winter, miners transported entire boxes of frozen dynamite to the building where they thawed the contents. The miners opened the boxes up, placed the cartridges into the thawer, and threw the empty containers out. The thawers saw heavy use, which is indicated by parts thrown away, probably due to excessive wear.

A well-organized rail system served the upper tunnel's surface plant. The tunnel and waste rock dump featured the compulsory rail line for transporting rock out of and materials into the mine workings. A branch of the line extended east, and it served the magazine and the timber dressing shop. Miners used flat cars to transport heavy materials such as timbers and shipments of dynamite. Currently, the rail bed remains (Feature 7). Mine workers carefully constructed the rail bed by erecting dry-laid rock walls to retain sorted cobbles and gravel fill. Such an elaborate bed was necessary, because the rail line crossed scree slopes, which were not conducive to more-common cut-and-fill construction methods.

A wagon road linked the upper tunnel with the outside world, and a well-made pack trail (Feature 13) linked the upper and lower tunnels. Mine workers constructed the trail with the same methods that they used to grade the rail bed. The trail switches back and descends through a scree field to the lower tunnel. Mine workers graded a cut-and-fill platform (Feature 14) east of the mine's surface plant which was served by the trail. The platform may have been a staging area for pack trains.

The residential complex, located southeast of and upslope from the mine's surface plant, consisted of a boarding house and dining hall, several other frame residences, and privies. Nearly all of the platforms have been destroyed or heavily damaged by earthmoving, rendering the determination of exact locations and physical makeup impossible. The existence of the platforms was determined through small, intact portions, and through artifacts.

The material remains of the lower tunnel's plant were part of the substantial and costly production-class facilities financed during the late 1890s by the Bachelor Mining Company. The plant featured spacious shops, mule trammage, organized storage and preparation of explosives, and processing and transportation of ore in economies of scale.

The shop building (Feature 10) stands on a cut-and-fill platform south of and adjacent to the Bachelor Mine's lower tunnel portal. Mine workers erected a hewn log cribbing wall to retain the platform's cut bank and to prevent scree from sliding onto the structure. The building is a two story side-gabled frame structure 40 by 29 feet in area. The second story is 29 by 22 feet in area, and it stands only over the northern portion of the building. The building's bottom floor enclosed a blacksmith and machine shop, and the upper story served as a changing and warming room. The machine shop is located underneath the warming room, and the blacksmith work area occupies the single-story portion of the structure.

The interior of the blacksmith work area remains intact and it retains historical integrity. A gravel-filled wood box forge, 5 by 5 feet in area and 2 feet high, stands in the northwest corner. The blacksmith surfaced the forge with two layers of red and fire bricks, and he installed a blower on the forge's south side. An anvil block, also 2 feet high, stands east. Blacksmithing refuse, especially upset drill-steel blades and pick tine points, lie scattered around the anvil block's base. A coal bin, integral with the building's frame, stands along the shop's south wall. The blacksmith withdrew coal for use in the forge through a louvered port 18 by 18 inches. The shop's interior features brackets suspended high in the wall beams. An iron cross bar rested in the brackets, and the blacksmith hooked a hanger to the bar that supported the ends of long drill-steels he placed in the forge for sharpening. A large funnel-shaped hood hangs over the forge, and the roof features a louvered cupola 3 by 3 feet in area and 3 feet high for ventilation. These features, and the overall size of the shop, reflect a substantial production-class facility.

The Bachelor Mining Company provided miners with a system for storing and thawing dynamite. A magazine (Feature 16) stands well removed from the mine's surface plant. The built the structure on the waste rock dump of a small prospect adit, which was probably abandoned by the late 1890s. Mine workers carried boxes of dynamite from the magazine down a footpath and over to a thawing house (Feature 14), where they warmed the explosive during cold months.

The dynamite thaw house stands on platform located along a rail bed that extends south from the main mine complex. The thaw house is a well-built side-gabled frame building 16 by 8 feet in area. Mine workers sided the exterior of the walls and the roof with boards clad by corrugated iron, and they sided the interior with corrugated iron. The building's interior features floor joists which tie the walls together, however the floor consists of well-sorted sand and gravel instead of planks.

The structure's interior has seen little disturbance. A rock masonry hearth occupies the south portion of the thaw house. The hearth is 7 feet wide, 6 feet long, 4 feet high, and it features sheet iron surfaces on top. The hearth has a receptacle in the top for a dynamite thaw box. The box, 21 inches wide, 26 inches long, and 22 inches deep, is made of zinc coated sheet iron and it features a water jacket surrounding an inner void. The void is tapered and fitted with brackets to hold a series of pans. Miners filled the jacket with water, placed frozen dynamite on the pans, closed the trap door lid, and stoked a fire in the hearth. The fire heated the water, which warmed the inner void, thawing the dynamite. The hearth features a stovepipe port in the rear.

After the building was erected, mine workers added a shed for storage on the south side. The shed is 8 by 8 feet in area and 7 feet high. The shed lacks a formal frame, and the floor consists of planks nailed to timbers laid on boulders. Rockdrill parts and hardware lie inside.

Like the upper tunnel, a well-organized rail system served the lower tunnel's surface plant. The tunnel and waste rock dump featured a rail line for transporting rock out of and materials into the mine workings. A branch of the line extended east, and it served the thawing house and magazine. Miners used flat cars to transport heavy materials such as timbers and shipments of dynamite. Currently, the rail bed (Feature 15) remains, but the track has been removed. Mine workers carefully constructed the rail bed by erecting dry-laid rock walls to retain sorted cobbles and gravel fill. Such an elaborate bed was necessary, because the rail line crossed scree slopes, which were not conducive to more-common cut-and-fill construction methods.

The Bachelor Mining Company financed the erection of a massive ore sorting house, and the installation of a Bleichert double rope aerial tramway to ship ore to the railhead at North Creede. The sorting house is a well-built, lofty, two story frame building. The main portion of the structure is 50 by 46 feet in area, and the north side features an extension 25 feet long and 15 feet wide. The structure's support system consists of a 12x12 square-set frame assembled with mortise-and-tennon joints. Some of the frame's horizontal beams are spliced with scarf joints. The roof is made of 2x12 rafters supported by queen posts nailed to the building's square-sets. The frame is clad on the exterior with board-and-batten siding, and the roof is clad with corrugated iron nailed to 1x8 purlins.

The sorting house's top floor is concurrent in elevation with the tunnel portal, and it stands 10 feet above the bottom floor. The structure's interior is mostly open, and the beamwork is exposed. Two mine rail lines entered doorways in the top floor's south wall, and they traversed through the sorting house's open area across trestles. The trestles terminated at the edge of a third trestle extending along the building's north wall. To input ore, miners pushed loaded ore cars out of the tunnel, they threw a switch on the main track, and continued into the sorting house. The miners pushed the cars across the trestles and stopped them on iron turntables. They rotated the cars 90 degrees, which aligned the cars with the track on the third trestle. The miners then pushed the cars to the edge of one of two grizzlies located in the building's north portion. They emptied the cars, and fine ore passed through the grizzlies and collected in holding bins at the building's foot. Waste-laden cobbles rolled down the grizzlies and stopped at sorting stations located on the building's bottom floor. The top floor features a third grizzly that is partially located in the building's north extension. The extension may have housed a fourth grizzly, but later mining operations removed it and installed a tramway terminal for the line extending to the upper tunnel.

In addition to the trestles, the top floor features two warming rooms 15 by 14 feet in area. The warming rooms were sealed off from the remainder of the interior with board siding and they were furnished with closets, benches, and stoves on gravel pads. The south room is sided on the interior with ribbed paneling painted white. The rooms were accessed from the building's exterior and from the interior through 30 by 78 inch paneled doors. The western-most warming room also featured windows affording views of the building's interior and of the outside.

The building's bottom floor was used for ore sorting, timber dressing, and carpentry work. Three sorting stations, located at the toes of the grizzlies, occupy the bottom floor's north portion. The floor around the sorting stations is armored with boiler plate iron. There, mine workers sorted ore from waste, and they threw recovered ore through openings flanking the grizzlies and shoveled waste into parked ore cars. The workers used a combination of natural light admitted through numerous windows, and supplied by kerosene lamps placed in sconces nailed to the building's frame timbers. A timber dressing and carpentry work area occupied the south portion of the bottom floor. One of the building's frame posts features bolt holes that may have anchored a power shop appliance. The area is blanketed with sawdust and cut wood scraps.

The building's north extension housed a fourth sorting station, and as stated, a third grizzly projected from the extension into the main part of the building. During the 1930s one of the mine's operators removed the fourth sorting station and installed a terminal for the aerial tramway descending from the upper tunnel.

The ore bins lie underneath the grizzlies and sorting stations, and they were designed to deliver ore to the mine's aerial tramway terminal standing at the sorting house's foot. Each bin is 14 by 14 feet in area and 18 feet deep. The bins, supported by heavy post-and-girt framing, feature sloped floors armored with plate iron. Mine workers tapped the bins through louvered gates, which fed ore into chutes. Mine workers stopped tram buckets under the chutes to receive ore.

The aerial tramway stands on the north edge of the sorting house. An aerial tramway was a marvelous system for transporting massive quantities of ore from a mine to ore bins at a distant point. The original terminal associated with the ore sorting house at the Bachelor Mine was a component of a variety of a tram system known as the *Bleichert Double Rope* tramway. The Bleichert system utilized a *track rope* spanning a series of tram towers, and a separate *traction rope* that tugged ore buckets around a circuit. The track rope was fixed in place and the buckets coasted over it on special hangers featuring guide wheels. Bleichert Double Rope tramways relied on top and bottom terminal stations where the buckets were filled and emptied, and they ran by gravity. In the terminals, mine workers uncoupled the buckets when the vehicles arrived, they pushed them across a hanging rail, and stopped them underneath chutes where the buckets were filled with ore. Once full, a mine worker recoupled the buckets onto the cable, and the buckets left the upper terminal. Workers in the bottom terminal uncoupled the buckets and emptied them.

The top tramway terminal at the Bachelor Mine's lower tunnel stands at the north base of the ore sorting house. The terminal building is a two story shed erected on the north side of the ore bins. The terminal's south and west walls are the same as the ore bins' walls. Mine workers erected 8x8 post-and-girt frame walls to enclose the terminal's north and east sides, and a rafter shed roof to cover the interior. The walls are clad with board-and-batten siding, and the roof is clad with corrugated iron. Like the ore sorting house, the terminal stands on a waste rock platform retained by log cribbing.

The terminal's bottom floor features the tramway's sheave system and rail circuit for the buckets. The sheave system, located in the floor's center, consists of two in-line horizontal sheaves, and two pulleys oriented vertically. The east sheave is 5 feet in diameter and the west sheave is 6 feet in diameter. The west sheave features two wood-lined grooves for the traction cable, and two strap brakes. The east sheave features one groove. The tram's traction cable entered the upper terminal and first passed around the west sheave. The cable looped back and around the east sheave, and passed back to the west sheave, forming a figure 8 around the two wheels. This ensured that that the cable would not slip around the wheels when the tramway had to be stopped. Both sheaves rotated in bearings bolted to heavy beamwork. The timber frame is fastened with bolts and it features diagonal bracing to counter the pull of the traction cable. The idler pulleys, oriented vertically, are bolted onto the beamwork and they helped guide the traction cable into the sheaves' grooves.

The bottom floor also features a hanging rail for the tram buckets. The rail is suspended from special steel hangers bolted to overhead beams. The hanging rails extend out and down from the terminal for 75 feet. The 75 foot extension is supported by a series of five 8x8 gallows frames tied with 8x8 stringers. The incoming tram buckets transferred onto the track cable at the end of the extension. Inside the terminal, the rail loops around and behind the central sheave system. As the tram buckets entered through the broad opening in the terminal's east side, mine workers uncoupled them from the traction cable and pushed them around the loop. They filled the buckets at the ore chutes, which extend down through the terminal's west and south walls. Once full, mine workers pushed the loaded buckets to the end of the loop, they engaged the traction rope clamp, and the buckets exited the terminal. The ore chutes, one for each holding bin, feature rotating gates controlled by long levers.

The terminal's top floor, which stands 8 feet above the bottom floor, features the tram operator's station. The tram operator controlled three brake levers. The outer two levers stopped the main sheave, and the center lever stopped the western sheave. A stove stood on a gravel pad adjacent to the levers. The top floor also features access ports into the four ore bins. A staircase, covered by a trapdoor, descends from the top floor's north portion.

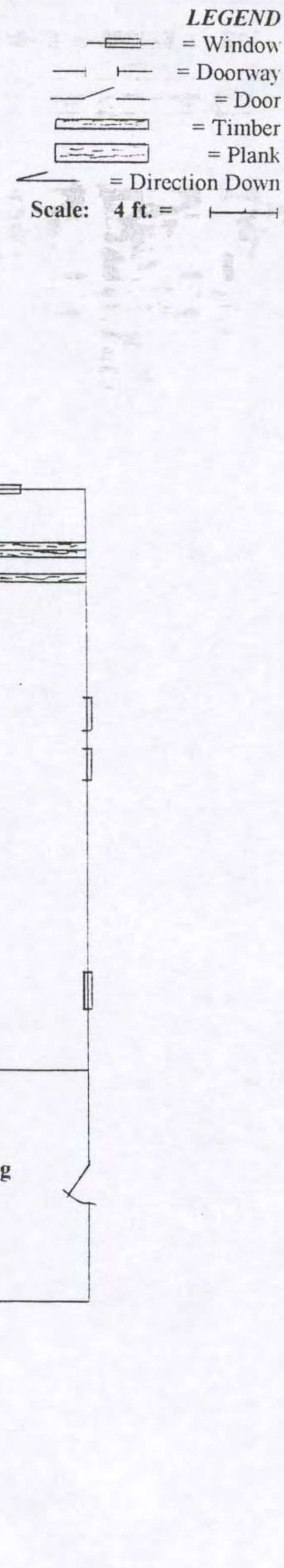
Numerous industrial artifacts lie scattered in and around the tram terminal. Electrical battery fragments reflect the use of a telephone to communicate with the bottom terminal. The mining company used the upper terminal for the storage of tram parts and general hardware. Much hardware and tram bucket hanger parts have been left in the structure. Oddly, mine workers stored a sheave wheel, 6 feet in diameter, in the terminal's second story. The sheave probably weighs in the high hundreds of pounds. How mine workers placed it in the upper floor, and how they expected to move it again is in question.

Downslope from the ore sorting house and tram terminal, mine workers erected two hewn log cribbing walls (Features 3 and 4) to catch waste rock and keep it from cascading onto the surface plant associated with Commodor No.5 Tunnel, located immediately downslope. One wall stands upslope from the other, and both are approximately 360 feet long and 20 feet high. Dateable artifacts visible behind the wall, such as dynamite box panels and hole-in-cap cans, reflect deposition of waste rock between the late 1890s and around 1905.

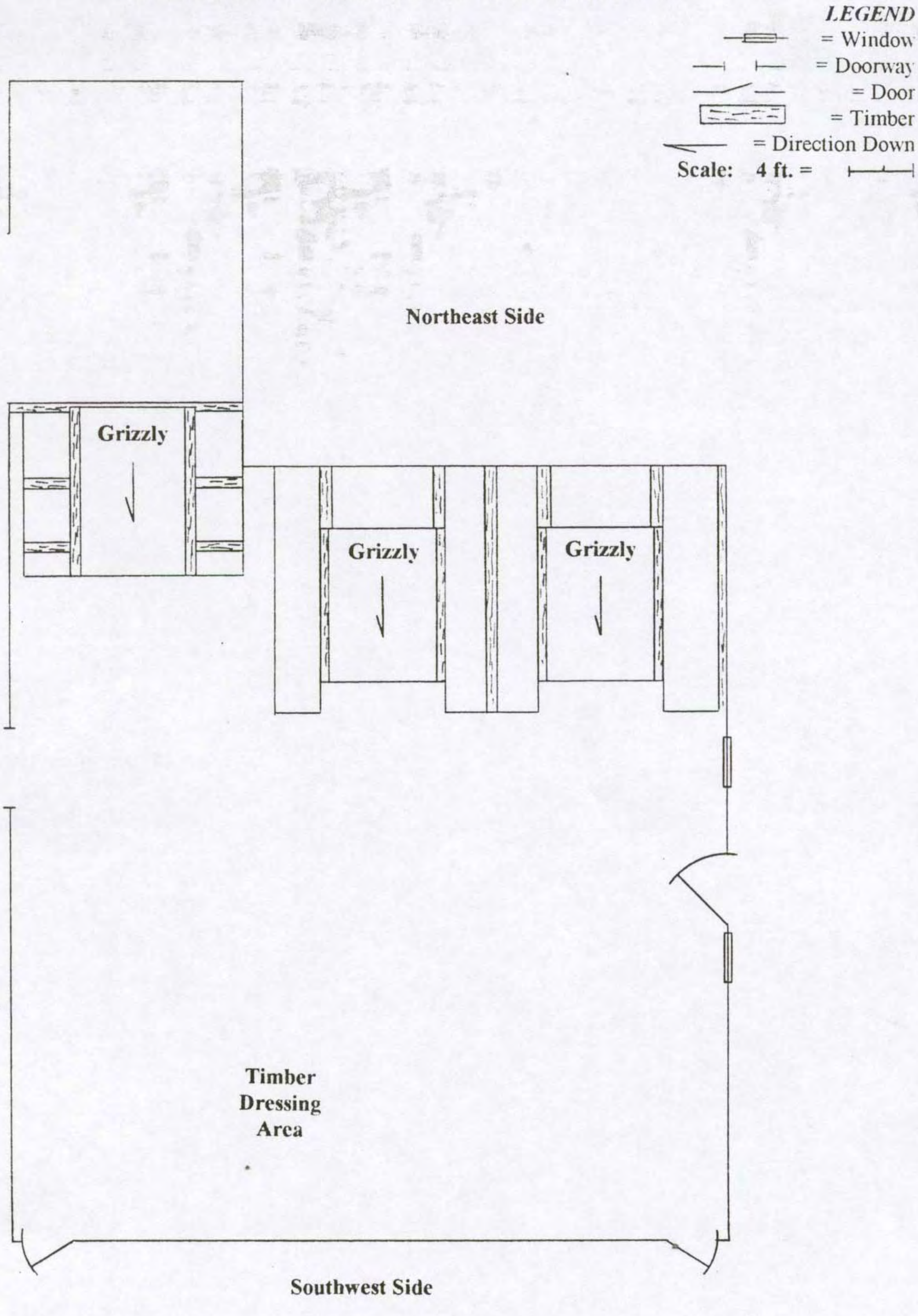
Figure 7.19 View southwest of the aerial tram terminal (Features 18 and 19). The terminal is the structure with the slanted roof, and the ore sorting house stands above. Tram buckets traveled up the timber beamwork at the lower left and into the terminal. Author.

Figure 7.20 View north of the shop building (Feature 10). The building's left portion housed the blacksmith shop, the right portion housed a machine shop, and a change room occupied the second floor. Author.

BACHELOR MINE: LOWER TUNNEL
PLAN VIEW
ORE SORTING HOUSE: TOP FLOOR
CREEDE MINING DISTRICT, MINERAL COUNTY, COLORADO

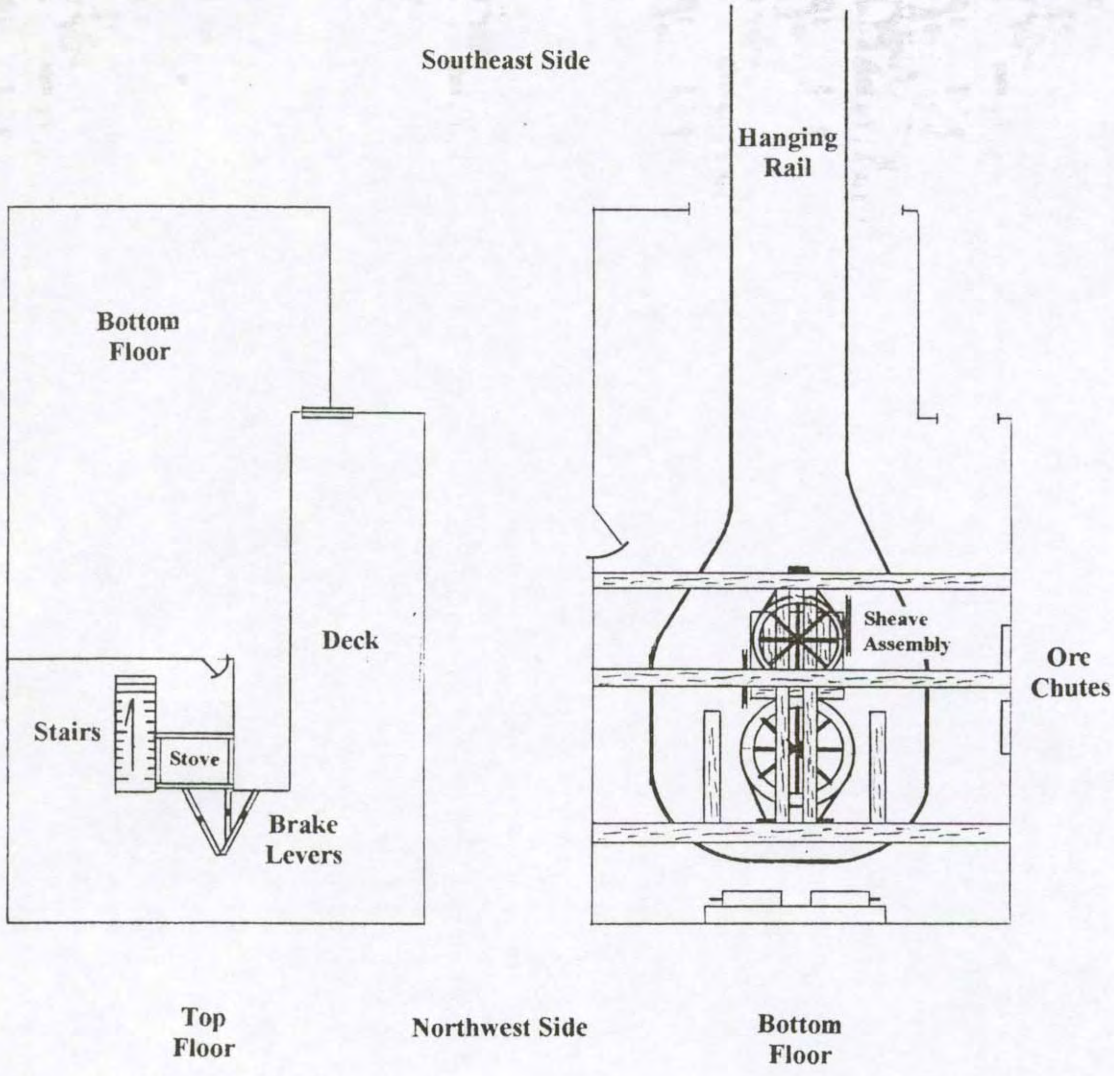


BACHELOR MINE: LOWER TUNNEL
PLAN VIEW
ORE SORTING HOUSE: BOTTOM FLOOR
CREEDE MINING DISTRICT, MINERAL COUNTY, COLORADO

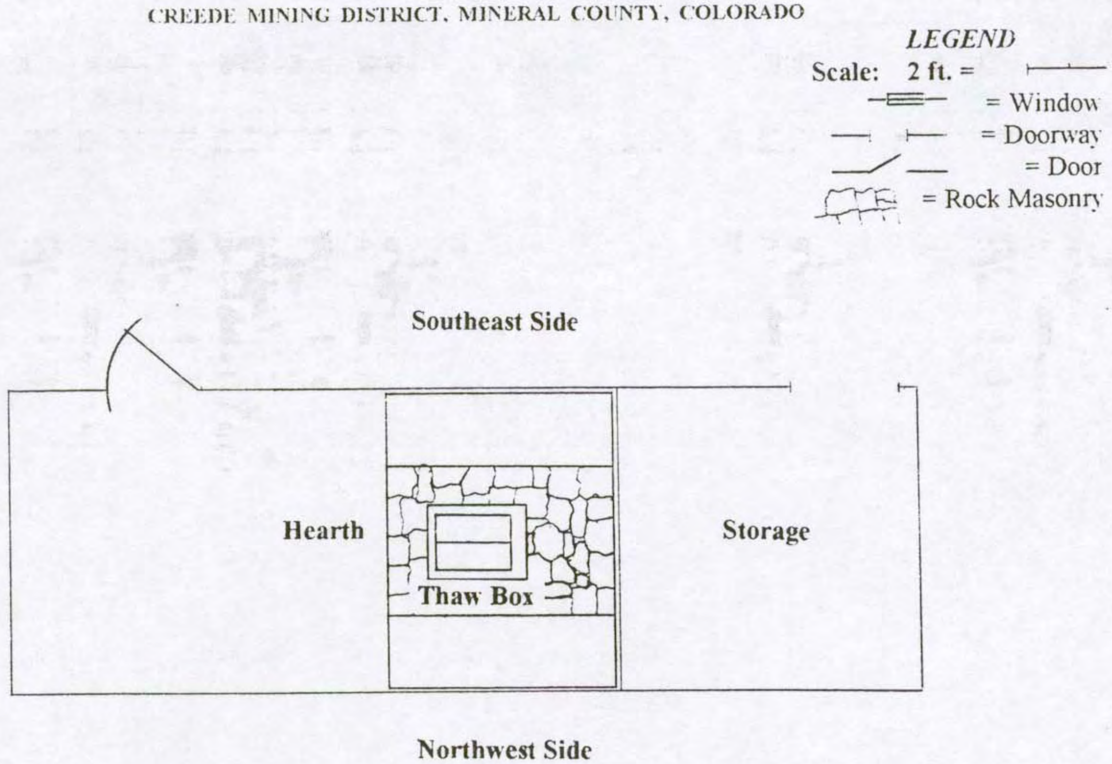


BACHELOR MINE: LOWER TUNNEL
PLAN VIEW
UPPER AERIAL TRAMWAY TERMINAL
CREEDE MINING DISTRICT, MINERAL COUNTY, COLORADO

LEGEND
= Window
= Doorway
= Door
= Timber
= Direction Down
Scale: 4 ft. =



BACHELOR MINE: LOWER TUNNEL
PLAN VIEW
DYNAMITE THAW HOUSE
CREEDE MINING DISTRICT, MINERAL COUNTY, COLORADO



The late 1890s surface plants that supported work at the Bachelor greatly boosted production, and the mine's owners profited for a time. Shortly after completion of the new plants, the Moffat syndicate acquired the adjacent Commodor operation, and consolidated the two properties in 1900. The mining industry subsequently recognized the two mines as being one entity, and miners linked the underground workings with numerous passages. As a result, the upper-most tunnel on the Commodor claim became known as Tunnel No.1, the Bachelor tunnels became known as No.2 and No.3, the Manhattan Tunnel, downslope from the Bachelor workings, became known as Tunnel No.5, and the Nelson Tunnel was unofficially termed No.4. In the combined effort to extract ore efficiently, the mine's engineer installed a generator and an air compressor plant driven by a Pelton wheel at the Commodor No.5. The Bachelor's powerhouse, and Tunnel No.1 and No.2, were abandoned.[16]

After the consolidation, Moffat's syndicate decided to lease the Bachelor to another mining outfit. In 1902 the Creede Home Mining Company, with C.C. Hord as president, A.H. Major as vice president, and Sam Lehmann as secretary, assumed operations at the mine.[17]

The Bachelor claim held great value through the 1900s, but by around 1910 miners had extracted the richest and most accessible ore. Around this time Norman Corson organized a mining outfit and leased the mine. He hired a crew of miners at competitive wages, around $4.00 per day, and they worked many of the stopes. The ore that the miners drilled and blasted above the lower tunnel was shipped via the aerial tramway, and the ore that they extracted below was sent out the Nelson Tunnel. Corson's operation did well in light of the high metals prices stimulated by World War I, but when the prices collapsed in the wake of the armistice in 1918, he was forced to shut the mine down.

In 1923 the federal government instituted price supports for silver, which stimulated interest in the white metal. Under this economic umbrella, lessees reopened the Bachelor Mine. For almost the entire year, 15 miners and 4 surface workers extracted ore. However, like Corson, they too had to suspend operations when the price of silver collapsed. The Bachelor lay idle until 1925 when a handful of independent miners gleaned ore left by the previous outfits. The economic duress caused by the Great Depression squashed what little mining occurred within the Bachelor workings.[18]

The property lay quiet until 1934 when President Franklin Delano Roosevelt signed the Silver Purchase Act into law. The Withrow Leasing Company, which extracted payrock from the Commodor workings during the 1920s, appears to have worked the Bachelor ground after 1934, in part because both mines were by then considered one property. In 1935 the Emperius Mining Company purchased the property and hired miners to both explore for new ore bodies, and to extract extant payrock. The ore was soft enough so that miners were able to drill blast-holes by hand, as generations

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[16] Colorado Historical Society Records, MSS Box 640, v24:34.
EMJ 6/16/00 p718.
[17] Colorado Historical Society Records, MSS Box 640, v24:61.
EMJ 5/17/02 p706.
[18] Colorado State Archives, Mine Inspectors' Reports, Box 104053: Bachelor.
Larsen, E.S. "Recent Mining Developments in the Creede District: *USGS Bulletin 811: Contributions to Economic Geology* U.S. Geological Survey, U.S. Government Printing Office, Washington, DC 1929.
Steven, Thomas A. and Ratte, James C. *USGS Professional Paper 487: Geology and Structural Control of Ore Deposition in the Creede District, San Juan Mountains, Colorado* U.S. Geological Survey, Government Printing Office, Washington, DC 1965 p10.

in the past had done, while the miners driving exploratory workings in hard rock were supplied with rockdrills.[19]

In 1939 disaster struck when a fire claimed the surface plant associated with the Bachelor's upper tunnel. In 1940 the Emperius Mining Company financed the construction of a new plant, which included an ore sorting house, an aerial tramway (to the lower tunnel), a compressor, a shop, and a change house. Mules continued to pull ore trains out of the mine. During the rebuilding efforts, the lower tunnel became a hub of activity for mining the Bachelor ground.[20]

The upper tunnel complex currently includes artifacts left by the Depression-era operation, and it features structures erected after the 1940 fire. Mine workers cleared away the debris left after the fire and erected an explosives magazine and a stable (Features 10 and 12) where the old shop building stood. A construction crew also built a well-engineered ore processing and transportation system to facilitate Emperius' high expectations of increased production.

The system consisted of an ore sorting house built near the tunnel portal, and an aerial tramway. The ore sorting house stands on a flank of the waste rock dump south of the tunnel area. The structure is well-built and three stories tall. The ore receiving room constitutes the top level, and it features two ore receiving chutes 3½ by 5 feet in area. A mine rail line, which provided access for loaded ore cars, extended across a deck abutting the structure's west side, and into the top level through a wide doorway. The top floor's walls consist of a 2x6 balloon frame sided with corrugated iron, and the roof consists of 2x4 common rafters braced with queen posts nailed to 2x8 tie beams.

The ore sorting house's second level encloses two ore sorting stations. Miners dumped ore from cars into the receiving chutes on the top floor. The material dropped onto grizzlies, and the fines passed through grizzlies while large cobbles rolled down and collected at the sorting stations. After passing through the grizzlies, the fine material dropped into ore holding bins comprising the building's bottom level. The ore sorting stations feature raised plank tables, 8 by 9 feet in area, at the feet of the grizzlies. Mine workers separated waste from ore on the tables, and they tossed recovered ore through ports under the tables into the holding bins below. Waste was shoveled into ore cars. The support system for the sorting floor is an extension of that for the ore bins. The walls consist of plank siding nailed to the interior of a 10x10 post-and-girt frame buttressed by diagonal braces.

The ore holding bins constitute the structure's bottom floor. The bins have sloped floors, and the support system consists of a 10x10 post-and-girt frame with timbers spaced every 5 feet. Diagonal posts lend further support to the floor. The frame and posts stand on heavy timbers laid on a log cribbing foundation buried in waste rock.

A small aerial tramway sent the processed ore from the upper tunnel's sorting house down to the lower tunnel. The tramway descends from a tram terminal located at the toe of the upper tunnel's ore sorting house, down to another terminal at the lower tunnel. The tramway is a double rope reversible system constructed with salvaged materials. Double rope reversible tramways were fairly simple to build and operate. The

[19] Colorado State Archives, Mine Inspectors' Reports, Box 104053: Emperius.
Steven, Thomas A. and Ratte, James C. *USGS Professional Paper 487: Geology and Structural Control of Ore Deposition in the Creede District, San Juan Mountains, Colorado* U.S. Geological Survey, Government Printing Office, Washington, DC 1965 p10.
[20] Colorado State Archives, Mine Inspectors' Reports, Box 104053: Emperius.

system linking the Bachelor tunnels consisted of a stationary track cable supported by two timber towers and a steel T tower. The timber towers were built according to a style known as the *through tower*, the tram buckets passed between the structures' beamwork. Two tram buckets were suspended from hangars that rolled across the track cables. An endless-loop traction cable pulled the buckets up to the top terminal and lowered them back to the bottom terminal in a reversible, balanced fashion. Mine workers filled the empty bucket when it arrived at the upper terminal, and they used a brake to lower it to the bottom terminal. As it descended, the full bucket pulled the opposing lighter empty one up to the top terminal. The traction cable passed around large sheaves in the terminals and across rollers fastened onto the tram towers. The towers were constructed of 10x10 timbers, and they stand on footers 12 by 10 feet in area placed on pads made of waste rock fill retained by log cribbing.

Mine workers installed the bottom terminal in the lower tunnel's ore sorting house. Specifically, the lower sorting house, erected in the late 1890s, featured a wing extending north off the main building. Historically, the wing enclosed a sorting station, which Emperius' workers removed in 1940 and retrofitted with the framing and hardware for the new terminal. In decades past, mine workers sorted ore at the station in the wing and dumped recovered payrock into the underlying bin. Another mine worker transferred the ore from the bin into the buckets associated with the lower tunnel's Bleichert tramway. The new system's buckets dumped ore into the same bin, and the payrock was transferred into the buckets associated with the lower tram system, which was still in use by 1940.

The top terminal consists of two stories, and it facilitated the transfer of ore from the sorting house's holding bins into tram buckets. The terminal is based on a 10x10 post-and-girt frame sided with corrugated iron. The upper story features a partial plank floor for the brakeman's station, and to provide footing to access the ore chutes extending from the sorting house's ore bins down into the terminal's bottom floor.

The terminal's bottom floor features the area where miners transferred ore into tram buckets. Two ore chutes descend from the holding bins in the adjacent sorting house through the room's ceiling, and they terminate over a broad, central loading chute. Mine workers filled empty buckets by opening pivoting gates manipulated by long levers.

The tram system's track cable is fixed to anchors at both the top and bottom terminals, and it passes through the upper terminal's bottom floor. In the upper terminal, the traction cable passes over several pulleys and around a 4 foot diameter sheave fixed onto the ore bin's foundation framing, adjacent and west of the terminal's bottom floor. The brake lever operates a strap brake that squeezed the sheave.

Figure 7.24 Quarter view up and west of the mine’s ore sorting house and aerial tram terminal (Features 16 and 18). The tram terminal stands at the base of the ore sorting house.

After several decades of mining, economic ore in the Bachelor's upper stopes finally appeared to be exhausted, and miners had failed to strike significant new ore bodies. However, the adjacent Commodor ground still held promise, and miners continued to work that property. According to historic records, surface activity shifted from the Bachelor Mine's surface plants to the expansive Commodor No.5 Tunnel plant. However, the Bachelor's lower tunnel exhibits evidence that miners used it as a haulageway as late as the 1970s. Miners, probably working for Emperius, upgraded the rail line in the tunnel to permit electric battery locomotives to pull ore trains. Further, mine workers converted the northern portion of the shop building into a locomotive recharging station. They walled off the blacksmith shop located in the building's east portion, and laid two stub rail lines into the recharging room. Emperius' workers also built a new aerial tramway to replace the inoperative Bleichert system. The new tramway was a traditional double rope reversible system with a limited carrying capacity. The top terminal (Feature 5) stood on the upper cribbing wall which the Bachelor Mining Company erected in the late 1890s to retain waste rock. The top terminal consists of a sloped floor bin 10 by 12 feet in area, and two cable anchors. Mine workers used lumber and hardware salvaged from the defunct Bleichert system. During the 1970s, miners input ore into the bin by unloading cars into a chute which extended up the flank of the waste rock dump. The bottom terminal, which has been totally dismantled, stood near the Commodor No.5 Tunnel portal.

The Bachelor Mine, the oldest paying claim in the district, finally fell idle and was abandoned around 1980. During this time someone used a bulldozer to scrape down the surface plant area at the upper tunnel, and they graded a road part way down the flank of the waste rock dump. Because the lower tunnel complex could only be accessed via pack tail, it saw little disturbance.

Residence

Because the Bachelor Mine lay so far from the Creede district's principal settlements, the mining company erected a boarding house and several detached frame buildings for the mine crew. The structures stood on cut-and-fill platforms that workers graded in a sparsely wooded area southeast from the mine. Privies stood on another platform (Feature 22) northeast from the boarding house platform. All of the structure platforms have been heavily damaged or destroyed within recent years by earthmoving activity.

The mine's residents disposed of their domestic refuse in the manner typical of Western mining camps. They dumped cans, bottles, and other forms of trash behind and downslope from the buildings, and threw organic wastes, such as bones and table scraps, downslope from the privies. The residents relied on the privies for personal use.

The complex's bunkhouse and dining hall stood southeast from the site’s extant privy pits. The building platform has been bulldozed. The associated domestic refuse, recorded as Feature 23, consists mostly of food cans, and it extends downslope. The bunkhouse featured indoor running water, indicated by pipes currently mixed in with the refuse dump.

The artifact assemblage associated with the residential complex reflects the lifestyle of the occupants. The abundance of food cans and the relative paucity of miscellaneous and decorative domestic items is representative of a population predominated by single miners working at a remote location. However, the artifact assemblage does include a few decorative domestic items, especially glass vessels, fine tableware fragments, and corset stays. These items reflect inhabitation by a woman, who probably served as cook and hostler.

Artifacts indicate that, during the mine's occupation, the Bachelor's miners ate a hearty Victorian diet similar to that consumed in other Western mining districts. The abundance of food cans and butchered bones reflects the consumption of meals that emphasized vegetables, fruits, and fresh meats. Further, the bones consisted primarily of cuts for stews and roasts. A significant number of baking powder cans and baking utensils indicate that the cook prepared baked goods. A great number of cans which contained institutional quantities of food, and abundance of large butchered bones, indicate that the mine crew ate communal meals prepared by a cook. Further, heavy china plate, cup, and bowl fragments, known as *hotelware*, reflect the use of durable, plain tableware in a dining hall setting. Many cans contained milk, which mine workers may have used in coffee or tea.

The trash dump includes numerous bottle and earthenware fragments. Many of the fragments belonged to liquor bottles and jugs, which indicates that the mine's inhabitants openly drank liquor. However, the overall quantity of liquor vessels was not unusually high.

The artifact assemblage associated with the residential complex reflects an occupation primarily between the late 1890s and around 1910. The set of food cans includes ten times as many vessels made with inner rolled and soldered side seams as those constructed with lapped side seams. Bottle bases with makers' marks, few in number, date between around 1905 and 1916. A total absence of sanitary food cans and machine-made bottles, which had become popular by the 1910s, reflects abandonment prior to World War I.

Bachelor Mine Site Analysis

The Bachelor Mine serves as an example of a large, heavily capitalized, highly productive tunnel mine. The mine featured three entries including an upper tunnel, a lower tunnel, and the Nelson Tunnel at the very bottom, and each served a primary function. While some of the mine's facilities were situated at one or the other of the tunnels' surface plants, they were participants in the system as whole. The roles of the tunnels shifted after 1910, when mining operations slowed due to the exhaustion of ore. The mine also illustrates the continuation of the application of traditional mining methods and means of equipping such operations, including the surface plant, from the Gilded Age through the Great Depression.

The arrangement of the tunnels, their special functions, and their complex surface plants reflect organization, fine engineering, and ore production in economies of scale. The upper tunnel served primarily as an entry for miners and supplies, and secondarily for the extraction of ore from the upper stopes. The location of the mine's residential complex, access road, and lack of large ore processing facilities reflects this function. The residential complex and wagon road, located at the upper tunnel, were the source of labor and supplies for the mine. Mining companies relied on wagon roads to permit freighters to deliver supplies, fuel, and machinery.

The lower tunnel served primarily as a haulageway for ore taken out of the mine's upper stopes, and secondarily to support work underground. The location of the mine's top terminal for the Bleichert aerial tramway, which shipped ore to the railhead at North Creede, the massive ore sorting house, and the lack of a wagon road are concurrent with such a function. The ore sorting house and aerial tramway, located at the lower tunnel, were the ore processing and transportation systems serving the Bachelor Mine’s workings. Last, the Nelson Tunnel served as the haulageway for ore removed from the mine’s lowest stopes. Miners drove interconnecting raises and which permitted ore to be transferred via gravity from the lower stopes to underground ore bins at the Nelson Tunnel.

Several of the facilities erected by the Bachelor Mining Company reflect a major capital investment, progressive engineering, and a reliance on mechanization to produce ore in economies of scale. The powerhouse, which stood on the bank of West Willow Creek, provided electricity and compressed air to the entire mine. In of itself, the powerhouse was an example of advanced engineering. During the 1890s the application of electricity to hardrock mining was in a nascent state, and few engineers understood how to generate it, wire it, and harness it. The Bachelor Mining Company undoubtedly paid handsomely to secure a capable engineer. The powerhouse also enclosed an air compressor that powered rockdrills in the underground workings. The air system was complex, consisting of plumbing routed from the powerhouse up to the lower tunnel. From there, a maze of pipes sent air to the critical areas underground. Such a system could have only been constructed with advanced engineering.

The ore sorting and transportation system was a product of advanced engineering. The ore sorting house and the tram terminal were well-built and costly structures, and both facilities interfaced to facilitate the flow of ore. While Bleichert tramways such as the one serving the mine included many factory-made components, each system had to custom-engineered.[21]

The explosive storage and thawing facility at the lower tunnel is indicative of a progressive, well-organized, and heavily capitalized operation. In general, few mining companies devoted the capital, space, and time to handle explosives in such an efficient and safe manner. The facility also indicates that miners consumed a large quantity of dynamite, reflecting heavy production and underground development activities

The artifacts at the upper and lower tunnels lend additional information to the interpretation of the Bachelor Mine site. In general, the quantity of items dating between the 1890s and 1910s is greater than items deposited before or after this period. Further, the quantity of artifacts dating to the 1930s is much greater than those dating to the 1970s. The artifact assemblage at the lower tunnel complex, and the remains of the surface plant almost exclusively date to the late 1890s and 1910s, while the upper tunnel complex features a greater concentration of plant components from the Depression-era operation. The high quantity of durable industrial items from both eras reflect long-term, intensive, and well-capitalized operations.

[21] Twitty, Eric *Reading the Ruins* Masters Thesis, University of Colorado at Denver, 1999 p161.

Specific sets of artifacts at the mine complex reflects the practices exercised by the mine's operators. For example, while the multiple tunnels comprising the Bachelor Mine offered the benefit of improved ventilation through natural circulation, a centrifugal blower located at the lower tunnel indicates that the Bachelor Mining Company supplied fresh air to miners laboring in deadend workings. Such a practice was progressive. Mule shoes and horseshoes at the upper tunnel indicates that the mining company relied on both mules and horses to haul ore trains underground. Electrical insulators associated with the mine's older structures reflects the early use of electricity for lighting and to power mine and shop machinery. A heavy concentration of upset drill-steel blades and pick tine points, generated during the sharpening process, lie scattered about the shop floor at the lower tunnel. The items indicate that the Bachelor Mining Company hired experienced and professional blacksmiths to repair and maintain mine hardware and tools. The high number of pipes and rockdrill parts mirrors the mine's reliance on rockdrills and other machinery to expedite ore production.

The Commodor Mine
Sites 5ML80 and 5ML344

The Commodor Mine was a vast network of interconnected underground workings linking two historical sites located on the Amethyst Vein's south portion. The Commodor Tunnel No.1 site (5ML344) is located on Bachelor Mountain's east flank, east of the Bachelor townsite. The Tunnel No.5 site (5ML80) lies in West Willow Creek's canyon approximately a half mile southeast from Tunnel No.1, and a half mile from North Creede. In terms of physical setting, the Commodor Tunnel No.1 site is located on a steep east-facing slope marked by a transition from a barren, rocky scree field to a sparse pine forest. The Commodor Tunnel No.5 site occupies a wide area in West Willow Creek's canyon, bounded on all sides by steep, rocky, and hostile terrain. The site is vegetated with a mixture of ponderosa pines, riparian trees and shrubs, and grasses.

In terms of character, the Commodor Tunnel No.1 site consists of the remains of a small adit operation, while the Commodor Tunnel No.5 site consists of the remains of the Creede district's largest, most complex tunnel operation. Both sites retain a high degree of historic integrity and they possess a unique ambiance. In addition, both sites feature intact structures and archaeological deposits.

Mining Operations

In 1891 news of the discovery of the Amethyst and Holy Moses veins began circulating throughout the Rocky Mountains, drawing hundreds of prospectors to the area. By the time the majority of the hopefuls began arriving in the Creede region, most of the promising ground had been claimed by prospectors who arrived early. One such prospector, John C. McKenzie, owned several of the best claims on the Amethyst Vein. In some senses he was entitled, because McKenzie and his party made the initial discoveries in the district, including the Alpha and Bachelor claims, in the 1870s. When interest in the area began peaking in the early 1890s, McKenzie renewed his search for additional strikes. He was most familiar with the south portion of the Amethyst vein high on Bachelor Mountain, and in 1891 he and partner W.V. McGillard identified another promising place near the Bachelor mine, which he staked as the Commodor claim.[22]

Within a short time, McKenzie and McGillard sank a 100 foot deep prospect shaft to locate ore at depth, and they continued subsurface exploration into 1892. After finding economic ore 200 feet down, they sold the property to A.E. Reynolds, who acquired several other prominent properties nearby. A.E. Reynolds was not as well-known as other Colorado mining moguls were, however, he invested heavily in San Juan mines, and his capital made many mining operations in the region possible. Reynolds formed the Commodor Mining Company and hired a crew of miners to develop the property and begin extracting payrock. By 1893 they had encountered not only the Amethyst Vein in all of its riches, but they had discovered a number of additional small fissure veins.[23]

[22] Emmons, William H and Esper, Larsen S. *USGS Bulletin 718: Geology and Ore Deposits of the Creede District, Colorado* U.S. Geological Survey, U.S. Government Printing Office, Washington, DC 1923, p149.
[23] *EMJ* 3/26/92 p358.

When the Commodor Mining Company was poised on the brink of realizing the anticipated profits from the rich ore underground, the Silver Crash of 1893 ruined the silver market, and like most of Creede's mines, the Commodor operation shut down. Mining did not resume at the Commodor for at least three years, and even then activity was minor and limited primarily to extraction of only the highest grades of ore, which provided maximum returns for minimal effort and expense. When the economy rebounded and the prices for silver and industrial metals rose during the late 1890s, the Commodor Mining Company intensified ore extraction and development.

The mining periodical *Engineering & Mining Journal* reported that the Commodor company employed up to 250 workers by 1898, and they fell into two groups. The first group consisted of miners that worked in the depths of the Commodor Mine which they accessed through the original Commodor Tunnel high up on Bachelor Mountain, and through the Bachelor Mine's tunnels. The Bachelor Mine lay adjacent to and southeast from the Commodor claim, and while David H. Moffat's syndicate owned the property, the Commodor's miners apparently used its lengthy tunnels to access their workings. The second group of the Commodor's impressive workforce consisted of miners and surface workers laboring at the Manhattan claim on the floor of West Willow Creek's canyon, preparing to drive what was then known as the Manhattan Tunnel, and later as the Commodor Tunnel No.5.

The Manhattan Tunnel concept was born out of greed and rivalry. In 1892 Charles F. Nelson organized the Nelson Tunnel Company to drive a deep haulage and drainage way along the south portion of the Amethyst Vein, linking the principal mine workings. During the late 1890s two other companies used the deep termination of Nelson's tunnel as a starting point for similar tunnels driven farther along the vein. The intended purpose was to reduce the costs of deep mining, and encounter additional ore. To pay for the costly project, Nelson solicited subscriptions from the wealthy mine owners, as well as levying a royalty per ton of ore hauled out the tunnel portal.

The owners of the Commodor Mine, including Reynolds, thought that the Nelson Tunnel Company's subscription rates and toll per ton of ore were too costly, and they elected to drive their own haulage way in the late 1890s. The Commodor Mining Company hired an engineer who selected the site for a surface plant and a tunnel portal on the Manhattan claim, only several hundred feet up West Willow Creek from the Nelson Tunnel. However, the Bachelor Mine lay between the proposed tunnel site and the Commodor claim, presenting the problem of trespass. Other locations for the proposed tunnel were out of the question, due to restricted nature of West Willow Creek's canyon. The Commodor Mining Company negotiated with the Bachelor's owners and secured the right to drive the tunnel through their ground, probably for a royalty.

The Commodor interests hired a mining engineer who put a crew to work erecting a surface plant and a crew of miners to work drilling and blasting the tunnel. The surface plant was handsome and well-appointed. First, mine workers erected a flume to channel West Willow Creek, and they covered it over. They built a cribbing wall to retain waste

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Emmons, William H and Esper, Larsen S. *USGS Bulletin 718: Geology and Ore Deposits of the Creede District, Colorado* U.S. Geological Survey, U.S. Government Printing Office, Washington, DC 1923, p151.
Henderson, Charles W. *USGS Professional Paper 138: Mining in Colorado: A History of Discovery, Development, and Production* U.S. Geological Survey, Government Printing Office, Washington, DC 1926, p56.
MacMechen, Thomas E. "The Ore Deposits of Creede, Colo." *Engineering and Mining Journal* March 12, 1892 p301.

rock generated by driving the tunnel, and they erected surface plant components on the dump's surface. The portion of the plant near the tunnel portal consisted of a shop, a change house, and seven other frame buildings. Across the flume from the tunnel portal stood a powerhouse, a timber dressing building, and ore bins. The powerhouse enclosed an air compressor and two generators driven by a horizontal steam engine, which was supplied steam from two return tube boilers. When West Willow Creek offered a sufficient head of water, a Pelton water wheel drove the compressor and generators.[24]

The Bachelor and Commodor companies were on good terms, which facilitated the Commodor's right of access through the Bachelor's ground. In 1900 the two companies became even closer when the Moffat Syndicate purchased a controlling interest in the Commodor, and the mining industry subsequently recognized the two mines as being one entity. As a result, the upper-most tunnel on the Commodor claim became known as Tunnel No.1, the Manhattan Tunnel became known as Tunnel No.5, the Nelson Tunnel was unofficially termed No.4, and Tunnels No.2 and No.3, associated with the original Bachelor Mine, pierced the ground upslope.

By 1900 miners had driven the Manhattan Tunnel 4,000 feet to workings underneath the Commodor claim, where they blocked out ore with raises and drifts. After the tunnel was complete, it served as the mine's principal haulage way, and the upper tunnel was abandoned, except as an entry to the upper workings. Miners drove the Discovery Shaft in efforts to link the mine's upper workings with the Tunnel No.5. The shaft, located deep underground near the border of the original Bachelor and Commodor claims, served as a point for underground exploration, and as an artery to transport ore down to Tunnel No.5 for the trip out of the mine. The shaft attained an area of 14 by 14 feet in the clear, which was substantial.[25]

By 1902 the Commodor Mining Company employed a total of 400 mine workers who accessed parts of the underground workings through tunnels two through five. The miners mostly concentrated their efforts on drilling and blasting rich ore between Tunnels 2 and 3, which were originally part of the Bachelor operation. The ore extended from the Bachelor ground into the Commodor workings. The Commodor Mining Company profited handsomely through the 1900s as it employed economies of scale to gut its share of the Amethyst Vein. Then, by around 1910 the fabulous vein began exhibiting signs of depletion, and the company decided it was more profitable to lease the mine than to extract the remaining ore itself.

Around 1910 the Creede Exploration Company assumed a lease, and it continued to mine the remaining payrock, as well as make a serious effort at locating further ore bodies. The company decided to gamble significant capital and sink an exploratory shaft to search for ore deep below Tunnel No.5. Miners drilled and blasted a large shaft station underground, and began sinking the shaft. The hoisting system serving the shaft consisted of a 68 foot headframe, an electric double drum hoist, and two skips as the hoisting vehicles. They sank the shaft to a depth of 480 feet, and failed to encounter

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[24] Colorado Historical Society Records, MSS Box 640, v24:34.
EMJ 6/16/00 p718.
Sanborn Map Company *Creede: Mineral County, Colorado* Sanborn Map Company, Brooklyn, NY 1904.

[25] Colorado Bureau of Mines *Manuscripts* Colorado Historical Society, MSS Box 640, v24:53.
EMJ 7/9/98 p46; *EMJ* 6/16/00 p718.
Emmons, William H and Esper, Larsen S. *USGS Bulletin 718: Geology and Ore Deposits of the Creede District, Colorado* U.S. Geological Survey, U.S. Government Printing Office, Washington, DC 1923, p149.

sufficient ore. Creede Exploration shut off the dewatering pumps and let the shaft flood.[26]

Due to exhausted ore reserves and a tumble in metals prices, the mine closed for several years after Creede Exploration's failure. The portions of the surface plant which retained value, such as machinery, were probably removed at this time. When the demand for industrial metals stimulated by World War I drove prices up again, the mine reopened in 1916. Miners extracted ore from the upper levels in both the Bachelor and Commodor workings until the demand faltered again after the war's end.

Like many of the Creede district's mines, the Commodor remained idle for several years. In 1920 the Commodor Leasing Company reopened the property, and like the small operators before, it found economic ore in the upper workings in both the Bachelor and Commodor properties. Ten miners, drilling primarily by hand, extracted up to 150 tons of low-grade ore per month for several years. In 1922 poor economic conditions combined with a glut of industrial metals made the Commodor's ore uneconomical, once again, and activity at the property ceased.[27]

In 1924 Clarence Withrow organized the Withrow Leasing Company in hopes of reopening the Commodor. Withrow hired 14 miners who both extracted low-grade ore left by previous operations in the mine's upper levels, and conducted underground exploration for additional ore bodies. A.L. Dean, one of the company's superintendents, decided to dispatch a small crew to deepen a few extant crosscuts driven into the walls of the Amethyst Vein by previous operations. There, miners encountered a substantial ore-laden fault that paralleled the Amethyst Vein, which they named after Dean. The ore provided Withrow Leasing with income, and with renewed vigor. Withrow mined the new ore body and extracted payrock from old workings until 1930, when the Great Depression forced the company to suspend operations.[28]

In 1934 President Franklin Delano Roosevelt signed the Silver Purchase Act into law, which created federally mandated price supports for the white metal. With the improved economic conditions, the Withrow Leasing Company resumed operations and rehabilitated key portions of the mine. After a year, Withrow let the lease expire for unknown reasons, and the Wilson Leasing Company assumed operations. Wilson continued to recondition the mine, and it focused surface activity at the Tunnel No.5 portal. Wilson, intent on making the mine pay, installed two Gardner-Denver compressors and an Ingersoll-Rand compressor to power rockdrills. With the drills, miners were able to blast a greater tonnage of ore in less time.[29]

By 1935 the Commodor Mine had been subject to 40 nearly continuous years of profitable ore extraction. The Emperius Mining Company recognized this, and it opted to purchase the property, along with several other formerly profitable Amethyst Vein mines. Emperius permitted Wilson to continue to lease the Commodor Mine, and Wilson's miners turned a profit. As part of the agreement, Wilson was responsible for maintaining

[26] Colorado State Mine Inspectors' Reports, Box 104053, Creede Exploration Colorado State Archives, Denver, CO.
Emmons, William H and Esper, Larsen S. *USGS Bulletin 718: Geology and Ore Deposits of the Creede District, Colorado* U.S. Geological Survey, U.S. Government Printing Office, Washington, DC 1923, p149.

[27] Colorado State Mine Inspectors' Reports, Box 104053, Emperius Colorado State Archives, Denver, CO.

[28] Colorado State Mine Inspectors' Reports, Box 104053, Emperius Colorado State Archives, Denver, CO.

[29] Colorado State Mine Inspectors' Reports, Box 104053, Emperius Colorado State Archives, Denver, CO.

the mine's surface plant, and in 1936 the Colorado State Mine Inspector ordered Wilson to relocate the compressors and the shop away from the tunnel portal.[30]

Wilson's outfit relinquished its lease in 1938, and the Commodor Mine was subjected to a succession of operators. The Commodor-Bachelor Mines, Incorporated worked the property until 1940, when the Creede Leasing Company took over, and in 1943 Emperius assumed operations. All of the operators had been focusing their efforts on extracting both low-grade ore left in the upper levels, and ore encountered in several small discovery veins. One of the reasons that Emperius began to work the property for itself was that in 1938 miners discovered the OH Vein, which paralleled the Amethyst Vein. Geologists celebrated the OH Vein as the single most significant find in the area since McKenzie initially encountered the Amethyst Vein.[31]

When Emperius made efforts to work the Bachelor and Commodor ground, it invested significant capital in upgrading Tunnel No.5 and the associated surface plant. In 1943 Emperius began reconditioning the tunnel, which it completed in 1944. To support the intensified work underground, the company replaced the traditional mule trammage used by the previous operations with electric locomotives that ran on a heavy rail line. Emperius installed two generators, and continued to rely on the extant shop, change house, and ore sorting house. In the late 1940s Emperius erected another compressor house. After the changes, Emperius relied exclusively on Tunnel No.5 as the principal entry into the underground workings and abandoned all other tunnels.[32]

The ore deep in the Bachelor and Commodor claims seemed endless. Emperius continued to mine payrock until 1974. At that time, the Minerals Engineering Company took over and used the Commodor Tunnel No.5 until 1983, when, after 90 years of activity, the mine closed permanently. The Commodor was the Creede district's longest-lived operation, and one of the most extensive mines, both underground and on the surface.[33]

Commodor Tunnel No.1 (5ML344) Site Analysis

The site encompasses the remains of the surface plants associated with the Commodor Tunnel No.1, and associated with a second prospect adit. Specifically, two collapsed buildings, a standing dynamite thaw house, two adits and associated waste rock dumps, a timber dressing area, and artifacts characterize the complex. The site has experienced little disturbance and it possesses a high degree of integrity and ambiance.

Historical records make little mention of the Commodor Tunnel No.1. The tunnel probably was the product of the first effort that miners made to develop the claim after A.E. Reynolds purchased the property from J.C. McKenzie and W.V. McGillard in 1892. The tunnel's location suggests that miners drove it to strike the bottom of the small shaft sunk by the two prospectors in 1891. At about the same time that miners were driving

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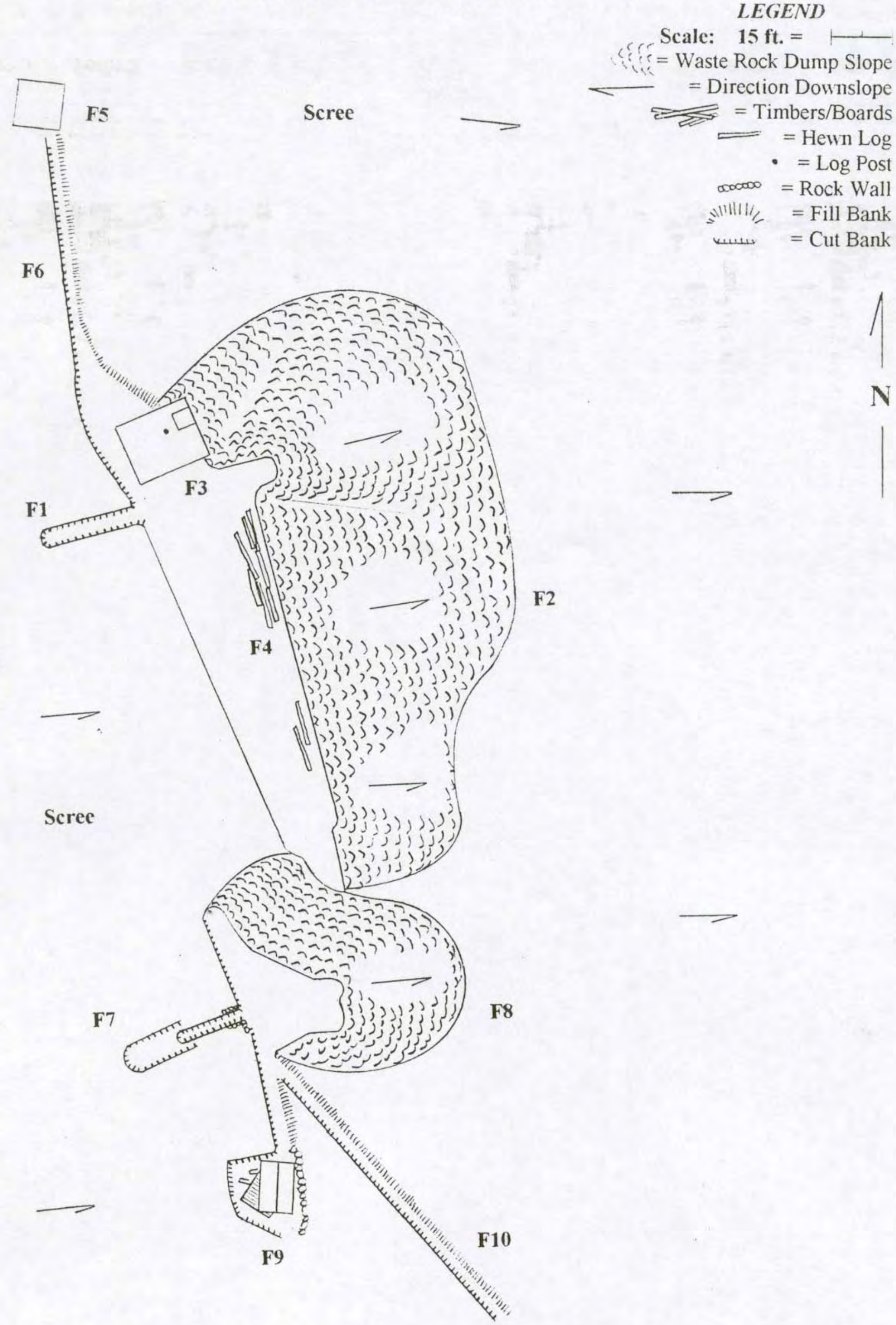
[30] Colorado State Mine Inspectors' Reports, Box 104053, Emperius Colorado State Archives, Denver, CO.

[31] Colorado State Mine Inspectors' Reports, Box 104053, Emperius Colorado State Archives, Denver, CO.
Steven, Thomas A. and Ratte, James C. *USGS Professional Paper 487: Geology and Structural Control of Ore Deposition in the Creede District, San Juan Mountains, Colorado* U.S. Geological Survey, Government Printing Office, Washington, DC 1965 p10.

[32] Colorado State Mine Inspectors' Reports, Box 104053, Emperius Colorado State Archives, Denver, CO.

[33] Colorado State Mine Inspectors' Reports, Box 104053, Emperius Colorado State Archives, Denver, CO.

COMMODOR MINE: TUNNEL NO.1
PLAN VIEW
CREEDE MINING DISTRICT, MINERAL COUNTY, COLORADO



COMMODOR MINE: TUNNEL NO.1
PLAN VIEW
DYNAMITE THAW HOUSE
CREEDE MINING DISTRICT, MINERAL COUNTY, COLORADO

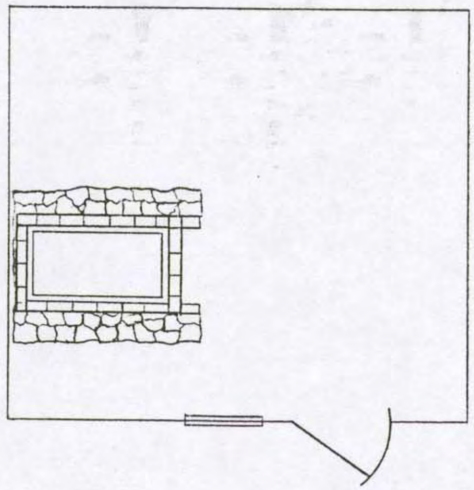
LEGEND

Scale: 2 ft. =

= Window

= Door

= Rock Masonry



South Side

Tunnel No.1, another party of prospectors were working on a second adit adjacent and south (Feature 7).

The material evidence comprising the site indicates that the Commodor Mining Company used Tunnel No.1 until around 1910, which is later than archival data suggests. At the time of abandonment, the tunnel's surface plant consisted of a small blacksmith shop, a timber dressing area, a dynamite thawing house, a privy, and the structure associated with the adjacent prospect adit (Features 3, 4, 5, and 9, respectively). The plant can be categorized as being small, capable of handling only limited quantities of materials, and lacking in ore storage and processing facilities.

The shop appears to have been a frame shed 18 by 15 feet in area, and the Commodor Mining Company equipped it for blacksmithing and metalwork. A wood box forge stood in the shop's northeast corner, the anvil block was set in the ground near the center, and the shop's west and south walls were lined with workbenches. One of the benches features bolt-holes for a hand-powered shop appliance. The artifact assemblage associated with the shop includes typical blacksmithing refuse and numerous dynamite box panels. Upset hand-steel blades, generated by sharpening drill-steels, mixed in with the blacksmithing refuse, reflect the work of a highly skilled blacksmith. The dynamite box panels scattered downslope indicate that miners used the shop to store dynamite, probably where it stayed warm during cold weather.

The surface plant appears to have been assembled over time, rather than erected at once. Mine workers probably used the shop and timber dressing area to support work underground when they were driving Tunnel No.1 in the early and mid 1890s, and prospectors used Feature 9 as a shop when they were working on the adit to the south.

After the Commodor's underground workings had been developed and activity shifted to Tunnel No.5 and to the Bachelor tunnels, the role of the surface plant associated with Tunnel No.1 shifted. The shop and the timber dressing area saw little use, and miners began to use the tunnel as an access to the upper workings. Miners used the associated surface plant as an explosives preparation and storage facility. At that time they probably stored boxes of dynamite in the south prospect adit, which had been abandoned by then, and they primed dynamite cartridges in the building outside the adit portal. The high number of dynamite box panels and blasting cap tins scattered around the collapsed building reflects such a function. Mine workers erected the site's dynamite thawing house at that time to thaw frozen dynamite in winter. The secondary use of the surface plant as an explosives storage and preparation facility is indicative of a large, well-organized, and heavily capitalized operation. In general, few mining companies devoted the capital, space, and time to handle explosives in such an efficient and safe manner.

The thawing house, which stands in sound condition, is a front-gabled frame building erected on a cut-and-fill platform. The interior features a brick hearth capped with a receptacle for a factory-made thawing box. Mine workers filled the tin receptacle with a few inches of water and nested a water-tight insert containing dynamite. The fire below heated the water, which in warmed the dynamite in the inner chamber. The thawing box had the capacity to hold at least 50 pounds of dynamite, and the high number of box panels downslope from the building indicate that miners carried entire boxes of dynamite into the structure, opened them, and transferred the cartridges into the thawer. The miners then carried the thawed dynamite directly underground.

The site includes evidence left by several other surface plant components. Ventilation tubing indicates that the Commodor company supplied fresh air to the miners working underground, probably when they were exploring the vein prior to the connection with the lower tunnels. The blower may have been a small hand-turned unit. Large power-driven blowers usually required machine foundations and a boiler, of which no evidence exists. The surface plant also included a privy, which currently lies on its side downslope from the shop remnant. The associated pit could not be identified.

The artifact assemblage associated with the surface plant complex indicates that the facility saw the most use between the late 1890s and 1910. Specifically, hole-in-cap food cans with inner rolled and soldered side seams, hand-finished bottle fragments, the types of dynamite box panels and blasting cap tins present, and tobacco tins reflect this time period. The absence of later dateable artifacts indicates that the tunnel was abandoned prior to World War I.

Commodor Tunnel No.5 (5ML80) Site Analysis

The site encompasses the remains of the surface plant associated with the Commodor Tunnel No.5, and the Bachelor Mine's power house. Specifically, 12 standing buildings, log cribbing walls, rail lines and associated trestles, foundations, additional features, and artifacts characterize the complex. The site has experienced little disturbance and it possesses a high degree of integrity and ambiance.

Nearly all of the structures and features comprising the Commodor No.5 site were constructed during the 1930s, 1940s, and 1970s. In so doing, the responsible mining operations erased nearly all evidence of the original surface plant components. The only original features remaining include an aerial tram terminal platform (Feature 9), a large cut-and-fill platform (Feature 55), portions of a log cribbing structure (Feature 3) retaining waste rock, and the platform and a coal bin that currently support the mine's office (Feature 21).

The tram terminal platform features foundation posts that supported a superstructure, and an anchor for a cable. The single cable anchor and the platform's small size indicate that the system was a single rope reversible tram.

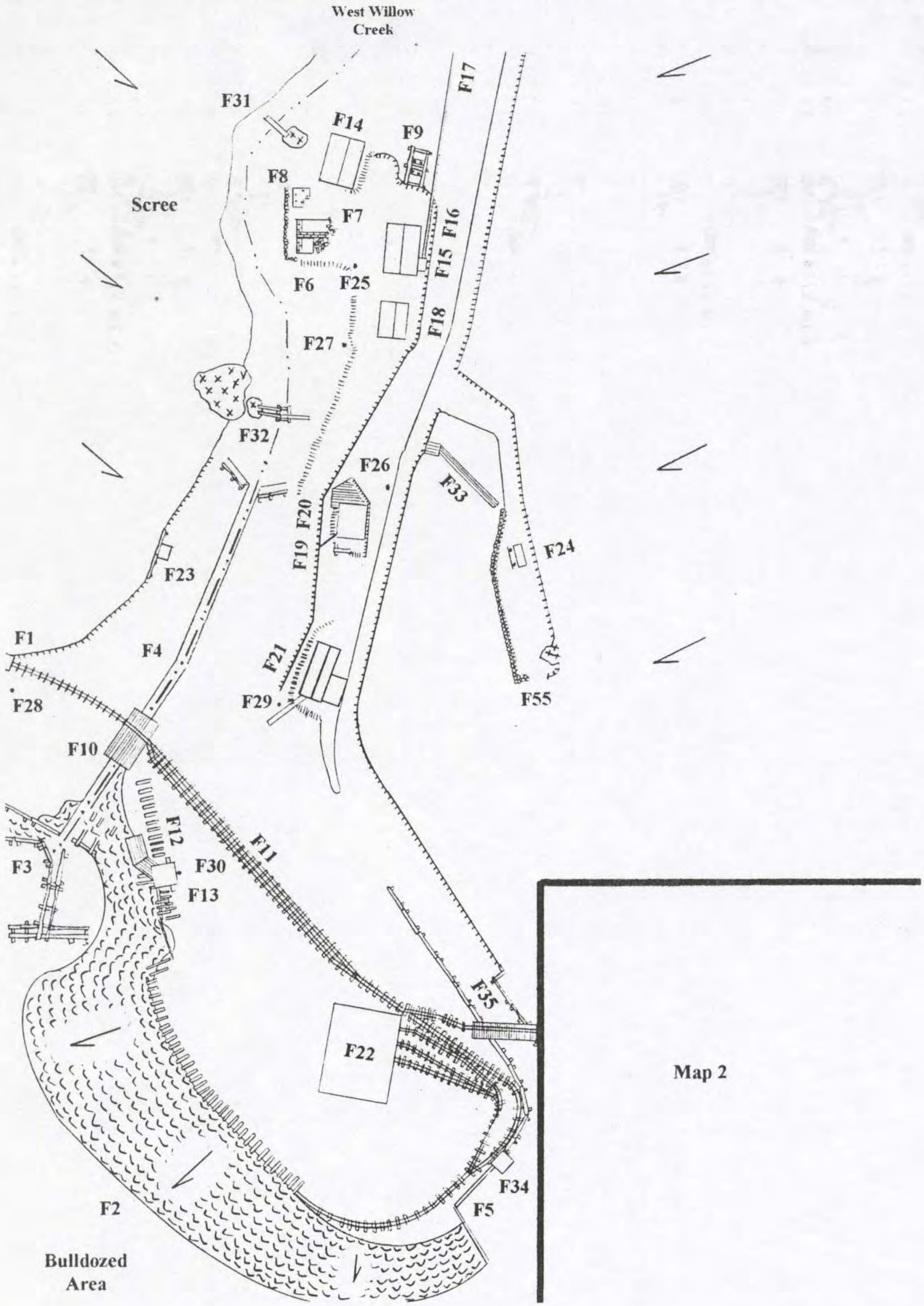
The north portion of the Commodor site encompasses the ruins of the Bachelor Mine's power house, which mine workers built in the 1890s. A masonry foundation, a boiler setting remnant, and a horizontal steam engine foundation (Features 6, 7, and 8) characterize the ruins.

Most of the tunnel's original surface plant components, and those used until 1935, were concentrated between the tunnel portal and what currently serves as the Bachelor Loop Road (Feature 56). In 1936 the Colorado Mine Inspector ordered the mine's operator at the time, the Wilson Leasing Company, to move its support facilities from their location by the tunnel portal. Wilson complied, and relocated its two Gardner-Denver compressors, an Ingersoll-Rand compressor, and its shop across West Willow Creek, which is reflected by the extant buildings in the site's north portion. Specifically, the two northern compressor houses and the shop (Features 14, 15, and 18) appear to have been built during the 1930s. Further, Feature 14 encloses two V-cylinder compressor foundations, and Feature 15 still encloses an Ingersoll-Rand duplex compressor (Feature 16). When Wilson relocated the compressors, it installed a water line (Feature 17) to provide the machines with coolant. The two compressor houses are frame buildings with gabled roofs, coolant plumbing, and electrical wiring for lighting and for the drive motors. Feature 14 features four broad double doors, permitting the building's interior to be fully exposed.

The shop (Feature 18) is a large frame shed, and the interior features work benches, machine parts storage, rockdrill storage, and a foundation for a diesel-powered generator. Mine workers plumbed the building for compressed air to power shop tools, and they wired it for lighting.

In the late 1940s the Emperius Mining Company erected the site's third compressor house (Feature 19) and installed an Ingersoll-Rand V-cylinder compressor (Feature 20). The building's interior features a workbench, indicating that mine workers used the compressor house as a shop.

COMMODOR MINE: TUNNEL NO.5
PLAN VIEW: MAP 1, NORTH
CREEDE MINING DISTRICT, MINERAL COUNTY, COLORADO



COMMODOR MINE: TUNNEL NO.5
PLAN VIEW: MAP 2, SOUTH
CREEDE MINING DISTRICT, MINERAL COUNTY, COLORADO

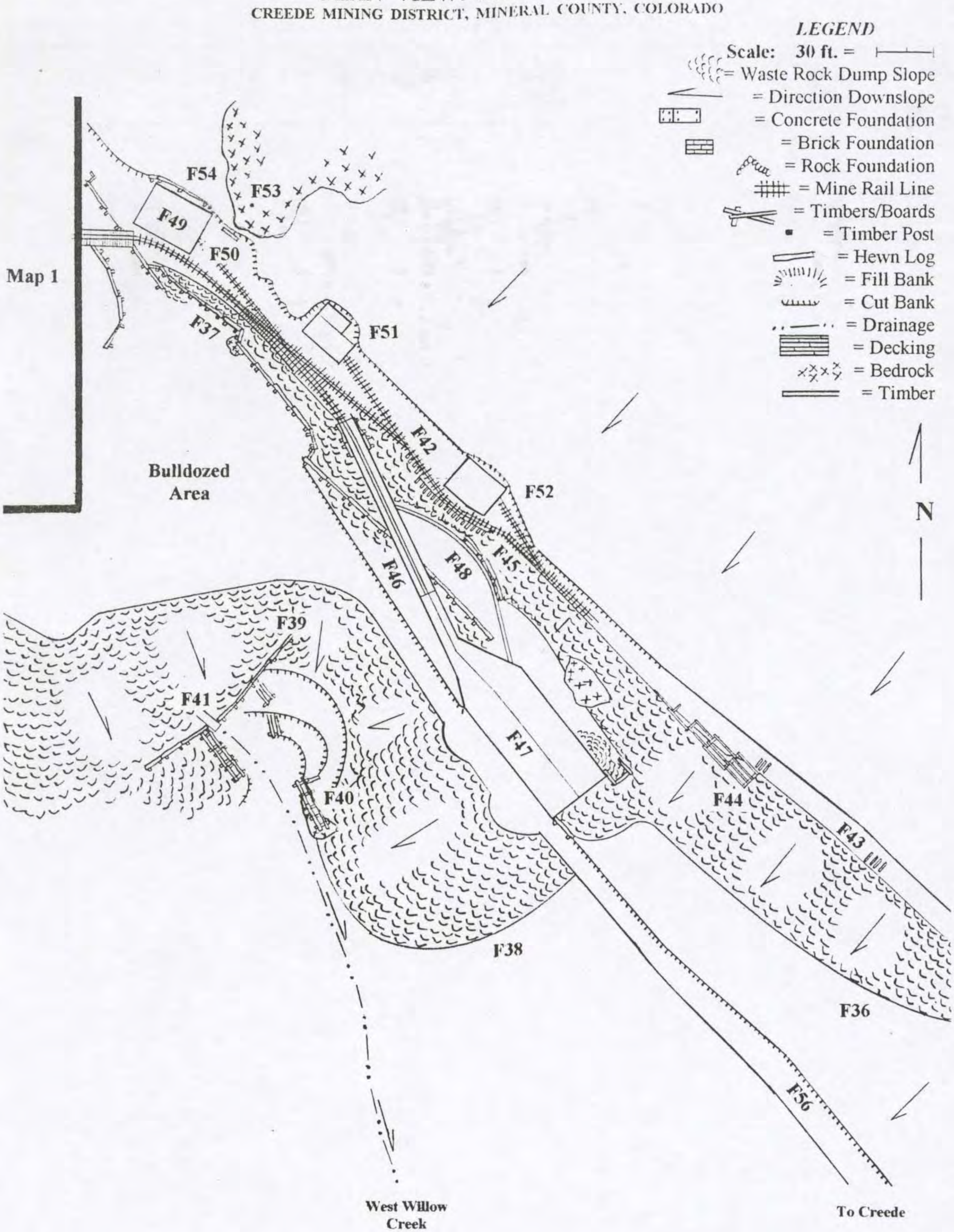


Figure 7.28 Sanborn's 1904 map of the Commodor Tunnel No.5's surface plant. Although not depicted on the map, the tunnel portal is located northwest of the notation "800' NW to Commodor Mine". The notation actually refers to the Bachelor Mine. The map is to scale with the archaeological map.

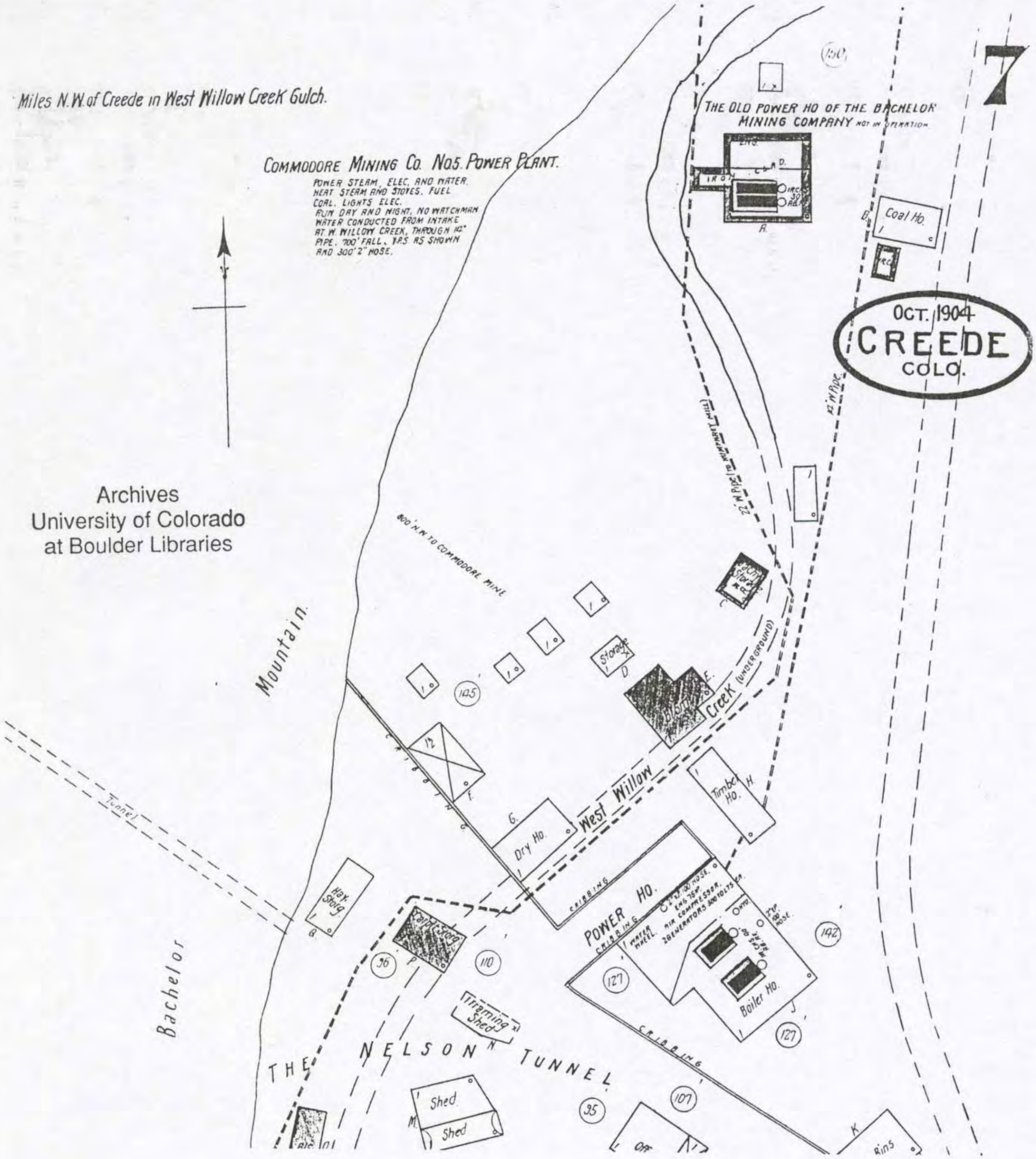


Figure 7.29 Overview down and east of the Commodor Tunnel No.5 complex. The Bachelor Loop road is visible passing through the site, and the cribbing wall retaining the Bachelor Mine's waste rock is at photo bottom. Author.

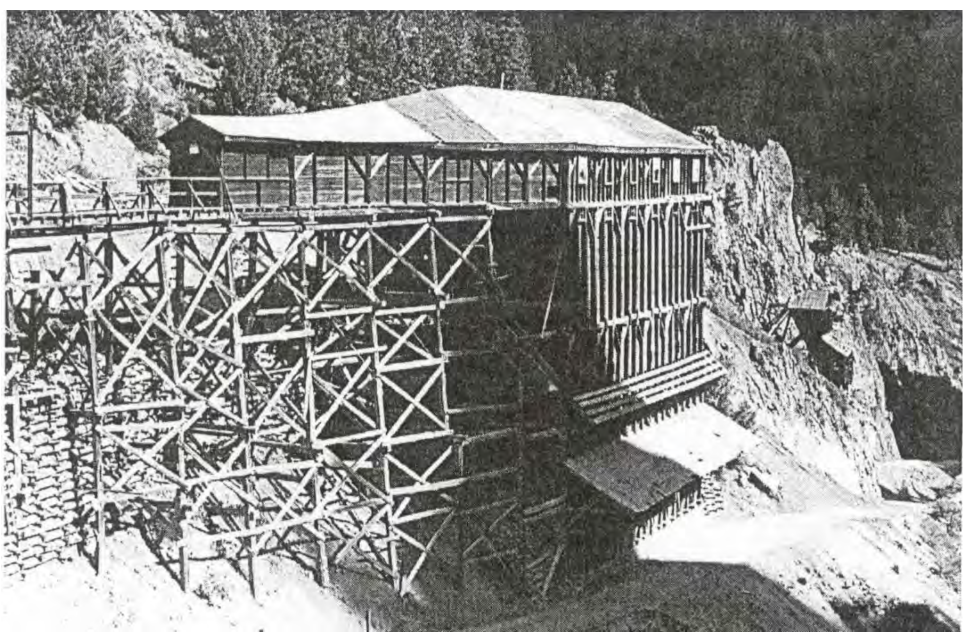
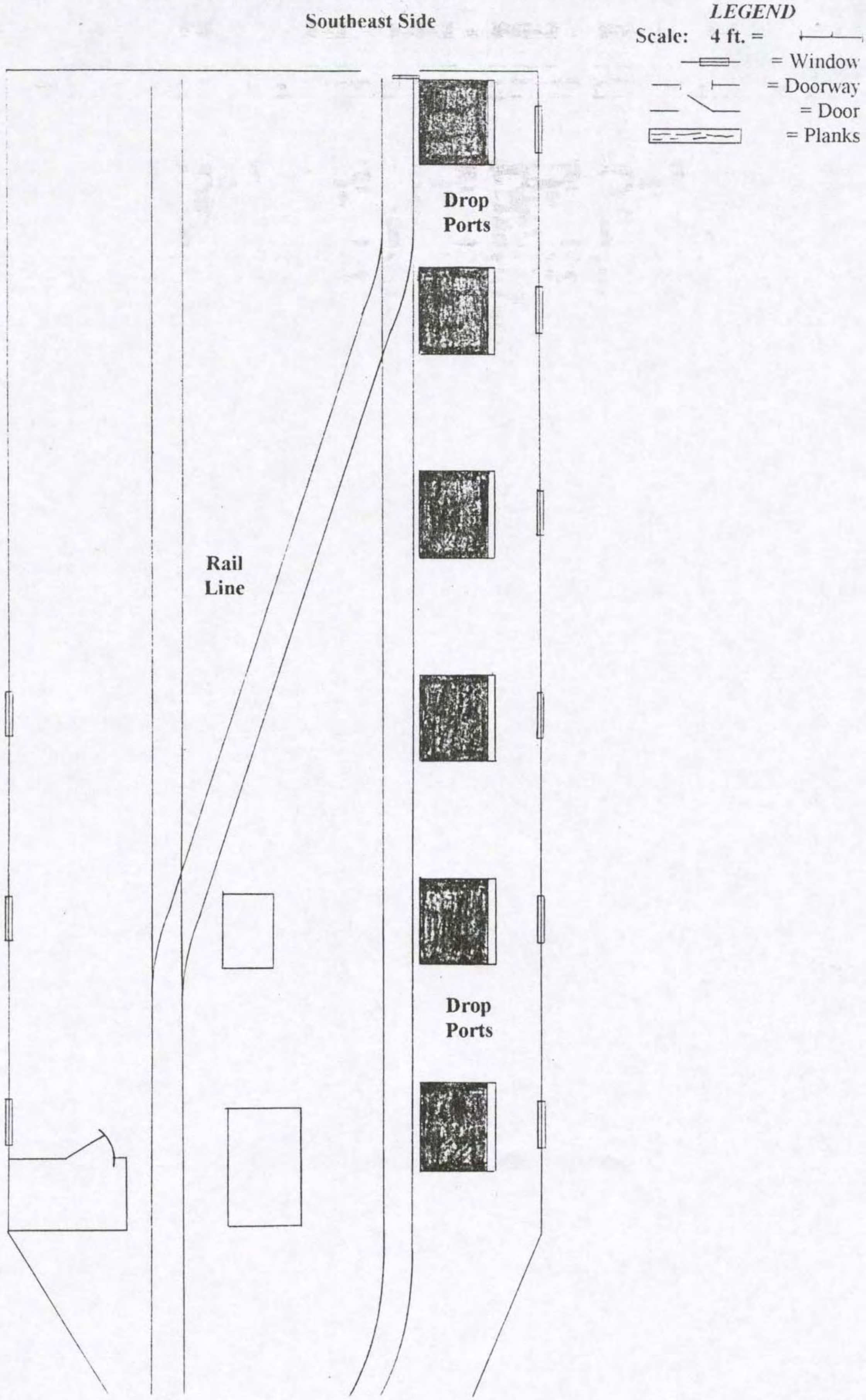
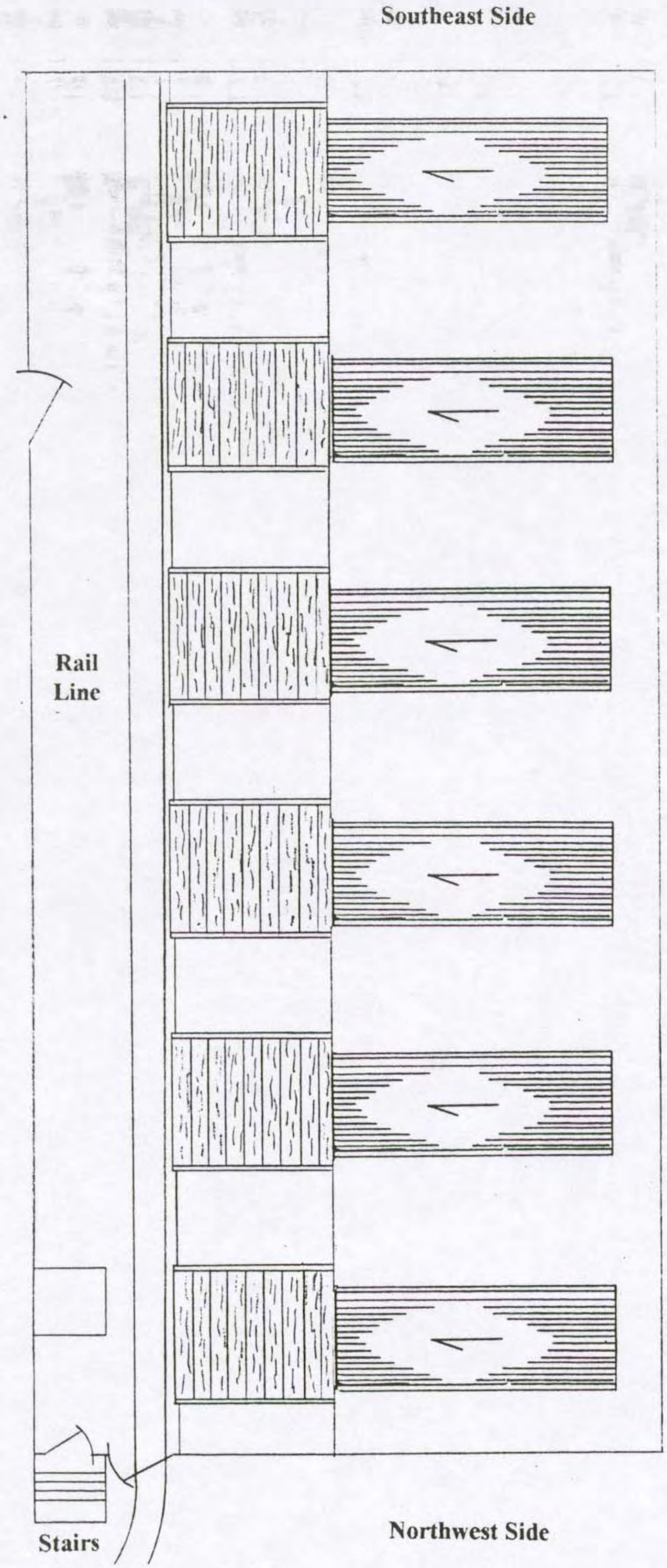


Figure 7.30 View east of the mine's two ore sorting houses. Feature 47 is the prominent structure, and Feature 57 clings to the cliff in the background. Author.

COMMODOR MINE: TUNNEL NO.5
PLAN VIEW
ORE SORTING HOUSE: TOP FLOOR
CRREDE MINING DISTRICT, MINERAL COUNTY, COLORADO



COMMODOR MINE: TUNNEL NO.5
PLAN VIEW
ORE SORTING HOUSE: MIDDLE FLOOR
CRREDE MINING DISTRICT, MINERAL COUNTY, COLORADO



The air system that the Wilson Leasing Company installed reflects a substantial capital investment and intensive underground operations. Not only did miners use the air to power rockdrills, but by the 1930s small air-powered hoists had become popular for work over winzes, and for drag lines in stopes. The fact that Emperius expanded the air system speaks of even greater underground activity. Each compressor house is unique, reflecting different construction periods. At least one of the compressor houses may have been built by the Withrow Leasing Company, Wilson's predecessor. The shop, on the other hand, is not particularly large, nor does it appear to have been equipped with power appliances. Such a facility had limited materials-handling capabilities.

The Commodor No.5 site includes components related to an electric power distribution system. An electrical substation (Feature 24) stands on a platform above the mine complex, and power poles are located throughout the surface plant. A date nail in one of the poles (Feature 29) indicates that the system was installed in 1934, when the Withrow Leasing Company resumed operations at the mine. The poles located by the compressor houses, the timber dressing shed, and by the ore sorting house (Features 25, 30, 53, and 54, respectively) were erected to serve those facilities.

The series of lessees that worked the Commodor Mine all enjoyed substantial production. Yet, the evidence pertaining to ore storage and processing at the tunnel site is unclear. The site's prominent ore sorting house (Feature 47) appears to have been erected in 1940 by the Emperius Mining Company. While no direct documentation of the ore sorting house has been encountered, the building is similar structurally, stylistically, and in construction to the one erected in 1940 at the Bachelor Mine.

The ore sorting house stands on a steep hillside downslope from the mine's southeast waste rock dump. The structure is 80 feet long, 35 feet wide, and consists of three stories totaling approximately 80 feet in height. The building's support system consists of square set framing made of 10x10 timbers assembled with square-notch joints. Each square set cell is 13 by 9 feet in area, and the cells supporting the sorting floor are 18 feet high, and those supporting the ore bins are 40 feet high. Post-and-girt frame walls and a gabled roof enclose the top floor.

The interior of the top floor features a row of 6 by 4½ foot receiving chutes along the west wall. Ore trains dumped their loads into the chutes from an adjacent rail line. The interior of the second floor features a row of six grizzlies and six sorting tables where mineworkers separated ore from waste. When miners dumped ore into the receiving chutes, the payrock slid onto one of the six grizzlies. Cobbles smaller than six inches passed through the grizzlies and dropped into the holding bins below. Large cobbles rolled down the grizzlies and stopped on one of the sorting tables, where mine workers knocked off waste. They threw recovered ore either under the table, or through an adjacent port, where it dropped into the holding bins below. Waste rock was shoveled into an ore car parked on a small track that extended through the second floor. Each grizzly, suspended from 2x10 planks nailed to the ceiling beams, consists of a sloped screen made from salvaged mine rail. The sorting tables, at the foot of each grizzly, are 9 by 8 feet in area, 3 feet high, and armored with sheet iron. Mine workers stood on raised platforms on both sides of the tables and processed the ore. The mine rail traversing the interior consists of a variety of rails spiked 26 inches on-center. A stove stood in the northeast part of the floor, and a stairway ascends from this corner up to the top floor.

Six ore holding bins underlie the sorting floor. The bins feature chutes that project out over the main road, where mine workers loaded trucks with ore. The loading area is protected from the elements by a slanted bonnet clad with corrugated iron.

The immense size of the ore sorting house, the high quality of engineering and construction, and the six sorting stations reflect substantial ore production and capital investment. Some of the materials used in construction, such as the blow-torch cut washers, and dateable artifacts reflect use during and after the 1930s.

The Commodor No.5 site also includes a second ore sorting house which was erected during the 1930s (Feature 57). The structure is poorly engineered and was assembled with a high degree of salvaged building materials, which is typical of Depression-era mining. The ore sorting house stands on a bedrock cliff southeast of the Commodor No.5 Tunnel complex. The structure consists of an ore bin and a sorting station at the bin's toe. The bin is 18 by 12 feet in area, 12 feet high, and possesses an unusually steep sloped floor. The sorting station is 24 by 10 feet in area and is covered by a shed roof. The ore bin is supported by a post-and-girt frame standing on a timber foundation, and by diagonal braces under the bin's floor. Iron tie rods help bind the frame together. The ore bin’s foundation consists of heavy horizontal beams spanning between niches blasted out of bedrock and timber posts placed on bedrock.

The sorting station's interior features a central plank floor, a 7 by 6 foot deck over the floor, and a 10 by 6 foot extension on the south side. Mine workers opened the louvered gate in the ore bin, permitting ore to collect on the elevated deck. They sorted the ore and threw waste out through an opening in the west wall and dropped recovered ore onto the floor below. The mineworkers transferred the recovered ore into the south extension, which was 3 feet lower than the main floor.

The ore sorting house was constructed predominantly with salvaged lumber. Most of the beams feature abandoned bolt-holes and hardware associated with aerial tram towers. The high degree of salvaged materials and lack of engineering reflect unskilled labor and limited capital. Further, the structure’s location away from the principal surface plant and its small size indicates that one of the mine’s leasing outfits erected it.

For the first three decades of the Commodor No.5’s existence, the mine’s operators used mules to pull ore trains out of the underground workings. For this purpose, rail lines consisting of 20 pound rail spiked 24 inches on-center was sufficient to handle the traffic. A remnant of the original rail line exists (Feature 43) on the site’s east waste rock dump. The line used in conjunction with mules extended out of the tunnel portal, it curved southeast, and ended on the eastern waste rock dump (Feature 36). A branch curved off the main line, it crossed a high trestle (Feature 46), and entered the large ore sorting house. The Emperius Mining Company, interested in increasing production, upgraded the line to accommodate electric battery locomotives by installing 25 pound rail spiked 24 inches on-center in 1946. To recharge the locomotives’ batteries the company erected two buildings that housed generators and served as locomotive barns (Features 51 and 52). Both of the generator houses currently stand, and their interiors feature foundations and wiring for generators, locomotive recharging stations, and tracks for parking locomotives. The machinery has been removed. The artifacts associated with the buildings include mining and industrial items, and they date to the 1950s and later.

When mining operations continued into the 1970s, either Emperius or the Minerals Engineering Company effected several changes to the Tunnel No.5's surface plant. One of the companies upgraded the rail lines once again by replacing the 25 pound rail with 30 pound rail, and they built a stout trestle (Feature 35) over the Bachelor Loop Road. Either operator erected a timber dressing shed (Feature 13) near the tunnel portal to prepare mine timbers. A rail line (Feature 12) served the facility to permit miners to move heavy timbers on flatcars.

During the 1960s or 1970s one of the companies erected two prefabricated steel buildings. One served as a locomotive barn (Feature 22), and the other served as a shop (Feature 49). The complex's rail line was rerouted and expanded to provide access to the locomotive barn, to expand the western waste rock dump, and to provide access to an ore unloading area. By this time, the ore sorting house fell into disuse, and the ore unloading area (Feature 34) was constructed. Mine workers erected a log cribbing wall to retain waste rock, and they built a chute to direct ore, emptied from cars, down onto a flat area. There, front-end loaders scooped the payrock into dump trucks.

The Commodor No.5 site features a complex assemblage of waste rock dumps that reflect the succession of operations. The original Commodor operation erected a hewn log cribbing wall in the floor of West Willow Creek to retain waste rock, and it flumed the water through the dump in a buried culvert. When the wooden structures rotted, subsequent outfits either repaired or replaced them. Currently, West Willow Creek travels across the site's west waste rock dump in a wooden flume (Feature 4), and drops through a decayed cribbing structure (Feature 3) into another flume. Both structures were constructed during the 1950s or 1960s. Prior to its collapse, the decayed cribbing featured a drop chute that directed the creek onto a broad welded iron sheet, which dissipated the water's energy. Log cribbing surrounded the sheet, and it appears to have been erected within the last 50 years by either Emperius or by Minerals Engineering. A small portion of the main headwall retaining waste rock may date to the Commodor's original operation, however the mine's later operators added to and repaired the wall.

The visible portion of the Commodor site's west waste rock dump (Feature 2) has been deposited during between the 1950s and 1980s. The superimposition of the extant mine rail circuit (Feature 11) and other recent plant components reflects the dump's late deposition. One of the mine's last operators used heavy equipment to bulldoze the dump, and it used some of the waste rock to bury a modern culvert that channels West Willow Creek through the Nelson Tunnel site (5ML346). Nearly all of the artifacts scattered across Feature 2 are less than 50 years old, reflecting the late deposition.

The Commodor site's eastern waste rock dump (Feature 36) was deposited during the 1930s revival. No surface plant components pre-dating 1934 were built on the dump, and nearly all associated artifacts post-date 1940. The site's third principal dump (Feature 38) also post-dates 1934.

Del Monte Mine
Site 5ML204

The Del Monte Mine site lies approximately 1,000 feet east of the Bachelor townsite on the southeast summit of Bachelor Mountain. The site lies on flat terrain, and the area is vegetated with spruce, fir, and aspen forest interspersed with subalpine meadow. While all of the mine's structures, machinery, and equipment were removed log ago, the site retains a degree of historical integrity. Within recent years the site suffered moderate disturbance. The shaft was plugged, portions of the waste rock dump were removed, and someone used a dump truck to deposit piles of earth in the south area of the site. Due to the region’s dry climate and poor soil, revegetation of the site has proceeded only slowly. Regardless, the degree to which the mine complex has revegetated reflects early abandonment.

In terms of character, the Del Monte Mine site consists of the remains of a small shaft operation and an associated residential complex. The site retains a modest degree of historic integrity, and it features archaeological deposits. Earth moving and shaft closure activities within recent decades has impacted the site’s south portion.

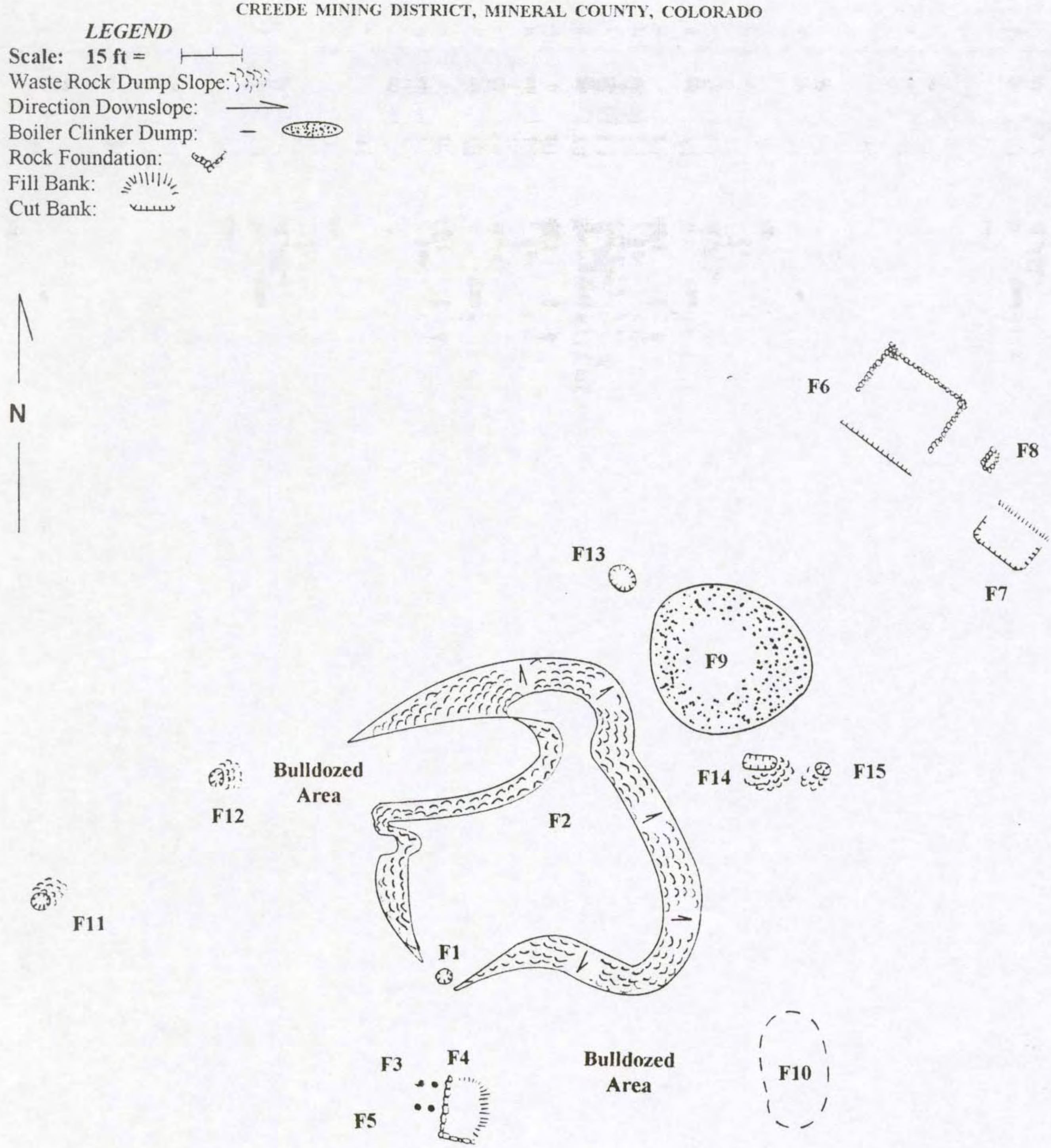
Mining Operations

The Del Monte Mine was one of the principal operations on the Creede district’s famous Amethyst Vein. Prospectors located the claim in the early 1890s and miners began sinking a shaft in search of ore. But before they were able to develop the claim to any great extent, the Silver Crash of 1893 struck, and work was suspended. Within a short time however, miners resumed exploration work, and they struck payrock. Once affirmations of the find circulated, the owners of the Last Chance and the New York mines, located north, became interested in the Del Monte property, and the various interests at first sued and counter-sued each other over apex rights. They later effected a cooperative. After the three groups quit battling and instead joined forces, miners probably accessed the Del Monte claim through either the New York or the Last Chance shafts because they featured superior surface plants, and activity at the Del Monte’s surface plant subsided.[34]

When the Nelson Tunnel penetrated the Amethyst Vein over a thousand feet below the Del Monte Mine, interest in the Del Monte’s ore bodies piqued, and activity at the claim intensified. However, it was obvious to the district’s mining men that the vein was not as rich as the surrounding properties. Around 1900 lessee C.M. Stump signed a contract to sink the Del Monte Shaft 200 feet to connect with the Nelson Tunnel. After Stump made the connection, miners accessed the Del Monte’s ore bodies through the Nelson Tunnel, and the surface plant was abandoned.[35]

[34] *EMJ* 10/28/93, p456.
[35] Colorado Historical Society, Denver, CO Colorado Bureau of Mines Manuscripts. *Creede Mines* Box 640, v24.

DEL MONTE MINE
PLAN VIEW
CREEDE MINING DISTRICT, MINERAL COUNTY, COLORADO



Like the other marginal claims on the Amethyst Vein, the Del Monte claim fell idle by the close of the 1900s due a lack of ore. In response to the high metals prices stimulated by World War I, lessees examined the old workings for low-grade ore left by previous operations. In 1916 metals prices had reached a level high enough to render the Del Monte's ore profitable, and mining resumed. The revival was short-lived, and the claim again fell idle until 1923 when Hollister & Futterer conducted exploration. Their efforts proved futile, and the Del Monte closed permanently.[36]

Today, the Del Monte Mine site consists of traces of the activity that occurred during the early 1890s. Archaeological features in the forms of foundations, cut-and-fill structure platforms, and associated artifacts characterize the site. Further, the remains represent the mine's surface plant, prospects, and a small residential complex.

The remains at the site indicate that the Del Monte Mining Company erected a conventional surface plant consisting of a combination of sinking-class and production-class components to support work in the shaft. The hoisting system featured a 4 by 6 foot steam hoist powered by a return tube boiler 4 feet in diameter and up to 14 feet long. Mine workers bolted the hoist onto a timber foundation, and they erected a stone masonry setting for the boiler (Features 4 and 5). The hoist and its foundation meet sinking-class criteria, and the boiler qualifies as a small production-class plant component.

The hoist that the Del Monte operation installed was a single drum geared steam model. A 4 by 6 foot hoist was rated at approximately 20 horsepower, and it could lift up to one ton at a speed of around 250 feet per minute. The boiler delivered up to 40 horsepower, which was more than sufficient to run the hoist. The mining operation probably used the surplus power to run a steam dewatering pump in the shaft. The use of fieldstones for the boiler setting instead of red bricks reflects an effort to save capital.[37]

The Del Monte company enclosed the machinery and the necessary blacksmith shop in a frame hoist house, which stood on a flat area (Feature 3). The western portion of the shaft house sheltered the shop, which was equipped with a free-standing pan forge and hand-powered appliances. Overall, the hoist house was probably a small and simple structure with an earthen floor.

<u>Residence</u>

The residential platforms (Features 6 and 7), located northeast of the mine's surface plant remains, supported frame structures. The larger of the two buildings was 20 by 25 feet in area, and the smaller building was 12 by 15 feet in area. The large building may have served as a bunkhouse and dining hall, and it housed a small crew of mine workers.

The artifact assemblages associated with the platforms reflect the lifestyles of the occupants, and the length of their stay. The abundance of food cans and the absence of miscellaneous domestic items is representative of single miners working at a remote

[36] *EMJ* 5/3/16, p1006.
Larsen, 1929.
[37] Twitty, Eric *Reading the Ruins* Masters Thesis, University of Colorado at Denver, 1999 p243, 256.

location. The Del Monte's miners ate a diet similar to that consumed in other nascent Western mining districts. The food cans reflect the consumption of preserved vegetables, fruits, and meat, which was probably supplemented with grain products. Many of the cans also contained milk, which miners may have used in coffee or tea. The canned food, a lack of butchered bone, and the paucity of domestic items associated with cabin platforms suggests that the mine was active at the beginning of the district's boom, before commercial services were in place, and before fresh food was widely available. Limited quantities of bottle glass indicate that the cabins' inhabitants did not openly drink much liquor or rely on medicines.

The artifact assemblage associated with the cabin platforms reflects a relatively brief occupation during the mid 1890s. Wire nails, a ratio of 4 to 3 food cans made with lapped side seams over those with inner-rolled and soldered side seams reflects a mid 1890s date.

Del Monte Mine Site Analysis

In terms of mining operations, the Del Monte Mine site encompasses the remains of a combination of temporary and production-class surface plant components. The return tube steam boiler and the hoist house qualified as production-class plan facilities, however the hoist and possibly the shop met temporary classification criteria. Overall, the remains of the surface plant reflect a modest investment of capital, an earnest attempt at developing the property, conventional engineering, and high optimism on the part of the mine's owners.

Despite the significant capital investment, the mine appears to have been unproductive in its early years. The Del Monte site does not include the remains of an ore storage facility, and the relatively small waste rock dump reflects limited underground workings. In addition, the site appears to have been abandoned after a short life. The limited number of food cans associated with the residential platforms and the site's overall light density of artifacts reflects a brief occupation. A lack of cut nails, and the greater number of cans constructed with lapped side seams over those constructed with inner-rolled and solder side seams reflects activity at the mine following the Silver Crash of 1893. The absence of sanitary cans and machine-made bottle fragments, which had become popular by around 1910, indicate that the surface plant was totally abandoned after around 1900.

Happy Thought Mine
Site 5ML202

The Happy Thought Mine site lies approximately 2,000 feet north of the Amethyst Shaft on the northeast summit of Bachelor Mountain. The site is located on gently sloping terrain, and the area is vegetated with second-growth spruce, fir, and aspen forest. While all of the mine's structures, machinery, and equipment were removed log ago, the site retains a high degree of historical integrity. Within recent years the site suffered minor disturbance when someone used a bulldozer to widen a road that passed through the complex. The site is located on a sheltered north-facing slope, which has proven conducive to reforestation. The degree to which the mine complex has become revegetated reflects early abandonment.

In terms of character, the Happy Thought Mine site consists of the remains of a large shaft operation and an associated residential complex. Archaeological features in the forms of equipment foundations, structure platforms, privy pits, and associated artifacts constitute the site. The archeological remains clearly represent the mine's surface plant and residential complex. The site includes buried cultural deposits.

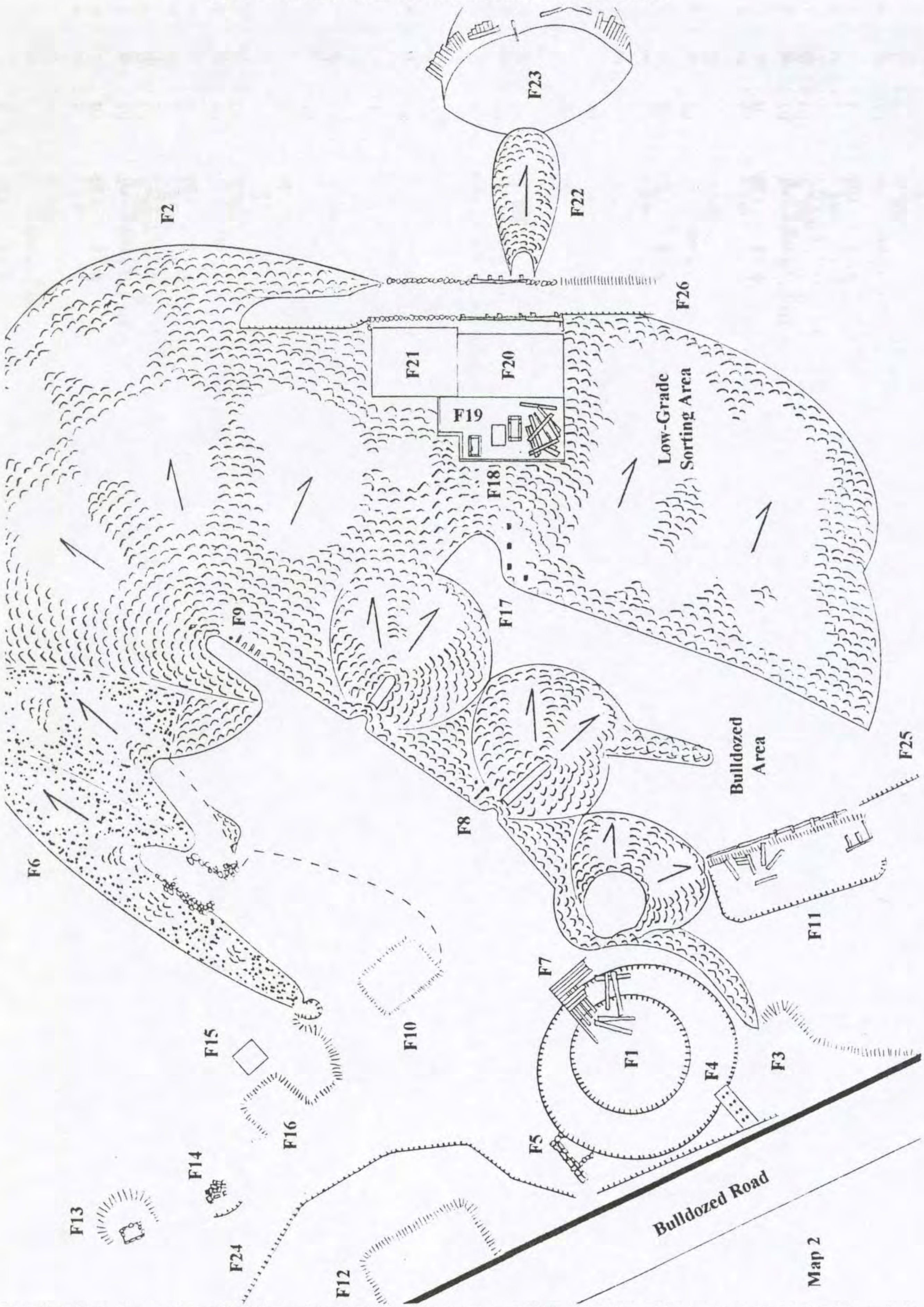
Mining Operations

The Happy Thought Mine began to take shape in late 1891 or 1892 when two prospectors named Grey and Mann sank an exploratory shaft in search of the Amethyst Vein. They located the shaft in alignment with the Amethyst and Last Chance operations, which were known to hold great promise. The prospectors encountered a promising lead, and within a year they had sunk a shaft 120 feet deep. The surface plant erected by the prospectors included a small shaft house, which probably enclosed a simple blacksmith shop, and a small bunk house. Grey and Mann sold the property to George C. Dewey and Major Norton, who commenced a race against adjacent claim holders to strike the vein and gain apex rights. Tensions ran so high that both parties geared up for an armed conflict. Bullets and blows were never exchanged, however, probably because the Silver Crash of 1893 brought underground exploration to halt at the claims, as it did at nearly all of the district's other mines.[38]

In the wake of hard financial times precipitated by the Silver Crash, David H. Moffat purchased the property under the corporate umbrella of his company United Mines. The outfit also included investors W.B. Felker, Byron Shear, and W.H. Bryant. United Mines installed a substantial surface plant to facilitate work underground, and by February, 1894 miners had sank the shaft to a depth of 300 feet.[39]

[38] *EMJ* 11/6/92 p517; *EMJ* 12/17/92 p590; *EMJ* 11/6/92 p12/31/92 p637.
[39] *EMJ* 1/6/94 p14; *EMJ* 2/17/94 p158.

HAPPY THOUGHT MINE
PLAN VIEW: MAP 1: NORTH
CREEDE MINING DISTRICT, MINERAL COUNTY, COLORADO



HAPPY THOUGHT MINE
PLAN VIEW: MAP 2: SOUTH
CREEDE MINING DISTRICT, MINERAL COUNTY, COLORADO

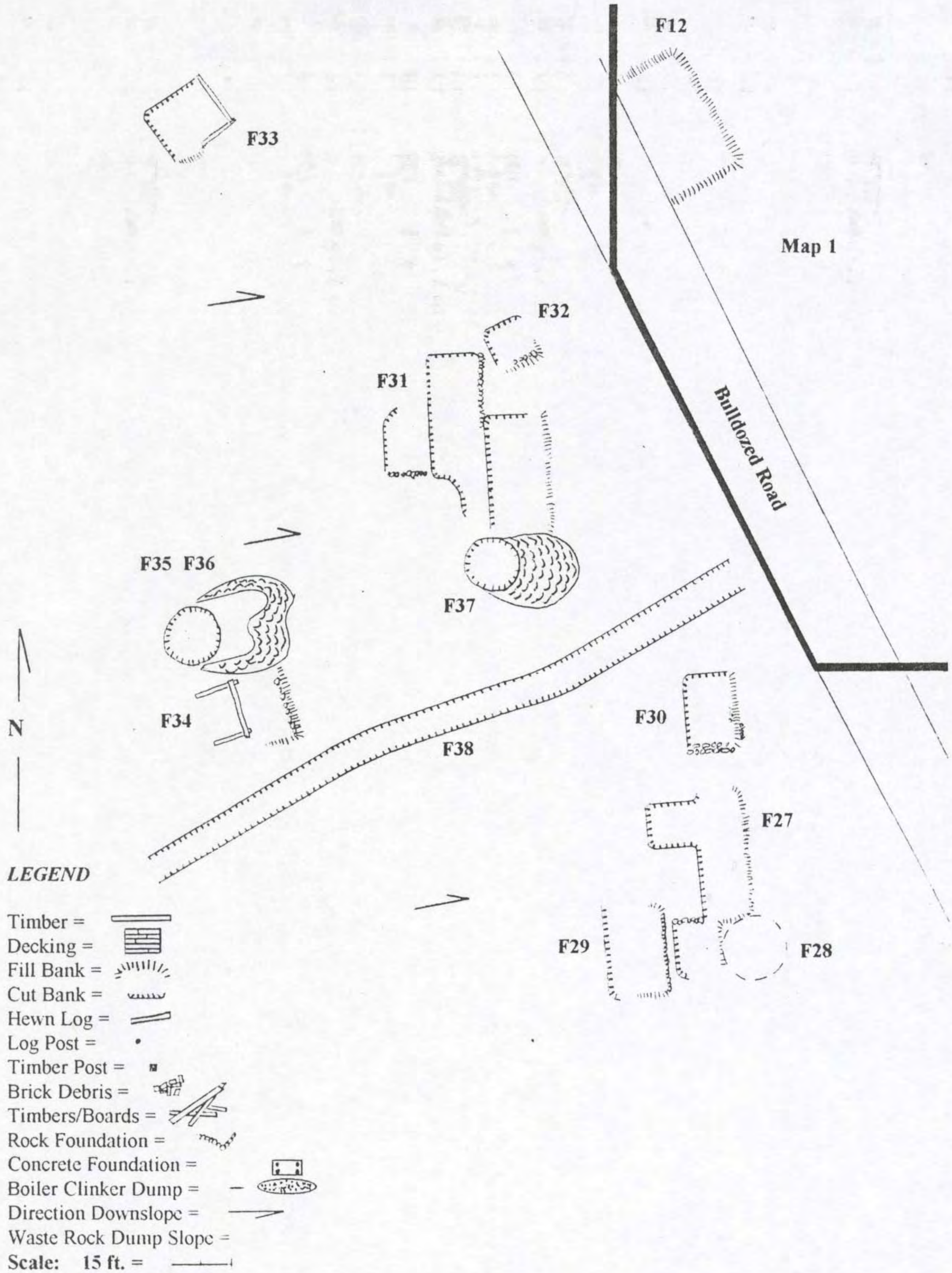
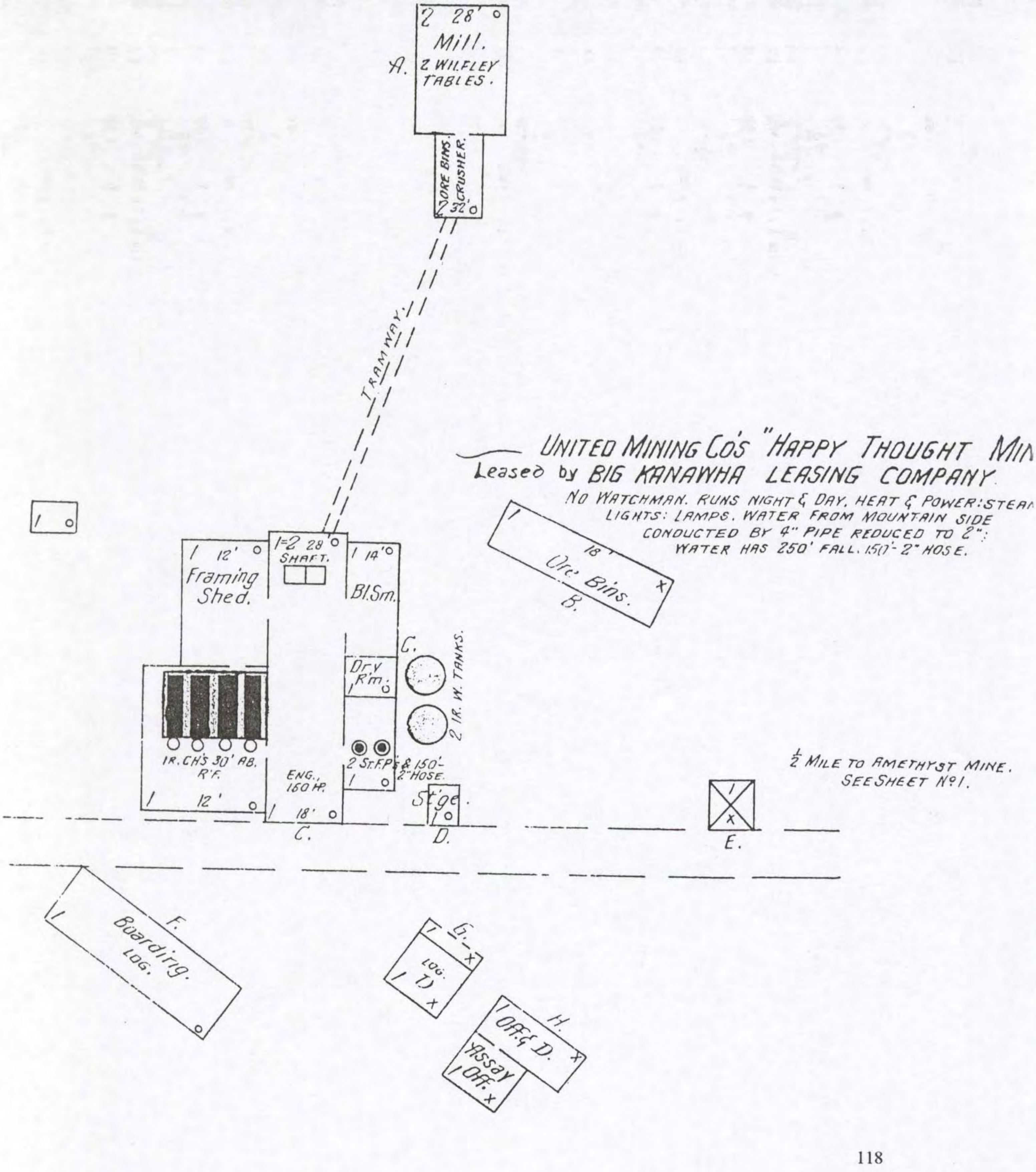


Figure 7.34 Sanborn's 1904 map of the Happy Thought's surface plant. The plan view is to scale with the archaeological map.



The mine came into fruition during the late 1890s. Miners had developed a substantial network of underground workings and they encountered substantial ore reserves. The rich ore on the Amethyst Vein encouraged superintendent F.E. Wheeler, employed by United Mines, to fully develop the property. By 1900 miners sank the shaft to a depth of 1,250 feet, and had driven drifts every 100 feet. The shaft was inclined along the dip of the Amethyst vein, which was 55 degrees. The shaft's depth may have been achieved in forecast of contact with the Humphreys Tunnel, which reached the Happy Thought in 1901.[40]

According to the material evidence at the site, United Mines installed a large production-class surface plant. In terms of a hoisting system, the outfit installed a single drum geared steam hoist to raise a vehicle in a two-compartment shaft. Traces of the hoist foundation are visible at the site. However, the shaft collar collapsed, leaving an enormous area of subsidence, which ruined the integrity of the hoist foundation. Determination of the size and nature of the hoist is difficult. Sanborn's 1904 map indicates that the hoist was rated at 160 horsepower. Such a machine was probably 10 by 10 feet in area and could lift around 4 tons at a speed of 550 feet per minute.[41]

The Happy Thought's owners invested capital constructing a compressed air system to power rockdrills. Miners used the rockdrills underground to bore blast-holes, which expedited the blasting process and increased production. The mining company installed a 4 by 15 foot single-stage straight-line compressor beside the hoist. A compressor of this size produced 550 cubic feet of air per minute which had the capability to power up to 6 piston drills. They bolted the machine to a timber and concrete foundation (Feature 4).[42]

Like similar conventional Gilded Age operations, the Happy Thought mine required an enormous head of steam to power the hoist and compressor, as well as pumps, small utility engines, and to provide steam heat. According to calculation, the mine's steam needs totaled at least 275 horsepower. The compressor required 115 boiler-horsepower, and the hoist required probably around 150 horsepower. In response the mine's engineer had workers erect a set of four return tube boilers. The boilers have been removed, however the setting was 18 feet long, suggesting that boilers were each approximately 5 feet in diameter and 16 feet long. Each unit delivered up to 80 horsepower, totaling 320, which was sufficient to power the compressor and the hoist. The mining company probably dedicated the surplus steam to power a dewatering pump in the shaft, and a small utility engine.[43]

The artifact assemblage associated with the shaft house platform (Feature 3) includes items reflecting the use of these two types of machines. Specifically, pump hoses reflect the use of a steam dewatering pump. Mining companies occasionally relied on small upright utility engines to power overhead drive shafts featuring large pulleys. Canvas belts passed around the pulleys and transferred power to mechanical

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[40] Colorado Historical Society Records, MSS Box 640, v24:64.
EMJ 6/23/00 p748.
Emmons, William H and Esper, Larsen S. *USGS Bulletin 718: Geology and Ore Deposits of the Creede District, Colorado* U.S. Geological Survey, U.S. Government Printing Office, Washington, DC 1923, p163.

[41] Twitty, Eric *Reading the Ruins* Masters Thesis, University of Colorado at Denver, 1999 p243.

[42] Twitty, Eric *Reading the Ruins* Masters Thesis, University of Colorado at Denver, 1999 p111.

[43] Twitty, Eric *Reading the Ruins* Masters Thesis, University of Colorado at Denver, 1999 p256.

metalworking and woodworking shop appliances. Canvas belt fragments, shaft bearings, and a drive pulley remain from this system.

United Mines enclosed the machinery and other surface plant components in a massive wooden shaft house which stood on a cut-and-fill platform. The structure also enclosed the mine's blacksmith shop. The collapse of the shaft collar impacted the area where the shop was located, yet associated artifacts reflect the shop's makeup. Shop-related artifacts lay primarily along the shaft house platform's south edge, and additional items were scattered across Feature 11, which was an ore bin foundation. An overhead drive shaft bearing, cut pipe scraps, machine set-screws and other parts mixed in with the assemblage indicates that United Mines equipped its shop with power appliances driven by canvas belts. The appliances probably had basic metal-working capabilities. Shop workers used the facility to carry out the repair of heavy machines, which the presence of a broken air compressor piston ring and gaskets reflect.

The surface plant erected by United Mines included a well-equipped carpentry shop. The shop stood on a platform that currently manifests as a raised pad of rock, 12 by 18 feet in area, studded with timber foundation pilings. The foundation was intended to bear great weight, and it may have supported power carpentry appliances. The shop may have been dismantled prior to 1904, because it was not included on Sanborn's 1904 map. Sanborn's map indicates that the shaft house enclosed the shop.

United Mine's surface plant included structures in addition to the shaft house, and they are represented by the extant remains at the site. The Sanborn's map depicts ore bins south of the shaft, which is confirmed by an existing platform (Feature 11). The platform's size indicates that the ore storage structure featured at least two bins. The map also documented a small building northeast from the shaft, which may correspond to a cut-and-fill platform (Feature 16). The mine site features additional components not documented by Sanborn, such another building platform, a privy, and a dugout log cabin (Features 12, 13, and 15). The waste rock dump features vestiges of the mine rail line that workers used to move materials around the plant. Features 8 and 9 are trestle pilings that supported rail lines used for dumping waste rock.

Well-graded roads, made with cut-and-fill construction, provided wagon access to all of the principal portions of the mine. Features 24, 25, and 26 permitted wagons to pull up to the shaft house, the ore bins, and the mill, respectively. The extant road that passes between the mine's surface plant and the residential complex is historic in nature, being depicted on the 1904 Sanborn's map. The road served as a main thoroughfare, linking the principal mines on the Amethyst Vein's north portion.

By 1902 the Big Kanawha Leasing Company leased the Happy Thought from United Mines, and assumed control of an extremely well-equipped production-class surface plant capable of supporting deep operations. Anticipating heavy ore production, the new mining outfit erected an ore reduction mill immediately north of the main surface plant. The mill's purpose was not to produce refined silver bullion. Rather, Big Kanawha erected the mill to remove waste rock and concentrate the ore brought out of the mine. In so doing, the outfit hoped to save costs associated with shipping waste-laden ore to smelters east, and to save a portion of the fees that smelting companies levied for processing ore. Big Kanawha's investment proved to be a wise one.

Currently, the Happy Thought site includes the remains of Big Kanawha's ore reduction mill. The mill complex consists of a series of three low terraces that supported the mill, pilings from the ore input trestle, and a tailings dump. Structural debris and building remains stand on the mill terrace, and industrial artifacts are scattered about.

Like other mills erected at mines, the Happy Thought mill concentrated ore by separating metalliferous material from waste rock. The concentration process began when miners pushed ore-laden cars from the shaft across a high trestle to the mill's ore receiving bin. A mill worker fed the raw ore from the receiving bin into a rock crusher, and the fractured material proceeded to sets of Cornish rolls below. The crusher mount towers over the mill complex's first terrace. The mount consists of a 6x6 timber frame 2½ by 4 feet in area and 17 feet high, crowned by a heavy block 4 feet high. A jaw crusher was bolted to the top of the mount, its flywheels flanked the mount's sides, and crushed rock slid down through a slot, approximately 1 by 3 feet in area, through the mount's center. Circular scars left by the crusher's spinning flywheels are visible on the mount's sides. Construction workers assembled the block by laminating a latticework of 2x10 planks.

The Happy Thought Mill featured 2 sets of Cornish rolls, which reduced the ore to a slurry with the consistency of sand. The rolls were anchored to foundations located on grinding platform (Feature 19), which constitutes the mill complex's upper-most terrace. The platform features two machine foundations that probably anchored grinding apparatuses. Each foundation consists of a heavy 12x12 timber frame bolted to 12x12 timber posts. The northern-most foundation is 2½ by 9 feet in area and 5 feet high, and it featured eight 1 inch anchor bolts. The southern-most foundation is 3½ by 7 feet in area and 2 feet high, and it features eight 1 inch anchor bolts. Rock reduced by the northern grinder probably passed via gravity through a classification screen to the other machine.

Once pulverized to a slurry, the rock proceeded through screens to the recovery floor, where two Wilfley tables separated the metalliferous fines from the gangue. Oversized particles returned to the rolls. Because the tables were light and not in need of heavy foundations, they left little direct evidence. As with the grinding floor, the slurry sent to the recovery platform passed through classification trommel screens. Some of the tubular screens remain. Material too big for the screens returned to the grinders via a bucket line. The platform (Feature 20), floored with plank decking and enclosed by part of the mill building, is coated with a veneer of pulverized rock.

The Happy Thought mill included an engine floor, which is currently represented by a debris-covered platform (Feature 21). There, an electric motor or an upright steam engine turned an overhead drive shaft via canvas belting. The shaft powered the mill's appliances via additional belts. The engine floor also housed additional concentration machinery and appliances that separated metalliferous fines from gangue. Because the mill's appliances have been removed, the specific concentration process cannot be determined. Lack of a masonry boiler setting remnant indicates that the engine was powered by steam piped from the mine.

After the mill's appliances had separated metalliferous fines from the gangue, mill workers discharged the worthless material into a pipe which emptied onto a tailings dump west and downslope (Feature 23). The dump consists of sand retained by a low plank dam, which currently is collapsed.

During the late 1890s, the Happy Thought's mine workings became a link in a complex network of drifts on the Amethyst Vein. Miners linked the workings of the Happy Thought to the White Star Mine located northwest, to the Amethyst Mine located southeast, and to the Humphreys Tunnel which passed through the claim deep below. The underground connections proved to be of immense benefit because they permitted natural air currents to flush foul gases from much of the workings. Regardless, gas in the Happy Thought was so bad that miners reported that when the wind blew from the south, some of the workings became inaccessible until the weather changed. The underground links also became an escape route in the event of disaster, as 35 miners experienced in 1913. A fire in the Humphreys Tunnel blocked their escape, and volunteer miners working from the Park Regent's ground cleared the old drifts to facilitate the Happy Thought miners' escape.[44]

Disaster befell the Happy Thought Mine in 1907. The surface plant caught fire and burned to the ground. All but the mill and a dugout cabin escaped the flames. Worse, the fire crept down the shaft timbering and permanently wrecked the support system, facilitating the shaft's collapse. Afterward, the surface plant and upper mine workings were abandoned, and miners only worked from the 700 level to the 1200 level, which they accessed through the Humphreys Tunnel. Currently, the remains of timber structures and wood debris around the shaft house platform exhibit signs of the fire. The hoist foundation and decking on the shaft's north edge (Feature 7) are charred.[45]

Miners worked the Happy Thought ground continuously into World War I. Most of Creede's other mines stood idle from the late 1900s until around 1916. In 1915 the Mineral County Mining & Milling Company leased the ground from the Creede Mining & Milling Company, which has assumed ownership of the property. Mineral County extracted ore in light of the demand for industrial metals stimulated by World War I. Mining ceased with the exhaustion of economic ore in 1917, and work on the claim was suspended. After producing $3,000,000 in silver, lead, and gold, the sun had set on the Happy Thought mine.[46]

Local mining interests held out hope for the existence of more ore under the Happy Thought property, despite the mine's apparent exhaustion. During the 1920s, probably following the brief rise in the price of silver in 1923, R.J. Murray leased the Happy Thought ground in a search for ore. In 1928 the Spam Leasing Company, under the charge of Clyde Sprague, thought that it had encountered sufficient ore to warrant reopening the Happy Thought ground. The outfit began rehabilitating the Humphreys Tunnel to facilitate access to the workings, and afterward, the outfit extracted ore. The Spam Leasing Company's miners must have discovered high-grade ore, because they continued operations after the Crash of 1929. To their advantage, the miners operated on a very low budget. They drilled by hand and trammed ore in mule-drawn trains. In 1931,

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[44] Colorado Historical Society Records, MSS Box 640, v24:64.
EMJ 1/14/13 p42.

[45] Emmons, William H and Esper, Larsen S. *USGS Bulletin 718: Geology and Ore Deposits of the Creede District, Colorado* U.S. Geological Survey, U.S. Government Printing Office, Washington, DC 1923, p164.

[46] Colorado State Mine Inspectors' Reports, Box 104053, Happy Thought Colorado State Archives, Denver, CO.
Emmons, William H and Esper, Larsen S. *USGS Bulletin 718: Geology and Ore Deposits of the Creede District, Colorado* U.S. Geological Survey, U.S. Government Printing Office, Washington, DC 1923, p164.
Steven, Thomas A. and Ratte, James C. *USGS Professional Paper 487: Geology and Structural Control of Ore Deposition in the Creede District, San Juan Mountains, Colorado* U.S. Geological Survey, Government Printing Office, Washington, DC 1965 p11.

at the depths of the Great Depression, the Spam Leasing Company suspended operations, and the Happy Thought's stopes were never reopened.[47]

The artifact assemblage the types of the facilities associated with the mine's surface plant and the mill reflect an operating timeframe concurrent with archival information. Most of the dateable artifacts indicate abandonment prior to 1920. Further, hole-in-cap cans and 3/8 inch thick dynamite box panels reflect that the principal period of activity occurred prior to 1910.

Residence

Because the Happy Thought Mine lay far from the Creede district's principal settlements, the mining company erected boarding houses and a dining hall for the mine crew. The complex consisted of five buildings on cut-and-fill platforms that workers graded in a wooded area southwest of the mine. Because the area received much snow in winter, mine workers excavated a water diversion ditch (Feature 38) through the complex.

Currently, only the platforms and artifacts represent the residential complex, but the material evidence reflects the nature and the functions of each structure. Three frame cabins, all less than 18 by 25 feet in area, stood on cut-and-fill platforms amid the complex (Features 30, 33, and 34). The 1904 Sanborn's map only depicts the structures that stood on Features 30 and 33. The third cabin may have been dismantled by that time. The southern two cabins probably served as bunkhouses, and the residents ate their meals in the mining company's dining hall, as indicated by a lack of food-related artifacts. On the other hand, the occupants of the northern-most cabin prepared and consumed some food there. The cabin may have been one of the first residential structures erected at the mine, and the deposition of the domestic refuse may have occurred before United Mines erected the dining hall.

The complex's largest and center-most platform (Feature 31) supported a frame bunkhouse and dining hall. The domestic refuse associated with the platform, which consists mostly of food cans, is concurrent with the building's use as a bunkhouse and dining hall. The great number of cans, including vessels which contained institutional quantities of food, indicate that the mine crew ate communal meals prepared at one time. Most of the associated artifacts lie downslope.

The complex's southern two platforms (Features 27 and 29) supported an office and assay shop, which is reflected by the high number of assay-related artifacts, and the associated coke dump (Feature 28). While field analysis is inconclusive, the 1904 Sanborn's map depicts the assay shop as standing on the western-most of the two platforms, and the office as standing on the eastern-most platform. Both buildings were of frame construction, and the assay shop was approximately 15 by 22 feet in area, and the office was 18 by 36 feet. Charred lumber and melted glass indicates that the residential buildings burned along with the mine's surface plant.

[47] Colorado State Mine Inspectors' Reports, Box 104053, Happy Thought Colorado State Archives, Denver, CO.
Larsen, E.S. "Recent Mining Developments in the Creede District: *USGS Bulletin 811: Contributions to Economic Geology* U.S. Geological Survey, U.S. Government Printing Office, Washington, DC 1929.

The complex's residents disposed of their wastes in the fashion common to the time. They threw solid wastes and trash behind buildings, and they erected privies for personal use. Domestic refuse was recorded with each platform. The complex included two prospect shafts (Features 35 and 37) which were probably used for privies and trash dumps after they were abandoned. The complex conspicuously lacks the quantity of domestic refuse expected to have been deposited over the mine's protracted operating period, because the residents probably threw it down the shafts.

The artifact assemblages associated with the platforms reflect the lifestyle of the occupants. The abundance of food cans and the absence of miscellaneous and decorative domestic items is representative of single miners working at a remote location. During both of the mine's occupations, the Happy Thought's miners ate a diet similar to that consumed in other Western mining districts. The abundance of food cans reflects the consumption of prepared vegetables, fruits, and meat, which they probably supplemented with grain products, salt pork, and bacon. Butchered bones scattered amid the complex, and concentrated around the eastern-most prospect shaft, indicate that the miners ate fresh food, when available. Small quantities of bottle glass indicate that the mine's inhabitants did not openly drink much liquor or rely on medicines. Many cans contained milk, which mine workers may have used in coffee or tea.

The artifact assemblage associated with the residential complex reflects an occupation between the mid 1890s and the early 1900s. Wire nails used to construct the cabins, the heavy predominance of food cans made with inner rolled and soldered side seams over those made with lapped side seams, and the double vent hole milk cans reflect this time period.

Happy Thought Mine Site Analysis

In terms of mining operations, the Happy Thought Mine reflects a major investment of capital, successful development of the property, and conventional Gilded Age steam engineering. The mining company equipped the mine with a substantial production-class surface plant designed to maximize production while saving operating costs over a prolonged period of time. The enormous clinker dump (Feature 6) reflects a prolonged and sustained use of steam power. The large waste rock dump indicates that miners developed extensive underground workings in pursuit of the ore body.

The erection of a small ore reduction mill reflects an effort at saving the transportation and treatment costs levied by freighting and smelting companies by removing waste and concentrating the metals content. The mill features a relatively modest-sized tailings dump, indicating that the mining operation processed a significant quantity of payrock.

The site's overall high density of durable industrial artifacts mirrors both a reliance on mechanization, and operations carried out over a prolonged period. The nature of the surface plant components and the dateable items in the artifact assemblage reflect an occupation from the mid 1890s until around 1905. A few sanitary food cans suggests a brief occupation of the site afterward.

In terms of residence, the site includes platforms and artifacts left from a small residential complex that included private cabins, a bunkhouse, privies, an administrative office, and an assay shop. The complex appears to have been inhabited by a crew of single miners who were fed a typical and unembellished Victorian diet. The miners ate en masse, and most shared the accommodations of the large bunkhouse. The artifact assemblage includes a set of hole-in-cap food cans predominated by types assembled with inner-rolled side seams over those assembled with lapped side seams. The cans suggest the residential complex saw the greatest inhabitation during the late 1890s and early 1900s. All of the dateable bottle fragments were from hand-finished vessels to the exclusion of machine-made types. Few artifacts post-date the 1910s. The timeframes for mining operations and residence are concurrent.

Last Chance Mine
Site 5ML345

The Last Chance Mine was one of the Creede district's earliest and richest ore producers. The mine site lies approximately 500 feet south of the Amethyst Shaft on the east flank of Bachelor Mountain. The site is located on steep terrain, and the area is vegetated with spruce, fir, and aspen forest. Within recent years the site suffered disturbance when someone used a bulldozer to widen a road that passes through the complex. In decades past, mining operations removed nearly all of the Last Chance Mine's waste rock for processing.

In terms of character, the Last Chance Mine site consists of the remains of a large shaft operation and an associated residential complex. The site retains a high degree of historical integrity, and it features structure remnants, a building, machine foundations, building platforms, privy pits, and associated artifacts. The privy pits contain intact buried cultural deposits.

Mining Operations

In 1891, shortly after word of discoveries in the Creede district began circulating, a party of prospectors including Theodore Renniger, Ralph Granger, Julius Haas, and Eric Von Buddenbock, subsisting on a $25 grubstake, set up a base camp and began a search for wealth. The party encountered samples of float along the banks of West Willow Creek and followed the lead upslope. Unsure of what they had found, the prospectors asked the experienced prospector Nicholas C. Creede, who located the district's first significant find, to examine their strike and pass judgement. Creede immediately recognized the richness of the ore and urged the prospectors to stake claims, which they did under the name Last Chance. Inspired by the party's find, Creede calculated the orientation of the ore body, traveled a short distance north, and staked the Amethyst claim. The Last Chance and Amethyst mines became the district's wealthiest operations.[48]

Understanding that they were not able to work the claim by themselves, Renniger and his party sought investors. Eager to make a profit, Julius Haas sold his share in the claim to the other three prospectors for $10,000. Renniger and Von Buddenbock sold their shares to investors Jacob Sanders and S.Z. Dixon for $50,000 each. The last of the Renniger party, Ralph Granger, refused to completely sell out, even when offered $100,000. Granger, Dixon, and Sanders interested Willard Ward and silver magnate Henry O. Wolcott in the property, and the men formed the Last Chance Mining Company.

The new outfit wasted no time in installing a surface plant and commencing mining, and by the end of 1892 it shipped approximately $1,600,000 of ore. At that time, the company employed 70 workers under the charge of superintendent E.H. Crawford.[49]

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[48] *EMJ* 8/2/90 p133.
Francis, J. *Creede Mining Camp* Press of the Colorado Catholic, Denver, CO, 1892, p7.
Mumey, Nolie *Creede: The History of a Colorado Silver Mining Town* Artcraft Press, Denver, CO 1949, p20, 38.
MacMechen, Thomas E. "The Ore Deposits of Creede, Colo." *Engineering and Mining Journal* March 12, 1892 p301.
[49] *EMJ* 2/13/92 p212.

The Silver Crash of 1893 brought mining at the Last Chance to a halt, as it did at nearly all of the district's other mines. Operations resumed within the following two years, but by 1896 the mine fell idle again. Part of the reason may lie with litigation between the Last Chance and adjacent mining companies. Surveyors discovered that in the frenzy of staking claims on the Amethyst Vein, a prospecting outfit to the south overlapped its claim, the Del Monte, with the Last Chance, and a second outfit southeast overlapped its claim, the New York. In the tradition of western mining, all of the mining companies spent considerable sums of money suing, counter-suing, and extracting as much ore as possible in the event they should lose their right to the vein. The three property owners, tired of seeing their profits go to lawyers, attempted to cooperate, rather than fight. They made their combined effort formal in 1902, when leading officers from the three companies, including Henry R. and Edward O. Wolcott, Ralph Grainger, W.P. Ward, and Jacob F. Sanders formed the Del Monte Leasing Company, which operated the three claims as a contiguous unit.[50]

Operations at the Last Chance resumed in 1898, and the company hired a crew of 50 workers. The miners continued to extract rich ore, however the depth at which they were working rendered the cost of operations very high. When the Wooster Tunnel Company put forth its proposal to extend the Nelson Tunnel to the Last Chance workings, the mine's owners immediately subscribed. Miners made the final connection between the Wooster Tunnel and the Last Chance Shaft in the late 1890s.

Establishing the connection proved to be a dangerous and difficult undertaking. During inoperative times, the Last Chance company had allowed the lower levels of the shaft to fill with water and mud, which threatened to completely inundate the miners driving the Wooster Tunnel, should they blunder directly into the shaft. Instead, one of Wooster's engineers by the name of Mr. Rowley elected to follow a precautious course. He instructed his miners to drive the tunnel along the Amethyst Vein and halt in the vicinity of the Last Chance shaft. Then, Rowley had the Sullivan Drill Company dispatch a team of expert drillers to use a set of long-hole diamond drills, which was a new technology during the late 1890s, to bore holes from the Wooster Tunnel into the Last Chance Shaft's sump. The holes would serve as drains, permitting a controlled release of water. When the drilling crews completed the holes, the water did not flow as anticipated because the shaft's sump was heavily silted, which interfered with drainage. Seized by a stroke of creativity, Rowley solved the problem by packing 50 pounds of dynamite into an iron tube which he shoved through one of the long-holes into the shaft's muddy sump. He detonated the charge, and it cleared the mud away from the hole, which permitted the water to pour out.[51]

Emmons, William H and Esper, Larsen S. *USGS Bulletin 718: Geology and Ore Deposits of the Creede District, Colorado* U.S. Geological Survey, U.S. Government Printing Office, Washington, DC 1923, p4.

[50] Colorado Historical Society Records, MSS Box 640, v24:64.

Emmons, William H and Esper, Larsen S. *USGS Bulletin 718: Geology and Ore Deposits of the Creede District, Colorado* U.S. Geological Survey, U.S. Government Printing Office, Washington, DC 1923, p152.

[51] Colorado Historical Society Records, MSS Box 640, v24:64.

Figure 7.35 View south of the Last Chance Mine during the winter of 1893. The shaft house is the prominent building at right, and the blacksmith shop stands in front. The covered trestle supported the track for dumping waste rock. Today, the shaft house is represented by Feature 3, and Feature 14, a platform, denotes where the shop stood. The small frame building standing between the shop and shaft house manifests today as Feature 12. The trestle visible in the photo stands over the mine's ore sorting house. Foundations for the sorting house, remain today, and they manifest as Feature 11. Courtesy of Colorado Historical Society (F-24096 S0025675).

LAST CHANCE MINE
PLAN VIEW
CREEDE MINING DISTRICT, MINERAL COUNTY, COLORADO

LEGEND

Scale: 15 ft =
Waste Rock Dump Slope:
Direction Downslope:
Boiler Clinker Dump:
Concrete Foundation:
Mine Rail Line:
Timbers/Boards:
Timber Post:
Brick Debris:
Hewn Log:
Fill Bank:
Cut Bank:
Decking:
Timber:

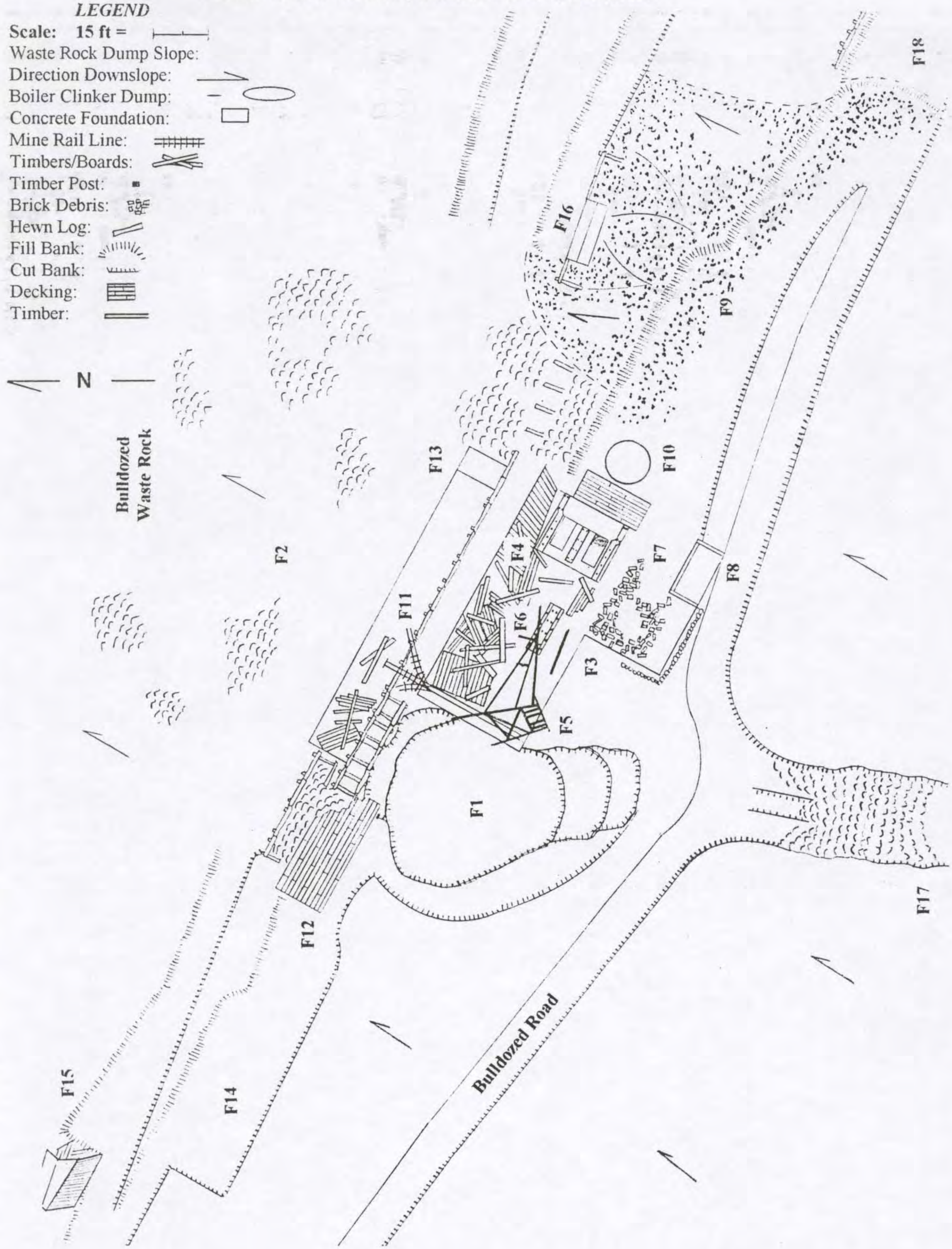
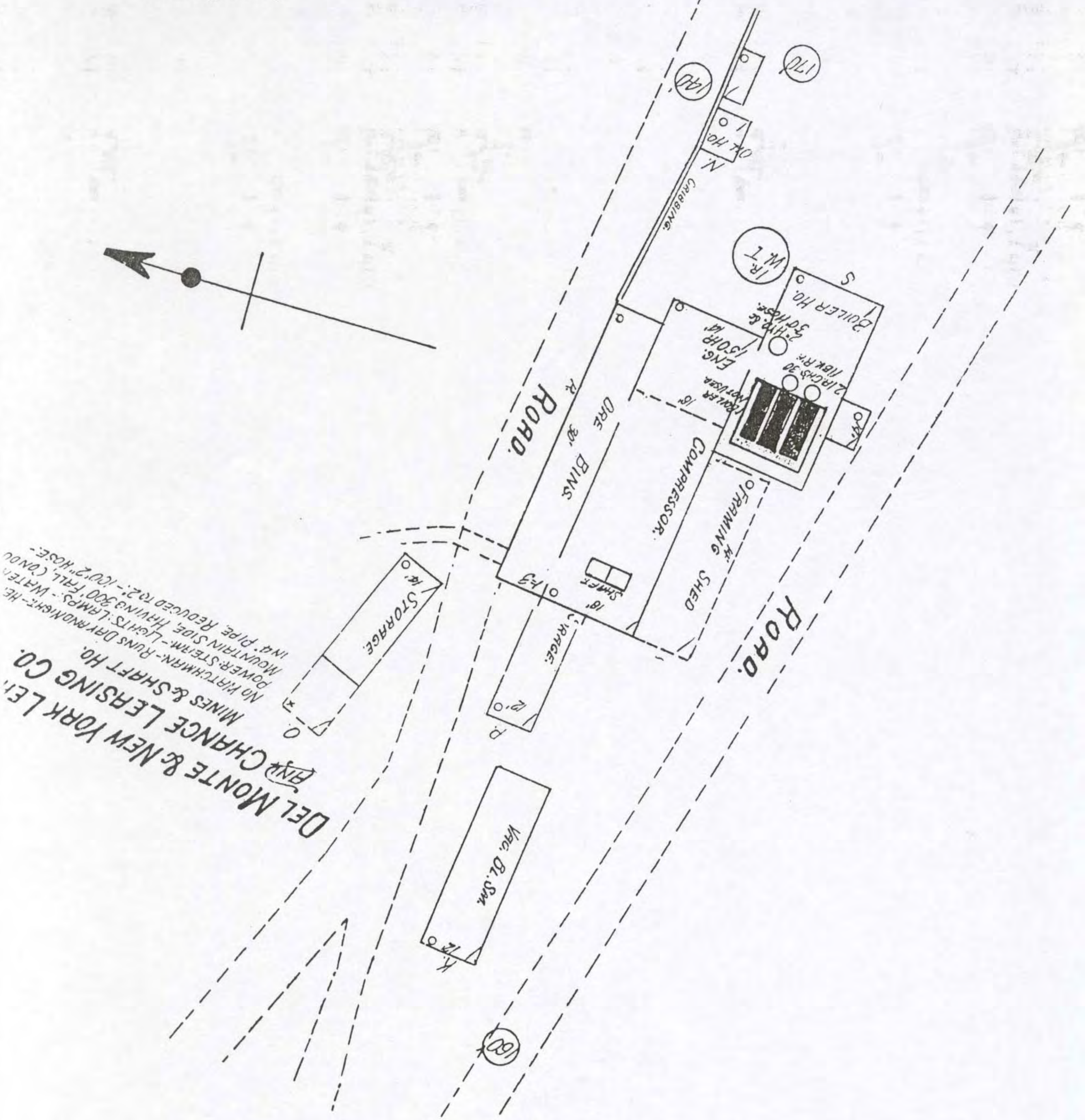


Figure 7.37 Sanborn's 1910 map of the Last Chance surface plant. The plan view is to scale with the archaeological map.



By the 1900s the mine had become one of the biggest and richest operations in the district. Miners had developed a substantial network of underground workings and they encountered extensive ore reserves. Unlike many of the other mines on the Amethyst Vein, the Last Chance company continued to use its shaft and surface plant after the completion of the Wooster Tunnel. The connection between the two workings permitted the mining company to apply an unconventional hoisting practice. According to convention, nearly all Western shaft mines relied on a hoisting system to raise waste rock and ore out of the shaft. Because most mines relied on the shaft as the principal entry underground, such a practice, while necessary, consumed much time, power, and fuel. The Last Chance operation, however, used its hoisting system to lower ore from the upper workings down to ore bins at the Wooster Tunnel level. The hoist merely had to do the work of lifting minor loads up the shaft, and slow the ore's descent, which saved considerable operating costs.[52]

The relationship between the Last Chance Mining Company as the property owner and the Del Monte Leasing Company as the operator continued into the 1910s. Like the other mines along the Amethyst Vein, the ore in the Last Chance stopes began showing signs of exhaustion, and by 1916 Del Monte decided to scale back its operations. By 1916 only 10 miners were at work, and they drilled and blasted 400 tons of payrock per month. After the end of World War I spelled a slump in the price of metals, the lessees scaled back production further. By 1919 Del Monte ceased work, and only a few independent lessees were shipping 80 tons of ore per month.[53]

The mine had fallen idle in 1921, and lessees Morgan & Sloan took an interest in the property in 1923. The surface plant and some of the mine workings decayed to an irreparable state. Without regular maintenance such as the replacement of rotten timbers, the stopes located in heavy ground collapsed. Morgan & Sloan invested some capital rehabilitating the mine, and the outfit even conducted exploration for new ore veins. The outfit's miners managed to turn a profit picking through the ore left by previous operations, and during exploration they encountered a few rich stringers that paralleled the once-mighty Amethyst Vein. When Morgan & Sloan assumed the lease on the mine in the 1920s, the Last Chance surface plant had long-since fallen into disuse, and the outfit's miners accessed the workings through the Nelson Tunnel. Morgan & Sloan's operations continued in this way through the 1920s, until the collapse of metals prices in the wake of the Great Depression forced the outfit to suspend operations.[54]

The company's lessees knew that that the Amethyst Vein and the discoveries made during the 1920s still held substantial quantities of ore, and when President Franklin Delano Roosevelt reinstituted price supports for silver in 1934, they reopened the mine. By this time the mining outfit's name changed to Sloan & Company, and the Last Chance Mining Company still owned the property. Sloan & Company had abandoned use of the badly decayed Nelson Tunnel in favor of the Last Chance Tunnel

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[52] Colorado State Mine Inspectors' Reports, Box 104053, Last Chance Colorado State Archives, Denver, CO.

[53] Colorado State Mine Inspectors' Reports, Box 104053, Last Chance Colorado State Archives, Denver, CO.

[54] Colorado State Mine Inspectors' Reports, Box 104053, Last Chance Colorado State Archives, Denver, CO.
Emmons, William H and Esper, Larsen S. *USGS Bulletin 718: Geology and Ore Deposits of the Creede District, Colorado* U.S. Geological Survey, U.S. Government Printing Office, Washington, DC 1923, p152.
Larsen, E.S. "Recent Mining Developments in the Creede District: *USGS Bulletin 811: Contributions to Economic Geology* U.S. Geological Survey, U.S. Government Printing Office, Washington, DC 1929.

No.2, which accessed the mine's upper workings. Tunnel No.2, used periodically since the district's boom-era, pierced the ground between the Last Chance and the Amethyst shafts.

In 1935 the Emperius Mining Company purchased the property as part of its game of monopoly with the Amethyst Vein's best producers, and it spent considerable capital rehabilitating crucial portions of the mine. Emperius' miners continued to work the property principally through the Last Chance Tunnel No.2 until 1937, when miners made connections to the Amethyst Tunnel. The shift in access to the underground workings spelled the end of significant activity on the Last Chance property's surface, although miners continued to extract ore through the Amethyst Tunnel for years afterward.[55]

A rich legacy of material remains are left from the Last Chance Mine, and they constitute one of the most intact sites in the district. Archaeological features in the forms of equipment foundations, collapsed buildings, structure platforms, privy pits, and associated artifacts characterize the site, and they clearly represent the property's history.

According to the material evidence at the site, in 1892 the Last Chance company constructed the largest, most advanced production-class surface plant in the Creede district. In terms of a hoisting system, the outfit installed a massive double drum direct-drive steam hoist to raise and lower two skips in a three compartment shaft, and it erected a two-post gallows headframe over the shaft. Currently, the hoist foundation and the headframe remain. The shaft, however, retains no integrity. The support timbering rotted and the collar collapsed, leaving an enormous area of subsidence.

Mine workers bolted the multi-component hoist to a masonry foundation (Feature 4), which is 20 by 18 feet in area. Such a hoist had the power to raise at least 5 tons at speeds approaching 3,000 feet-per-minute.[56] The foundation features two wells for the cable drums, and numerous anchor bolts for the hoist's components and power-assist clutch and brake assemblies. The foundation footing consists of mortared rock, and mine workers used dressed sandstone blocks for the pillows that supported the steam drive components and cable drum bearings. The headframe stood 36 feet high, and mine workers used full-length 13x14 timber beams for the posts and backbraces. They assembled the structure with mortise-and-tennon joints and iron tie rods. The headframe's crown features two sheave wheels that accommodated the two hoist cables that suspended the skips. Numerous cut nails are embedded in the structure's members, indicating that the mining company erected it in the early 1890s.

The Last Chance company spent a considerable sum of capital constructing an advanced compressed air system to power rockdrills. Miners used the rockdrills underground to bore blast-holes, which expedited the blasting process and increased production. The mining company installed a 4 by 15 foot two-stage straight-line compressor, and they placed it between the hoist and the shaft. A compressor of this size had the capability to power well over 6 piston drills. Mine workers bolted the machine to a timber and concrete foundation (Feature 6), which features wells for two flywheels. The location of the wells indicates that the machine's compression cylinders were nearest the shaft, and the steam drive cylinder was nearest the hoist.

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[55] Colorado State Mine Inspectors' Reports, Box 104053, Last Chance Colorado State Archives, Denver, CO.

[56] Twitty, Eric *Reading the Ruins* Masters Thesis, University of Colorado at Denver, 1999 p246.

Like most conventional Gilded Age operations, the Last Chance mine required an enormous head of steam to power the hoist and compressor, as well as pumps, small utility engines, and to provide steam heat. According to calculation, the mine's steam needs totaled at least 200 horsepower. The compressor required 70 boiler-horsepower, and the hoist required probably double that. In response the mine's engineer had workers erect a set of three return tube boilers. The boilers have been removed, however the setting's size, 18 by 25 feet, indicates that the three boilers were each approximately 5 feet in diameter and 16 feet long. Each unit delivered up to 80 horsepower, totaling 240, which was sufficient to power the compressor, the hoist, a pump, and possibly a small utility engine.[57] The artifact assemblage at the site includes pump hoses, reflecting the use of a steam dewatering pump.

A bank of two coal bins, designed to hold a significant quantity of the fossil fuel, stood south of the boilers (Feature 8). Wagons loaded the bins by parking on the road upslope and south of the shaft house platform, and boiler tenders withdrew fuel to fire the boilers through chutes in the structure's front.

The Last Chance company enclosed the compressor and the hoisting system in a massive frame shaft house which stood on a cut-and-fill platform. The structure (Feature 3) has collapsed, but the existing debris indicates that a square set frame assembled with mortise-and-tennon joints braced with iron tie rods constituted the support system. The walls were sided with boards, the floor consisted of planks, and the roof was clad with corrugated iron. Mine workers used hundreds of cut nails in the assembly of the shaft house, indicating they built it in the early 1890s, probably 1892.

The mine's blacksmith shop was housed in a separate building that stood northwest of the shaft house. While only the shop's cut-and-fill platform remains (Feature 14), its area, 75 by 27 feet, is unusually large, indicating that the facility was spacious and well-equipped. The mine's carpentry shop may have also been housed in the structure. The associated artifact assemblage includes items typically generated in a blacksmith shop, and it includes numerous drill-steel blades and pick tine points upset, or cut off with a chisel, by the blacksmith during the sharpening process. Upsetting blades was a hallmark of an experienced and professional shop worker.

A large ore sorting house, reflecting substantial production, stood along the shaft house's northeast edge. Most of the structural materials have been removed, however a few walls and the foundation (Feature 13) are left. The foundation consists of hewn log cribbing retaining waste rock. The existing debris includes lumber that indicates that the ore sorting house was supported by a stout square-set frame assembled like that of the shaft house. The building consisted of three levels, and it enclosed numerous ore sorting stations, reflected by its 15 by 100 foot size. The top level, concurrent with the shaft house floor, featured receiving chutes where miners dumped ore. The ore rolled across grizzlies, and the fines dropped through into holding bins comprising the structure's bottom level. The grizzlies directed waste laden cobbles to a series of sorting stations where mine workers separated ore. The workers dropped the recovered ore through ports into the holding bins below, and dumped the waste into ore cars. When the bins became full, mine workers tapped the ore through chutes into wagons waiting on an adjacent road. A combination of cut and wire nails, used to assemble the structure, indicates that they erected it in the early 1890s, like the shaft house.

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[57] Twitty, Eric *Reading the Ruins* Masters Thesis, University of Colorado at Denver, 1999 p256.

The Last Chance Mine site includes several additional features that were part of the surface plant. A frame building stood north from the shop platform (Feature 15). The structure has collapsed, and it is not represented on the Sanborn's map, suggesting that it post-dates 1910. The mining company placed a large water tank (Feature 10) adjacent to and south of the shaft house. The reservoir's primary purpose was to supply the steam boilers with feed water. Last, the site includes a large privy building (Feature 16). Mine workers erected the structure over a portion of a cribbing wall, and they used several empty cells in the cribbing as privy pits. The building is a side-gabled structure with no formal frame. Mine workers assembled the walls by nailing board-and-batten siding onto 2x4 crossmembers, they stood the walls up and leaned them together, and fastened the corners. A common rafter roof covers the building. The privy has been divided into two rooms, and each features an opening along the north wall. The opening was not equipped with toilet seats. The structure is 10 by 18 feet in area, indicating that it was intended to accommodate more than one mine worker at a time. Deposits of clinker and paper scraps fill the underlying pits.

Residence

Because the Last Chance Mine lay far from the Creede district's principal settlements, the mining company erected a boarding house and dining hall for the mine crew, and at least one detached frame building, probably for the superintendent. The buildings stood on cut-and-fill platforms that workers graded in a wooded area southeast from the mine (Features 18 and 19). Privies stood on another platform (Feature 20) southeast from the boarding house platform. Features 19 and 20 are not represented on the site's plan view.

The mine's residents disposed of their domestic refuse in the manner typical of Western mining camps. They threw cans, bottles, and other forms of trash behind and downslope from the buildings, while they threw organic wastes, such as bones and table scraps, downslope from the privies. The residents relied on the privies for personal use.

The complex's largest and center-most platform supported a bunkhouse and dining hall. The domestic refuse, which consists mostly of food cans, located downslope from the platform, is concurrent with the building's use as a bunk house and dining hall. The bunkhouse featured indoor running water, indicated by 3/4 inch pipes mixed in with the artifacts downslope.

The artifact assemblage associated with the platforms reflects the lifestyle of the occupants. The abundance of food cans and the absence of miscellaneous and decorative domestic items is representative of single miners working at a remote location. Artifacts indicate that, during the mine's occupation, the Last Chance's miners ate a hearty Victorian diet similar to that consumed in other Western mining districts. The abundance of food cans and butchered bones reflects the consumption of meals that emphasized vegetables, fruits, and fresh meats. Further, the bones consisted primarily of cuts for stews and roasts. A significant number of baking powder cans and baking implements indicates that the cook prepared baked goods. A great number of cans which contained institutional quantities of food, and numerous large butchered bones, indicate that the mine crew ate communal meals prepared by a cook. Many cans contained milk, which mine workers may have used in coffee or tea. Heavy china plate, cup, and bowl fragments, known as *hotelware*, reflect the use of durable, plain tableware in a dining hall setting. Small quantities of bottle glass indicate that the mine's inhabitants did not openly drink much liquor or rely on medicines.

The artifact assemblage associated with the residential complex reflects an occupation between the early 1890s and 1900s. Almost twice as many food cans made with lapped side seams over those constructed with inner rolled and soldered side seams, and the double vent hole milk cans reflect this time period.

<u>Last Chance Mine Site Analysis</u>

In terms of mining operations, the Last Chance Mine reflects one of the Creede district's greatest investments of capital, successful development of the property, advanced Gilded Age steam engineering, and heavy production. The Last Chance Mining Company, controlled by the wealthy Wolcott family, equipped the mine with the district's grandest production-class surface plant. The double drum hoist and the use of balanced skips, the advanced compressed air system, and the immense ore sorting house was intended to facilitate the extraction and processing of a high volume of ore with a savings in costs over a protracted period of time. The substantial shop and workspace in the shaft house expedited materials-handing. The unusually large boiler clinker dump (Feature 9) reflects a sustained and intensive use of steam power. The large waste rock dump, much of which has been removed, indicates that miners made a great effort to develop extensive underground workings. The site's overall high density of industrial artifacts reflects a reliance on mechanization, as well as long-term operation of the surface plant. Dateable items included in the artifact assemblage associated with the surface plant indicates that the complex was constructed around 1892 and operated until around 1910.

A safety lamp glass was recorded with the shaft house platform. At progressive, well-financed mining operations, mine workers occasionally used safety lamps to check the quality of air underground, and the Amethyst Vein was known for emitting unbreathable gases.

In terms of residence, the site includes platforms and artifacts left from a small residential complex that included private cabins, a bunkhouse, and privies. The complex appears to have been inhabited by a crew of single mine workers who were fed a hearty Victorian diet. The miners ate en masse, and most shared the accommodations of the large bunkhouse. The dateable artifacts suggest that mine workers inhabited the residential complex between the early 1890s and around 1905. The artifact assemblage associated with the residential complex includes a ratio of approximately 3 hole-in-cap cans assembled with lapped side seams for every 2 cans assembled with inner-rolled side seams, which reflects such a time period. The timeframes for mining operations and residence are concurrent.

Nelson Tunnel
Site 5ML346

The Nelson Tunnel was an engineering feat which had a profound impact on mining on the Amethyst Vein. The tunnel linked the Amethyst Vein's principal mines and turned their workings into a complex ore extraction system. The tunnel served as a drain, as a haulageway, as a ventilation duct, and as a platform for deep underground exploration. The tunnel portal is located along the west bank of West Willow Creek 2,000 feet north of North Creede. The site is lightly vegetated and features numerous bedrock outcrops.

In terms of character, the Nelson Tunnel site consists of the remains of a large tunnel operation. All of the associated structures and equipment were removed long ago, and the site retains a moderate degree of historical integrity. Archaeological remains in the forms of the tunnel portal, the associated waste rock dump, a rail bed, a flume, an ore sorting facility, and foundations comprise the site. Within recent decades the site has suffered major disturbance. The last operation to work the Commodor Tunnel No.5 erected a hewn log wall to channel West Willow Creek through the Nelson Tunnel site. The purpose in channeling the creek was to facilitate the expansion of the waste rock dump associated with the Commodor Tunnel No.5. The channel flumed the creek into a large culvert buried with waste rock. The new channel and the expansion of the Commodor dump impacted the area where some of the Nelson Tunnel's surface plant facilities were located. At a later date, someone used a bulldozer to push a veneer of redeposited waste rock over another portion of the tunnel's historic surface plant area.

Mining Operations

No mining engineer of the Gilded age could dispute the fact that the Nelson Tunnel was an awesome feat of calculation, surveying, and boring underground workings. With some embellishment, an unknown newspaper stated:

> "According to the light furnished by the Creede Candle, the Yak Tunnel at Leadville about which so much has been written, is a very small affair compared with the great Nelson Tunnel at Creede. Listen to this and Meditate upon it. The great bore in this district was started in 1892, is nearly three miles in length, has cost over $150,000, and has a depth from the surface of 1,600 feet. The Nelson and Humphreys Tunnel started in the heart of the silver section of the famous Amethyst Vein, and is now in the gold zone of that mine, where silver has almost entirely vanished, being superceded by gold values all the way from $18 to $120 per ton."[58]

[58] Colorado Historical Society Records, MSS Box 640, v24:79.

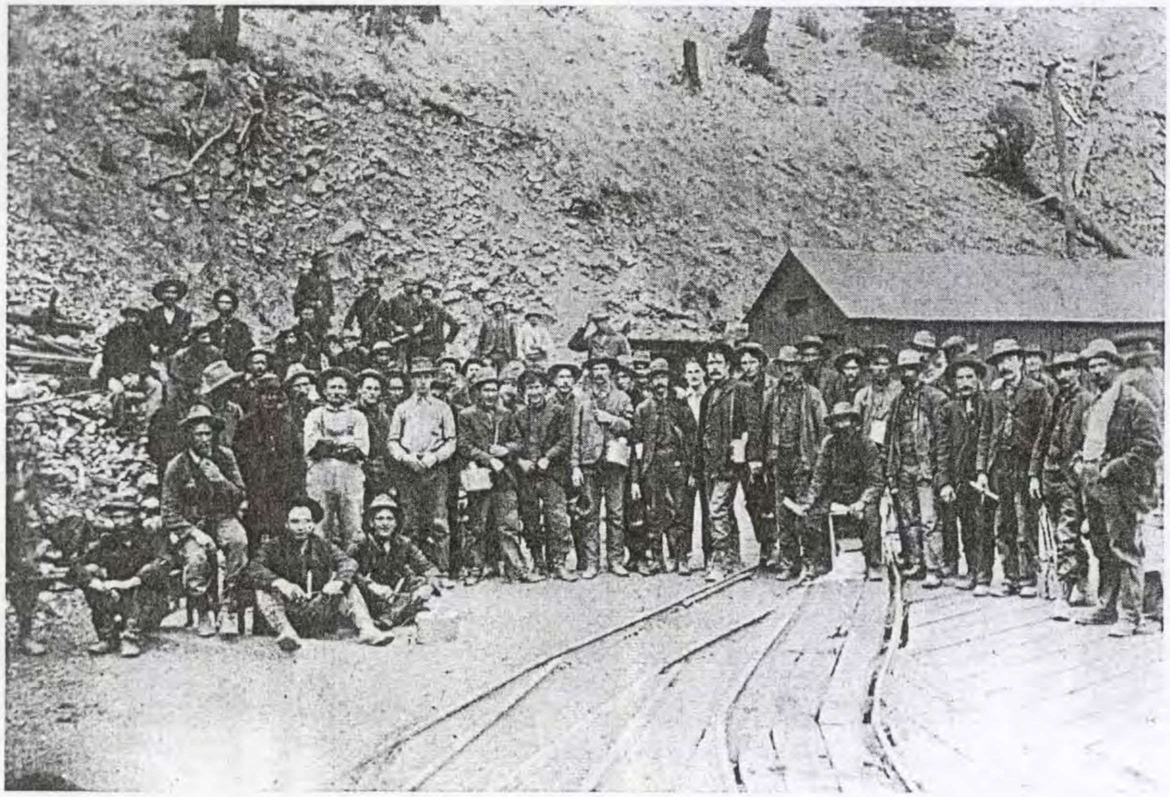

Figure 7.38 The view captures miners at the portal of the Nelson Tunnel, probably in the late 1890s. All have the garb typical of Western miners, including felt hats, tin lunchpails, and the ubiquitous candlesticks. Several Hispanics appear to be among the miners at left. The crew stands on plank decking erected over the banks of West Willow Creek. The building at right is the blacksmith shop. Today, everything but the tunnel portal has been removed. Courtesy of Colorado Historical Society (F-4809 S0025671).

NESLON TUNNEL
PLAN VIEW
CREEDE MINING DISTRICT, MINERAL COUNTY, COLORADO

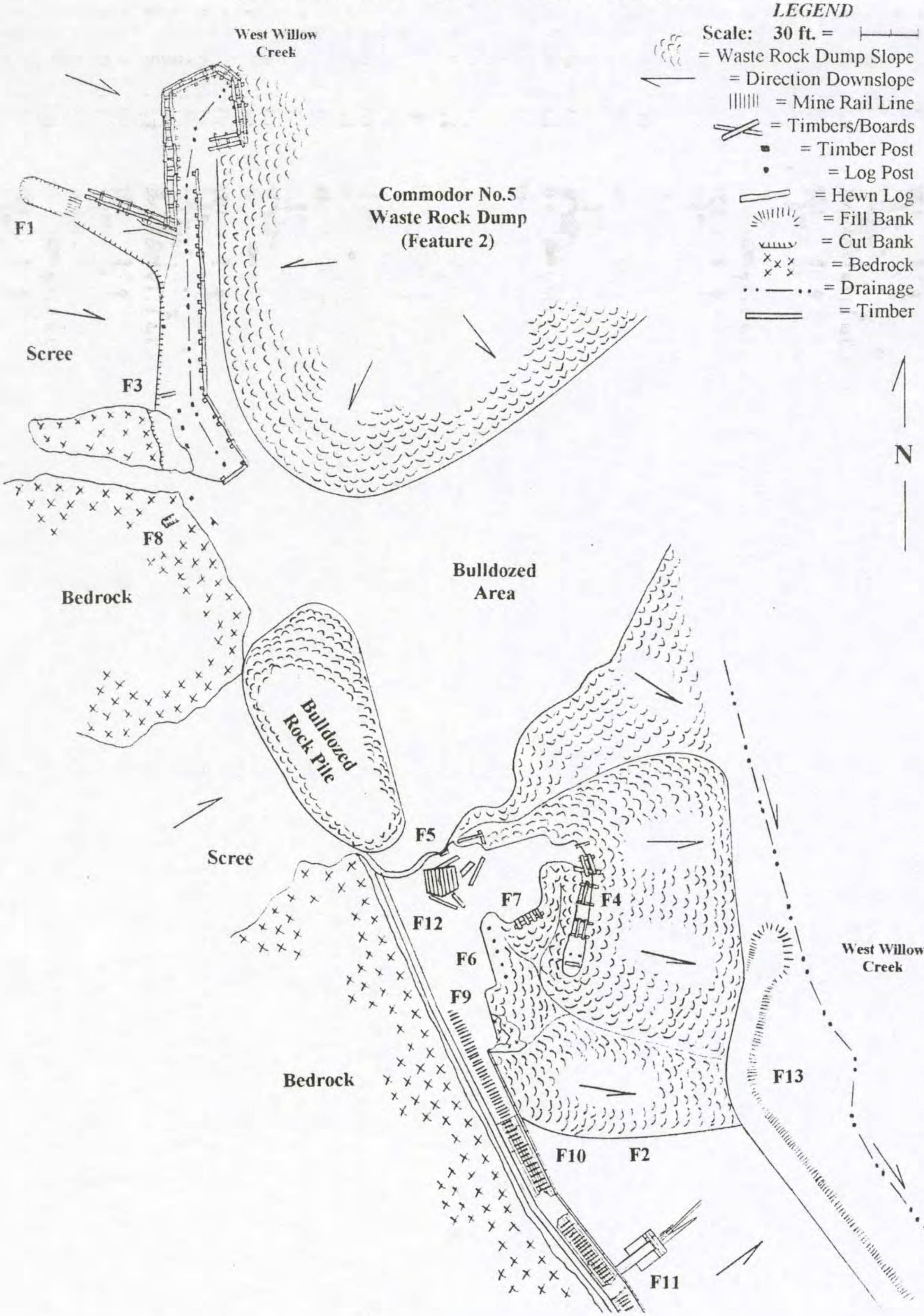

Figure 7.40 Sanborn's 1904 depiction of the Nelson Tunnel's surface plant. The plan view is to scale with the archaeological map.

Charles F. Nelson, who discovered the Soloman Mine, dreamed up the tunnel project in 1892 when mining in the Creede district was gaining momentum. In 1892 Nelson organized the Nelson Tunnel Company with the intent of remediating the problems of mining on the Amethyst Vein for at least some of the mines. Nelson served as the company's director, A.W. Brounell acted as president, and J.S. Wallace was treasurer. Nelson held visions of using the tunnel as a prospect bore to search for deep ore, of using the tunnel as both a drain and enormous ventilation duct for the mines, and as a haulage way for ore trains. Nelson also promoted the minor benefits of his proposed tunnel, such as serving as an escape route in instances of fire, and acting as a platform from which mining companies could develop deep ore. Nelson proposed establishing a portal and surface plant on West Willow Creek below the Bachelor Mine, and driving the tunnel along the Amethyst Vein. David Moffat's and Henry Wolcott's mines were at once interested. The cost of the project would, of course, be enormous. Nelson expected to cover the costs by charging subscription fees, and levying a toll per ton of ore hauled through the tunnel.[59]

The Bachelor Mine possessed the first workings that the Nelson Tunnel would encounter, and so Moffat's Bachelor Mining Company naturally was the first operation to subscribe. Nelson had mine workers erect a surface plant consisting of a well-equipped shop, an air compressor that powered mechanical rockdrills, and a generator driven by a Pelton water wheel, on waste rock 400 feet east of the tunnel portal. Miners managed to drill and blast 1,500 feet before the Silver Crash of 1893 brought the project to a halt. This distance brought the tunnel within the Bachelor ground, where tunnel workers encountered ore. Work on the tunnel resumed after the economic depression, and when the tunnel reached 2,100 feet in length, Nelson's contact was fulfilled.

The rate of progress and the discovery of ore were crucial to the success of Nelson's tunnel concept. The Last Chance, New York, and Amethyst mines offered subscriptions when the Wooster Tunnel Company formed around 1897. The Wooster company leased a right of way through the Nelson Tunnel, and contracted to drive a drift from the extant tunnel north to the Last Chance, New York, and the Amethyst properties. Using 4 heavy piston drills, miners advanced the tunnel 6 feet per shift, and in 1899 they first reached the Last Chance workings, then the Amethyst workings.

Impressed with the success of the Nelson and Wooster tunnels, the mines farther north along the Amethyst Vein subscribed to another tunnel designed to undercut their workings. In 1900 the Humphreys Tunnel commenced from the end of the Wooster Tunnel. The financing and logistical arrangements for the Humphreys Tunnel were similar to those of the Wooster company. Miners drilled and blasted the passage around the clock for two years, and by 1902 the Humphreys Tunnel had reached the Park Regent Mine, which was the northern-most operation on the Amethyst Vein. The aggregate length of the three tunnels totaled 11,000 feet, and all major operations except for the Commodor Mine enjoyed decreased pumping and transportation costs, improved ventilation, and the discovery of new ore. Mining companies found that the savings achieved through the tunnel system offset the cost of the subscription and the $1.00 per ton of ore passing out the mouth of the tunnel.[60]

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[59] Emmons, William H and Esper, Larsen S. *USGS Bulletin 718: Geology and Ore Deposits of the Creede District, Colorado* U.S. Geological Survey, U.S. Government Printing Office, Washington, DC 1923, p5.
EMJ 4/9/92 p407.
[60] *EMJ* 2/15/02.

Around 1900 United Mines, David Moffat's syndicate of investors, proposed erecting an ore reduction mill at North Creede to concentrate all the ore hauled out the tunnel. Completion of the tunnel had already rendered the mines on the Amethyst Vein components of a broad ore extraction system, and the addition of a mill increased the system's complexity. United Mines completed work on the Humphreys Mill around 1902, and the company connected it to the tunnel via a half mile long baby gauge rail line. While the mill primarily served Moffat's properties on the vein, independent mining companies could have had the mill process their ore for a fee. As a whole, the system was an engineer's dream. Miners drilled and lasted ore deep underground and it accumulated in holding bins immediately over the tunnel. Workers transferred the ore through chutes into mule-drawn trains. Mule drivers sent the trains out the tunnel portal and across the rail line to the mill, where the ore was concentrated. When processed, the concentrates were shipped via rail to smelters in Pueblo, Colorado and to the lead/zinc districts of Missouri for refining. The movement of materials was efficient and smooth, and because gravity carried it through most of the extraction and concentration steps, production costs were relatively low.

Because the Nelson Tunnel served as the principal artery into the Amethyst Vein's mines, the site remained active until mining nearly ceased on the vein by the mid 1920s. However, little maintenance was done to the tunnel's infrastructure after around 1910, and by the 1920s it was a shadow of its former glory. With the suspension of mining in the 1920s, the tunnel decayed heavily and became unserviceable for anything other than drainage and ventilation.

The Nelson Tunnel had decayed to such a point by 1934 that when mining along the Amethyst Vein revived, the tunnel stood silent. In 1935 the Emperius Mining Company purchased the tunnel during its acquisition campaign, but did little with the passage until 1945. At that time Emperius spent an enormous sum of capital reconditioning the tunnel's infrastructure in hopes of using it to increase production and access deep ore. Emperius' investment proved wise, because the tunnel served the company well until it was finally abandoned in the 1950s.[61]

The remains comprising the Nelson Tunnel site represent only a portion of the formerly grand mining operation. The area where the main portion of the tunnels' surface plant lay has either been buried by waste rock, or has been destroyed when the culvert was installed.

Currently, the south portion of the tunnel's original waste rock dump (Feature 2) remains undisturbed. Several structure foundations (Features 6 and 7), which consist of sets of log pilings and log joists, are superimposed on the dump's surface. The edge of the operation's blacksmith shop (Feature 5) extends out of the south edge of a layer of new waste rock redeposited on the Nelson Tunnel's dump. The remains of a gravel-filled wood box forge stands on the shop platform. Structural debris, including an articulated wall, associated with the platform indicates that a gabled frame building enclosed blacksmith facilities.

The rail line that extended between the tunnel portal and the Humphreys Mill is currently well-represented by structural and other remains at the site. The rail line

[61] Steven, Thomas A. and Ratte, James C. *USGS Professional Paper 487: Geology and Structural Control of Ore Deposition in the Creede District, San Juan Mountains, Colorado* U.S. Geological Survey, Government Printing Office, Washington, DC 1965 p11.

extended south from the tunnel to the surface plant, and it was elevated on a trestle. A flume which conveyed water to the Humphreys Mill (Feature 12) paralleled the rail line. Heavy timber pilings and a bench hewn out of bedrock (Feature 3) remain. All the rest of the trestle, and the decking that once encompassed the tunnel portal, have been removed. The rail line continued south from the tunnel's surface plant. Mine workers graded the line across a bench that they blasted out of the hillside. Where the line traversed bedrock cliffs, they erected a trestle to support the track. Currently, a series of in-situ rail ties (Feature 9), and a well-constructed trestle (Feature 10) remain.

The site includes a small ore sorting facility (Feature 11), which clings to the rocky hillside in the south portion of the site. The sorting station does not appear to be directly connected with the Nelson/ Humphreys operation, or any substantive mining company. Rather, it appears to have been constructed by lessees with little capital. The sorting station is a rough and open-air affair that featured a drop chute, a grizzly, a holding bin, and a sorting station. Miners dumped ore through a port in the decking covering the trestle. When not in use, they placed planks over the port for safety. The ore dropped into a vertical chute 2½ by 3 feet in area, and 8 feet tall. The chute directed the ore onto a grizzly, which has been removed. Metal-bearing fines passed through the grizzly while waste-laden cobbles rolled down to a sorting station. The fines dropped onto exposed bedrock and accumulated in a holding bin under the sorting station. The bin, 8 feet long, 12 feet wide, and 8 feet high, is constructed with traditional methods, consisting of a 6x6 post-and-girt frame sided on the interior by heavy planks. Waste-laden cobbles collected at the grizzly's bottom, and miners standing at the sorting station, which is a plank floor over the holding bin, picked out ore and tossed it into the open bin. They tossed waste over the plank walls enclosing the sorting station, and it rolled downslope. The fact that the sorting station is open-air and lacks a formal floor under the grizzly reflects use only during the warm months, and it also reflects limited capital. Miners drew ore out of the holding bin through a small gate. The ore slid down a long wood chute and into a wagon waiting on the road below. A dynamite box featuring a printed 1916 date reflects the era when the ore sorting station was used.

Residence

The tunnel complex and encompassing area lack evidence indicating that mine workers lived on site. They probably commuted from North Creede.

Nelson Tunnel Site Analysis

The site represents only a portion of a complex, well-engineered tunnel operation and ore extraction system. The immense quantity of waste rock at the site reflects extensive underground workings associated with the tunnel. The remains of the rail line and the flume extending to the Humphreys Mill site reflects the site's role as a link in a complex ore extraction system.

The tunnel site includes evidence suggesting that the project was organized and heavily equipped from the beginning of operations. Miners used rockdrills to bore blast-holes when they graded the bed for the rail line to the tunnel portal. The use of rockdrills indicates that the Nelson Tunnel Company had erected a well-equipped surface plant which included an air compressor at the very beginning of operations. The use of such technology mirrors heavy capitalization and a reliance on machinery to expedite tunnel driving.

The site includes few dateable artifacts. Those items currently remaining at the complex indicate that the last intense activity occurred between around 1910 and around 1918. The disturbance to the tunnel complex, and especially the deposition of waste rock, have obscured many surface plant features and associated artifacts.

Park Regent Mine
Site 5ML209

The Park Regent Mine was the northern-most principal operation on the Amethyst Vein. The mine was a marginal property, having never produced much ore, however it was a significant undertaking. The site is located on the far northeast flank of Bachelor Mountain near West Willow Creek. The terrain slopes gently north, and the area is vegetated with a sparse second-growth aspen and spruce-fir forest. Within recent years the site suffered minor disturbance when someone used a bulldozer to push some of the waste rock dump.

In terms of character, the Park Regent Mine site consists of the remains of a moderate-sized shaft operation, an ore reduction mill, and an associated residential complex. All of the site's structures, machinery, and equipment were removed long ago, and the shaft collar has collapsed, leaving a large area of subsidence. Archaeological features in the forms of equipment foundations, structure platforms, privy pits, and associated artifacts comprise the site. The archeological remains clearly represent the mine's surface plant and residential features. The privy pits and several of the platforms contain buried cultural deposits.

Mining Operations

Prospectors staked the Park Regent claim in 1891 hoping that they might sink a shaft and strike the fabulous Amethyst Vein. In their search for ore, the prospectors sank a temporary shaft and found that the ground underneath the claim held promise. Within a year the outfit either sold their holdings to investors, or they formed their own mining company to develop the property.

During the Fall of 1892 the Park Regent's operators erected a substantial surface plant to facilitate work underground, and began sinking a large shaft. Specifically, the outfit installed a 40 horsepower single drum steam hoist and boiler, as well as the other necessary plant components. Within a short time miners struck ore, and unsure of whether they had encountered the Amethyst Vein or a separate body, they termed their find the Best Friend Lode. Miners began to extract ore from shallow deposits, but the Silver Crash of 1893 temporarily brought operations to a halt.[62]

The property owners, chief of whom was O.H. Poole, optimistically resumed ore extraction and conducted minor exploration after a little more than a year's time. In 1895 Poole funded the erection of a stamp mill adjacent to the mine in hopes of concentrating the Park Regent's ore and thereby saving costs.[63]

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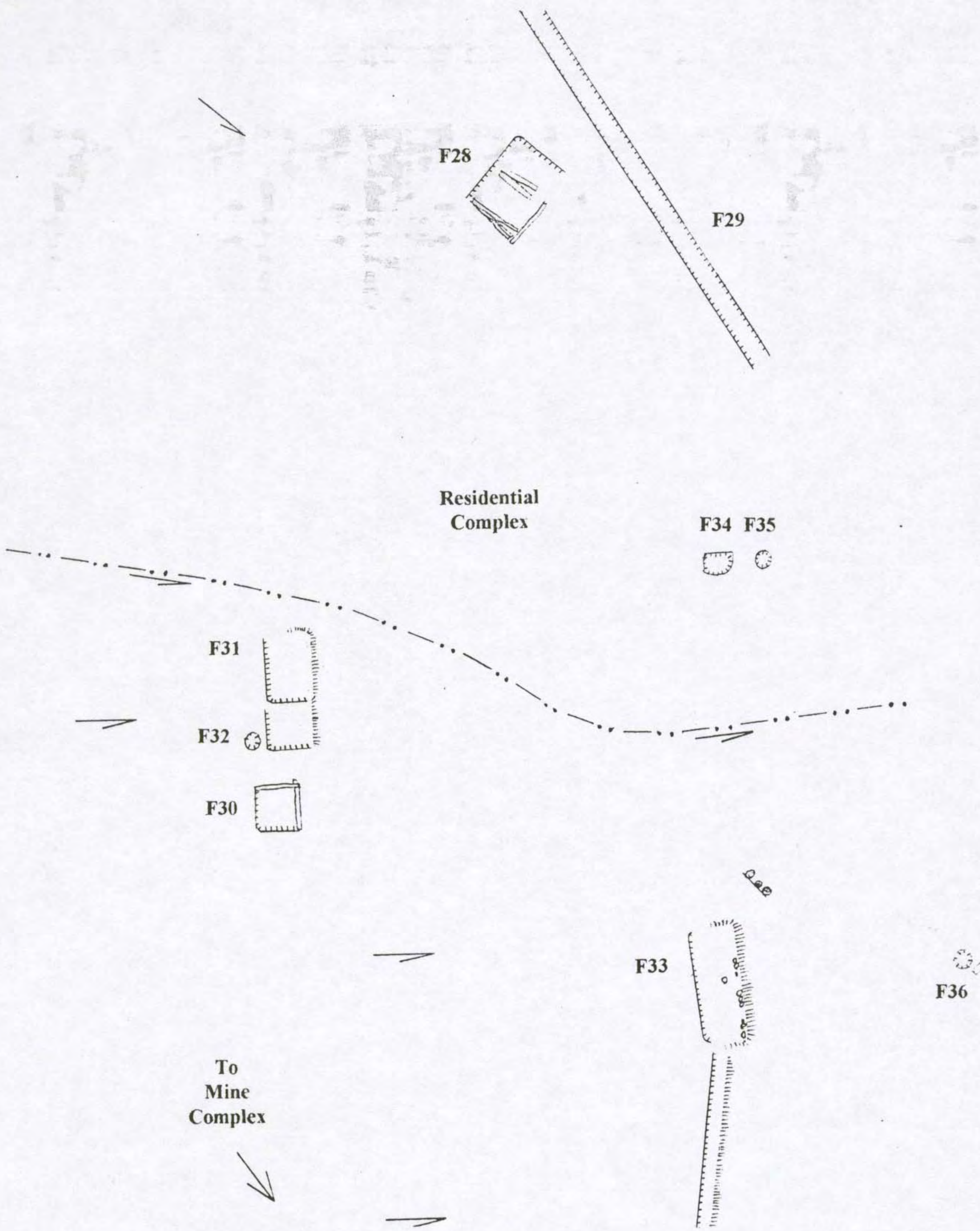
[62] *EMJ* 12/17/92 p590.

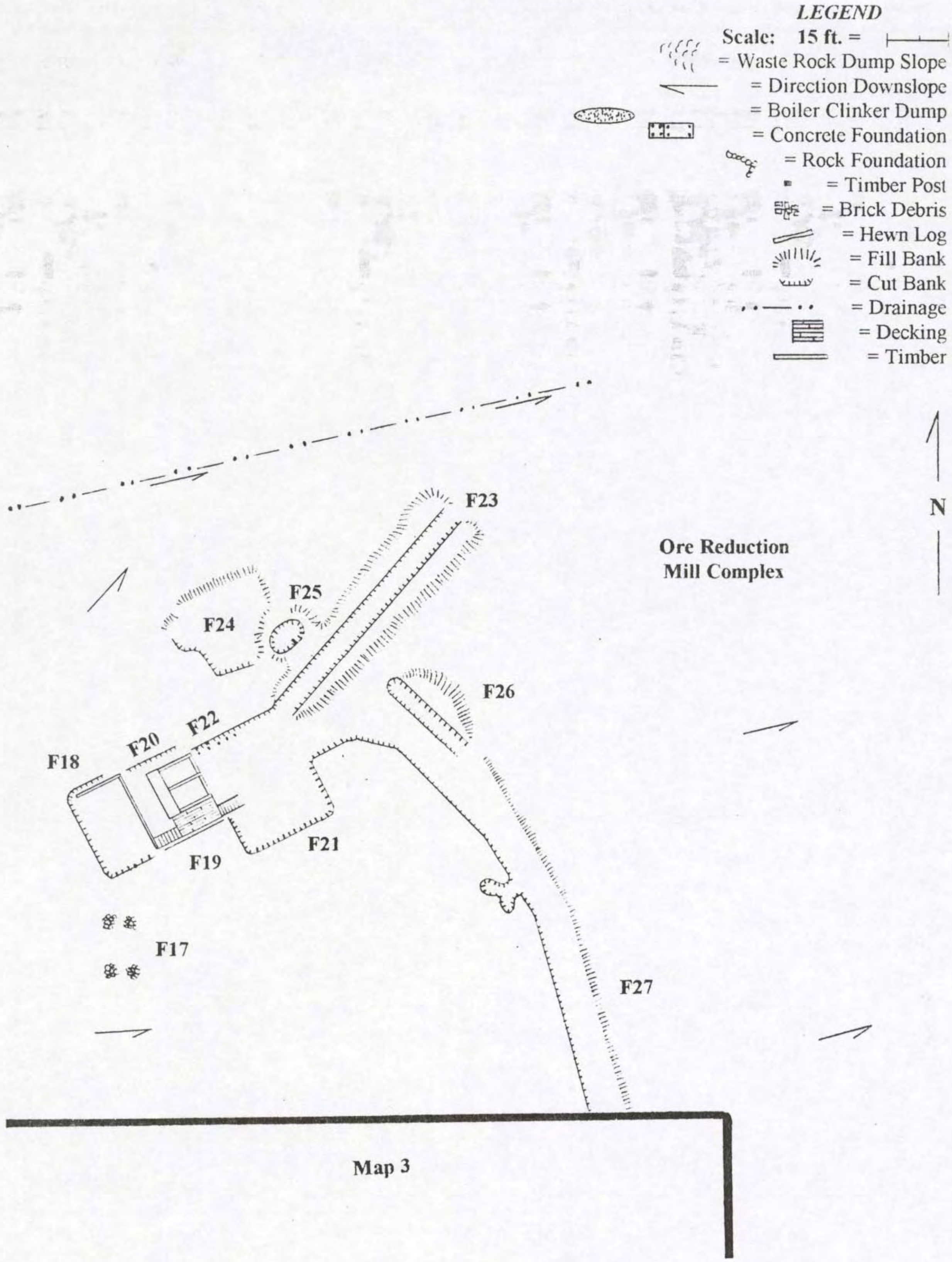
[63] Emmons, William H and Esper, Larsen S. *USGS Bulletin 718: Geology and Ore Deposits of the Creede District, Colorado* U.S. Geological Survey, U.S. Government Printing Office, Washington, DC 1923, p168.

Figure 7.41 In 1895 O.H. Poole had the Park Regent Mine's facilities upgraded. In the photo, mine workers assemble lumber and a return tube boiler shell (left of center) in preparation for construction. This north view depicts the mine's shaft house, and a portion of the associated residential complex at left. Today, the shaft house platform (Feature 3) and machinery foundations remain. The residential building at left stood on a platform, which manifests today as Feature 33. Courtesy of Colorado Historical Society (F-29362 S0025674).

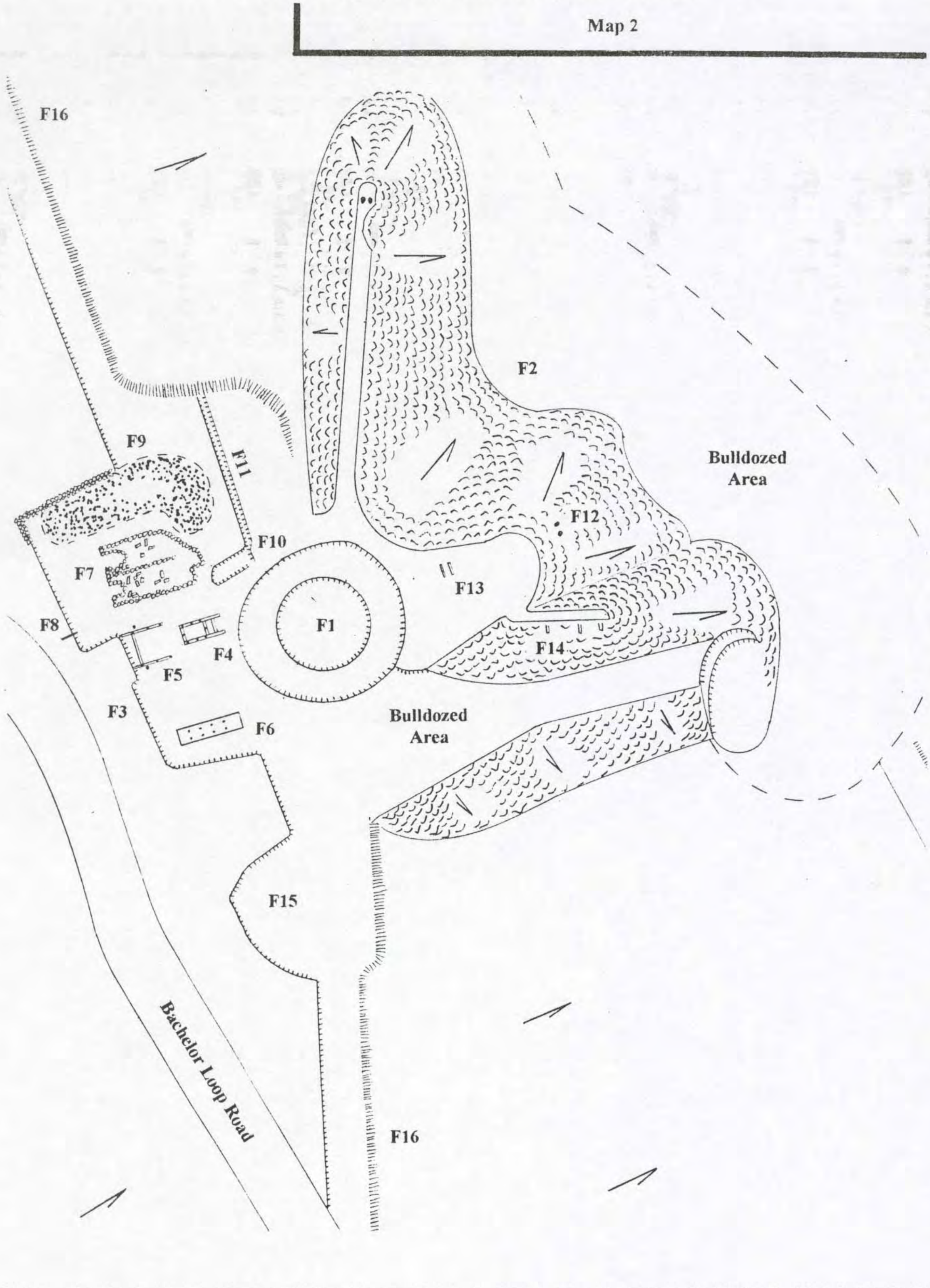
PARK REGENT MINE
PLAN VIEW: MAP 1, WEST
CREEDE MINING DISTRICT, MINERAL COUNTY, COLORADO



PARK REGENT MINE
PLAN VIEW: MAP 2, NORTH
CREEDE MINING DISTRICT, MINERAL COUNTY, COLORADO



PARK REGENT MINE
PLAN VIEW: MAP 3, SOUTH
CREEDE MINING DISTRICT, MINERAL COUNTY, COLORADO



The remains currently comprising the Park Regent site include surface plant components that date to the mine's first operation. The original outfit equipped the mine with a conventional sinking-class hoisting system that included a 5½ by 6 foot single drum geared steam hoist bolted to a timber foundation (Feature 4). Such a hoist was rated at 40 horsepower, confirming historic documentation, and it could raise a ton and a half at a speed of 400 feet per minute.[64] The hoist could have been powered by a large portable locomotive boiler, or by a small return tube unit. The mine's initial operation also erected a substantial frame shaft house, 75 by 75 feet in area, to enclose the machinery and the mine's shop. Structural debris remaining on the platform today indicates that a square-set frame supported the lofty shaft house, and that it was floored with planks except for the area around the boiler.

The Park Regent site includes the remains of the ore reduction mill erected by O.H. Poole. The mill complex currently consists of a series of three low terraces that supported the mill proper, as well as a flume remnant, a privy pit, trenches, and a second building platform. Decayed beamwork stands on the mill terrace, and industrial artifacts are scattered about.

Like other mills erected at mines, Poole's mill attempted to concentrate the Park Regent's ore by separating metalliferous material from waste rock. The concentration process began when miners pushed ore-laden cars from the Park Regent shaft across a high trestle and emptied them into the mill's ore receiving bin. A mill worker fed the raw ore into a rock crusher, and the fractured material proceeded to the stamp battery below. The receiving bin and crusher stood on a 12x12 timber subframe, part of which still stands on the mill complex's upper tier (Feature 18). Rock footers (Feature 17) are left from the high trestle.

The Park Regent Mill featured a battery of 8 stamps, which reduced the ore to a slurry with the consistency of sand. The material flowed over classification screens, and the grains that passed through proceeded on to concentration appliances, while oversized particles returned to the stamps. The stamp battery platform currently features 12x12 beamwork, like the crusher platform, which anchored the battery's framework and bracketed the battery foundation (Features 19 and 20). Workers constructed the battery foundation by manufacturing a pedestal 4½ by 12 feet in area by bolting together a cluster of 12x12 posts placed on-end. The foundation anchored a battery box, which was a heavy cast iron pan, and the stamp dies where the stamps pulverized the ore.

The slurry produced by the stamps proceeded down to the mill's concentration floor, which is currently represented by a debris-covered platform (Feature 21). There, concentration machinery and appliances separated metalliferous fines from gangue. Because the mill's appliances have been removed, the specific concentration process cannot be determined.

The concentration floor also housed the mill's steam engine, which stood on a timber foundation (Feature 22). According to convention of the day, the steam engine powered the mill's machinery by turning an overhead driveshaft via canvas belting. A large wood laminate drive wheel and canvas drive belt fragments remain from this power system. Lack of a masonry boiler setting remnant indicates that the engine was powered either by a portable boiler at the mill, or by steam piped from the mine.

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[64] Twitty, Eric *Reading the Ruins* Masters Thesis, University of Colorado at Denver, 1999 p243.

After the mill's appliances had separated metalliferous fines from the gangue, mill workers discharged the worthless material into a flume (Feature 23) extending downslope from the concentration platform. Currently, the flume, which opened into a natural drainage, has collapsed.

A second building stood along the north edge of the mill. The building probably served as an assay shop and office, and it stood on a cut-and-fill platform graded by mine workers (Feature 24). The building was a frame structure and it was approximately 20 by 20 feet in area. Currently, only the platform remains. Mine workers excavated a privy pit (Feature 25) adjacent to the platform, and they installed a pipe that drained effluent into the tailings flume.

During the late 1890s the mine ran into serious financial trouble. Miners quickly exhausted the easily accessed ore near ground-surface, and by nature the rock proved too refractory to be milled in Poole's facility. To worsen the situation, exploration failed to encounter further ore deposits. Deep exploration and revamping the failed mill proved too costly for Poole, and with little income, he let the mine fall idle and discharged his 25 employees.

In the late 1890s the Golden Link Mining Company purchased the mine, hoping that it might encounter the Amethyst Vein. Prior to investing money in the Park Regent property, Golden Link probably looked into the possibility that a connection would be made with the Humphreys Tunnel in the future. Golden Link upgraded the Park Regent's surface plant by installing a new hoist, an air compressor, and steam boilers, and the outfit began to sink the shaft deeper. Miners finally struck the Amethyst Vein, and they followed it hundreds of feet down. As a result, the Park Regent shaft attained the odd profile of beginning vertically, and angling into a steep incline at the vein. The shaft ultimately attained a depth of 1,200 feet.[65]

The existing remains of the Park Regent's surface plant reflect the improvements effected by Golden Link. The hoist that Golden Link installed was a 9 by 9 foot single drum geared steam model bolted to a timber foundation (Feature 5). This hoist generated 130 to 140 horsepower, and it could raise almost 4 tons at speeds approaching 500 feet per minute. The hoist qualified as being production-class, but the foundation was temporary.[66]

Golden Link constructed a compressed air system to power rockdrills. Miners used the rockdrills underground to bore blast-holes, which expedited the blasting process. The mining company installed a 5 by 15 foot single-stage straight-line compressor in the east portion of the shaft house. A compressor of this size produced 550 cubic feet of air per minute which had the capability to power up to 6 piston drills. Workers bolted the machine to a timber and concrete foundation (Feature 6).[67]

Like most conventional Gilded Age operations, the Park Regent mine required an enormous head of steam to power the hoist and compressor, as well as dewatering pumps. According to calculation, the mine's steam needs totaled at least 200 horsepower. The compressor required 115 boiler-horsepower, and the hoist required approximately the

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[65] Colorado Historical Society Records, MSS Box 640, v24:18.
Emmons, William H and Esper, Larsen S. *USGS Bulletin 718: Geology and Ore Deposits of the Creede District, Colorado* U.S. Geological Survey, U.S. Government Printing Office, Washington, DC 1923, p168.

[66] Twitty, Eric *Reading the Ruins* Masters Thesis, University of Colorado at Denver, 1999 p243.

[67] Twitty, Eric *Reading the Ruins* Masters Thesis, University of Colorado at Denver, 1999 p111.

same amount. To provide adequate power, the mine's engineer had a crew install twin return tube boilers. The size of the setting remnant as it exists today (Feature 7) is 20 by 20 feet in area, and it suggests that the boilers were each approximately 6 feet in diameter and 16 feet long. Each unit delivered up to 125 horsepower which was more than enough to drive the hoist and compressor.[68] The mining company probably used the additional power to run a dewatering pump and possibly a small utility engine. The Golden Link company installed a pipeline to feed the boiler fresh water. Truncated pipes (Feature 8) currently project out of the shaft house platform's cut bank near the boiler setting remnant.

In terms of structures, the Golden Link Mining Company apparently used the original shaft house. Currently, a significant quantity of structural debris, red bricks, fieldstones, and boiler smokestack sections lie on the platform. Golden Link may have added a drainage system to the shaft house. Feature 10 was drain box where blow-off pipes from the boilers and hoist terminated, and the mine's dewatering pump probably discharged into the box, as well. Water flowed from the box through a flume (Feature 11) and spilled out onto the waste rock dump.

Both the Golden Link and earlier mining outfits used ore cars on mine rail lines for moving rock and equipment around the complex. The waste rock dump possesses a well-graded top surface, and a footprint featuring numerous lobes, which reflects the use of a rail system. The pilings of trestles used for dumping waste rock (Features 12 and 14), and in-situ rail ties (Feature 13), remain from the rail system.

A network of roads provided wagon access to the mine and mill. Roads, constructed by mine workers with cut-and-fill methods (Feature 16), approached the north and south edges of the mine's surface plant, and another road (Feature 27) terminated at the mill's concentration floor. A footpath connected the mine with the residential complex, located northwest.

The Park Regent's mine workings became the northern terminus of a complex network of drifts by around 1900. Miners linked the Park Regent's workings with those of the White Star, located southeast, and with the Humphreys Tunnel. Some of the connections were the result of the company's search for ore, which was proving futile. The Park Regent Mine was at the Amethyst Vein's north tip, and at this point the vein exhibited signs of pinching out.

Regardless, A.E. Humphreys purchased the property from Golden Link because he thought that he could succeed where the other outfits had failed. Humphreys' miners accessed the Park Regent ground through the Humphreys Tunnel network and abandoned the surface plant, which fell into disrepair. By 1912 the shaft had decayed to the point of being unserviceable and inaccessible. In all, by 1912 miners managed to produce only \$25,000 worth of ore, despite the considerable capital invested in the property. After sporadic activity during the 1900s, the mine fell idle.[69]

When the demand for industrial metals stimulated by World War I boosted metals prices, the Park Regent's workings came to life one last time in 1916. Mining ceased

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[68] Twitty, Eric *Reading the Ruins* Masters Thesis, University of Colorado at Denver, 1999 p256.

[69] Emmons, William H and Esper, Larsen S. *USGS Bulletin 718: Geology and Ore Deposits of the Creede District, Colorado* U.S. Geological Survey, U.S. Government Printing Office, Washington, DC 1923, p168.
Larsen, E.S. "Recent Mining Developments in the Creede District: *USGS Bulletin 811: Contributions to Economic Geology* U.S. Geological Survey, U.S. Government Printing Office, Washington, DC 1929.

with the exhaustion of economic ore in 1917, and work on the claim fell silent, permanently.

Residence

Because the Park Regent Mine lay so far from the Creede district's principal settlements, the mining company erected bunkhouses and a dining hall for the mine crew. The complex consisted of four buildings on cut-and-fill platforms that workers graded in a meadow northwest of the mine. The meadow area tends to be marshy, and several small brooks flowing through it provided the residents with fresh water. Because the area's drainage is poor, mine workers excavated a water diversion ditch (Feature 29) north of the complex.

Currently, cut-and-fill platforms and artifacts represent the residential complex, and the material evidence reflects the nature and the functions of each structure. A hewn log cabin, 15 by 20 feet in area, stood on the complex's northern-most platform (Feature 28). The cabin served as a bunkhouse, and associated food cans and bottle glass indicate that the residents prepared and consumed some food. The complex's center-most platform (Feature 31) supported a frame bunkhouse 12 by 30 feet in area. The lack of domestic refuse associated with the platform is concurrent with the building's use as a bunkhouse, and it indicates that the residents ate in another building. A 12 by 12 foot frame building stood on the complex's smallest platform (Feature 30). Like the bunkhouse platform, few domestic artifacts are associated with Feature 30, indicating that the residents ate in another building. The structure's small size suggests that it housed only several people, possibly the mine superintendent.

The complex's dining hall stood on the southern-most platform (Feature 33). The great number of food cans and the paucity of other items proximal to the platform is typical of food preparation and consumption. The platform, 15 by 25 feet in area, features a dry-laid rock alignment which probably supported one of the building's wall footers. In addition, mine workers erected a timber frame against a nearby tree, probably to store food away from bears.

The complex's residents disposed of their wastes in the fashion common to the time. They threw solid wastes and trash behind buildings, and they erected privies for personal use. Domestic refuse was recorded with each platform. The complex included five privy pits. The largest buildings, the dining hall and the boarding house, each had dedicated privies (Features 32 and 36), and two more pits (Features 34 and 35) were located equidistant from all of the complex's buildings.

The cabin that stood on the complex's northern-most platform may pre-date the other structures. Mine workers constructed the northern cabin with logs, while the rest of the complex's buildings appear to have been frame structures. In addition, the artifact assemblage associated with the northern platform can be interpreted as being slightly older than those associated with the other platforms. The northern platform features a group of food cans in which types assembled with lapped side seams predominate over those assembled with inner-rolled and soldered side seams. The assemblage of cans associated with Feature 33 includes a greater number of types assembled with inner-rolled and soldered side seams. Further, the assemblage associated with the northern platform appears to date to the early 1890s while the assemblages associated with the other platforms probably date to the late 1890s and early 1900s. These time periods are concurrent with the occupations described by archival records.

The artifact assemblages associated with the platforms reflect the lifestyles of the occupants. The abundance of food cans and the absence of miscellaneous domestic items is representative of single miners working at a remote location. During both of the mine's occupations, the Park Regent's miners ate a diet similar to that consumed in other nascent Western mining districts. The abundance of food cans reflects the consumption of prepared vegetables, fruits, and meat, which was probably supplemented with grain products, salt pork, and bacon. The canned food, a lack of butchered bone, and the paucity of domestic items associated with cabin platforms suggests that the mine was active at the beginning of the district's boom, before commercial services were in place, and before fresh food was widely available. Institutional-sized food cans reflect the preparation and consumption of large quantities of food for the mine crew. Small quantities of bottle glass indicate that the mine's inhabitants did not openly drink much liquor or rely on medicines.

The artifact assemblage associated with the residential complex reflects an occupation of moderate duration at some point between the mid 1890s and the early 1900s. Wire nails used to construct the cabins, the almost-even split between food cans made with lapped side seams and those made with inner rolled and soldered side seams, and the double vent hole milk cans reflect this time period. The artifact assemblage associated with the dining hall platform (Feature 33) included a few sanitary food cans. These items probably reflect a brief post-boom occupation, possibly when workers dismantled the mine's surface plant.

Park Regent Mine Site Analysis

In terms of mining operations, the Park Regent Mine reflects a significant investment of capital, a serious attempt at developing the property, and conventional Gilded Age engineering. The mining company equipped the mine with a substantial production-class surface plant. Despite the capital investment, the operation's productivity appears to have been very limited. The site includes the remains of an ore reduction mill, however the total lack of mill tailings indicates that the facility processed little ore. The absence of evidence suggesting an ore storage facility indicates that the mine saw little production. The modestly sized waste rock dumps reflects somewhat extensive underground workings, most of which were no doubt exploratory. The mine complex's moderate density of durable industrial artifacts indicates that operations were limited in intensity and duration. The light density of such items in combination of a lack of mill tailings indicates that the mill operated for only a very brief time. The small to modestly sized boiler clinker dump reflects sporadic use of the mine's machinery.

Dateable items associated with the mine complex were few in number, and they reflect a timeframe between the early 1890s and 1910s. The mill complex also included few dateable artifacts. Mine workers used a combination of wire and cut nails to assemble the mill building, which suggests that they erected the structure before the documented timeframe of 1895.

The artifact assemblage associated with the residential complex reflects inhabitation between the early 1890s and around 1900. This timeframe is concurrent with the operating periods of the mine. A few sanitary food cans suggests a brief occupation of the site afterward.

Prospect Shaft Complex, Sulphide No.5 Claim
Site 5ML347

The Sulphide No.5 claim was a minor prospect operation located approximately a quarter mile south of the Park Regent Mine on the northeast flank of Bachelor Mountain. The terrain encompassing the site slopes gently, and the area is vegetated with a heavy second-growth aspen and spruce forest. While all of the associated structures and equipment were removed long ago, the site retains a high degree of historical integrity. Archaeological remains in the forms of the shaft, a waste rock dump, machinery depressions, structure platforms, and associated artifacts characterize the shaft complex. The degree to which the mine complex has revegetated and suffered erosion reflects early abandonment.

Mining Operations

According to archival sources, prospectors staked the Sulphide No.5 claim by 1892 at the latest, and they explored the ground underneath with a small shaft. The lack of a developed surface plant associated with the shaft indicates that the prospectors relied on only the most elementary and impermanent facilities to support their work underground.

Specifically, the surface plant included several basic components which are represented by the extant remains at the site. The hoisting system installed by the prospecting outfit consisted of a geared horse whim and a small headframe. This type of hoisting system had a depth limitation of 300 feet.[70] Today, the pit for the whim's foundation, the cable trench, and the draft animal track remain from this system (Features 3 and 4).

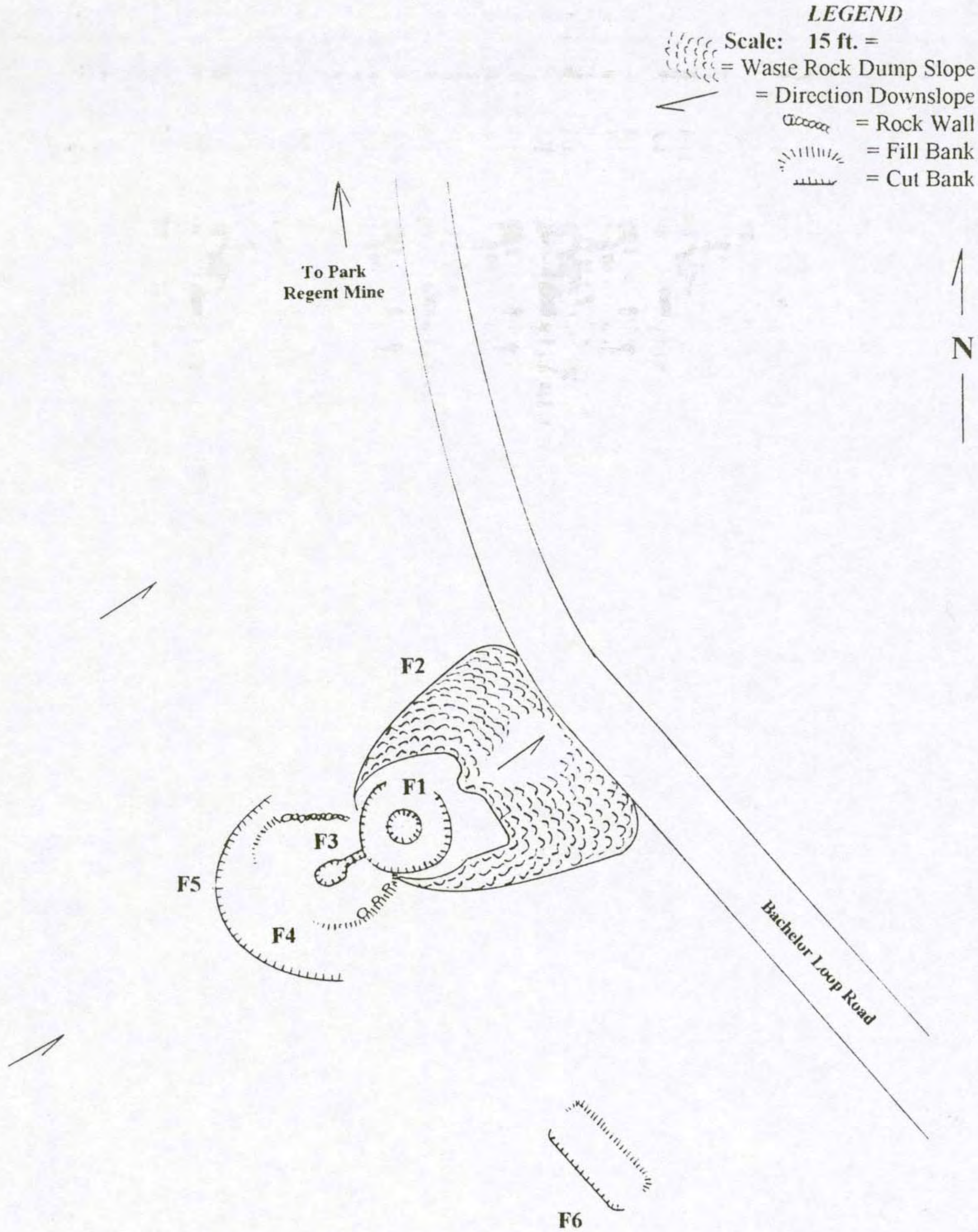
If prospectors erected a building to shelter their operations, then it probably was a small frame shaft house standing only over the shaft collar. Such a structure may have also enclosed a simple blacksmith shop. However, the shaft collar has collapsed, destroying evidence reflecting the presence of a shaft house. The operation's blacksmith shop was a simple affair. Lack of material remains indicates that the prospecting outfit equipped the shop with a free-standing iron pan forge, and portable hand tools and appliances.

The waste rock dump feature lobes radiating northeast and eastward, and prospectors graded the dump's top surface flat. The lobes and the level surfaces suggest that prospectors used wheelbarrows or ore cars to move waste rock away from the shaft, instead of merely emptying full ore buckets at the shaft collars, as was typical. The mining industry recognized wheelbarrows as being strictly temporary class conveyances.

[70] Twitty, Eric *Reading the Ruins* Masters Thesis, University of Colorado at Denver, 1999 p196.

PROSPECT SHAFT, SULPHIDE NO.5 CLAIM

CREEDE MINING DISTRICT, MINERAL COUNTY, COLORADO



Residence

The shaft complex includes evidence indicating that prospectors lived on site. A cut-and-fill platform (Feature 6), southeast from the shaft, probably supported a wall tent for a brief period of time. The platform is 10 by 20 feet in area.

The artifact assemblage associated with the platform reflects the lifestyle of the occupants, and the length of their stay. The presence of food cans and the absence of miscellaneous domestic items is representative of single miners working at a remote location. The miners ate a diet similar to that consumed in other nascent Western mining districts. The food cans reflect the consumption of preserved vegetables, fruits, and meat, which was probably supplemented with grain products. Some of the cans also contained milk, which miners may have used in coffee and tea. The canned food, a lack of butchered bone, and the paucity of domestic items associated with cabin platforms suggests that the mine was active at the beginning of the district's boom, before commercial services were in place, and before fresh food was widely available. A lack of bottle glass indicates that the cabins' inhabitants did not openly drink much liquor or rely on medicines.

The artifact assemblage associated with the cabin platforms reflects a relatively brief occupation during the mid 1890s. An almost even ratio of food cans made with lapped side seams to those made with inner-rolled and soldered side seams reflects a mid 1890s date.

Sulphide No.5 Site Analysis

In terms of mining operations, the shaft complex encompasses the remains of a typical shallow, short-lived labor-intensive prospect operation. Overall, the remains reflect a severely limited investment of capital, yet an earnest attempt at exploring the property. The site was unproductive and abandoned after a short life. The paucity of artifacts, the lack of a developed surface plant, and the small waste rock dump from shallow underground workings reflect a brief occupation. The almost even ratio of cans constructed with inner-rolled and soldered side seams relative to those with lapped side seams suggests that prospectors sank the shaft between the early and mid 1890s.

Prospect Shaft Complex, Sunnyside Claim
Site 5ML80

The Sunnyside claim, located approximately 1,000 feet east of the Bachelor Townsite, features a small complex of three shallow prospect shafts. While most of the associated structures and equipment were removed long ago, the site retains a high degree of historical integrity. Archaeological remains in the forms of shafts, waste rock dumps, a log structure, and associated artifacts characterize the shaft complex. Within recent years the site has suffered minor disturbance when someone used a bulldozer to cut a road upslope from the shafts. The site lies on a rocky northeast-facing slope vegetated with ponderosa pines, aspens, and grasses.

Mining Operations

According to archival sources, prospectors staked the Sunnyside claim by 1892 at the latest, and A.C. Dore purchased the property afterward. Early in the Creede district's history, prospectors explored the ground underneath the claim with three small shafts. It is unknown whether they sank the shafts first, and then staked the claim, or staked the claim first and explored it with shafts afterward.[71]

Prospectors sank the series of shafts along a northwest-southeast trend in search of the fabulous Amethyst Vein. The lack of developed surface plants indicates that the prospectors relied on only the most elementary and impermanent facilities to support their work underground. Specifically, they used hand windlasses for hoisting, and possibly a field shop equipped with basic blacksmith hand tools to maintain and manufacture tools and hardware. Hand windlasses had a depth limitation of 100 feet.[72]

The surface plants associated with the northern and southern-most shafts (Features 1 and 5) historically included several additional components. The presence of ventilation tubing at the base of the southern shaft's waste rock dump indicates that prospectors used either a windsock, or a small hand-turned blower, to ventilate the workings there.

Prospectors erected a small shaft house (Feature 7) to enclose the northern shaft, and possibly to shelter the complex's simple blacksmith shop, as well. The shaft house is fairly crude and small, being only 18 by 18 feet in area and 5 feet high at the roof eaves. Prospectors constructed the shaft house with saddle-notched hewn logs, and they installed a window in the east wall, and a 5 foot wide doorway in the north wall. The fact that they erected the structure over the shaft suggests that they were working during the early spring or late fall, when the weather was foul.

The waste rock dumps for both the northern and southern shafts feature lobes radiating outward, and prospectors graded the dumps' top surfaces flat. The lobes and the level surfaces suggest that prospectors used wheelbarrows to move waste rock away from the shafts, instead of merely emptying full ore buckets at the shaft collars, as was typical. The mining industry recognized wheelbarrows as being strictly temporary class conveyances.

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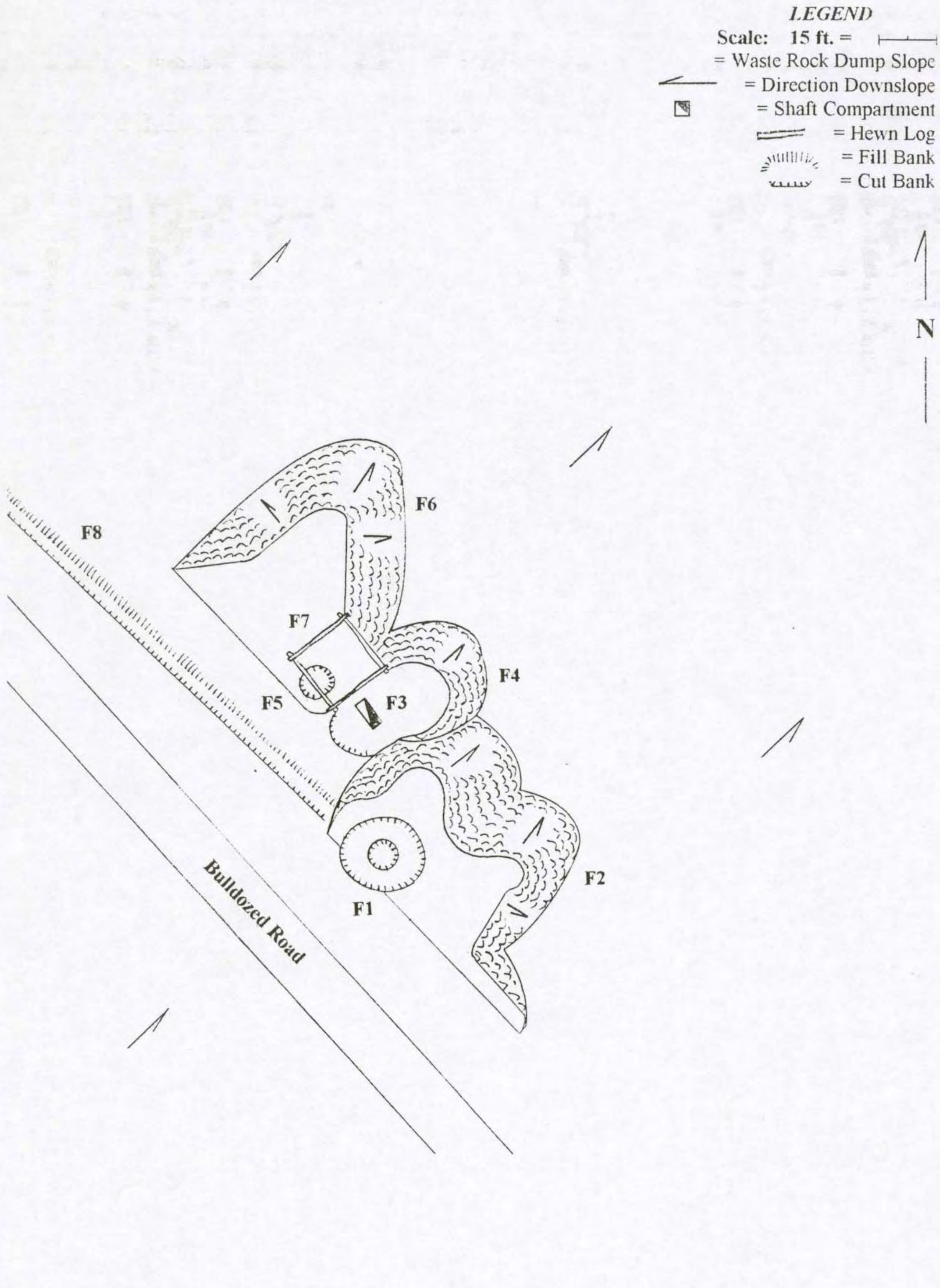
[71] Mumey, Nolie *Creede: The History of a Colorado Silver Mining Town* Artcraft Press, Denver, CO 1949 p40.
[72] Twitty, Eric *Reading the Ruins* Masters Thesis, University of Colorado at Denver, 1999 p193.

PROSPECT SHAFT COMPLEX, SUNNYSIDE CLAIM
CREEDE MINING DISTRICT, MINERAL COUNTY, COLORADO



Residence

The prospect shaft complex lacks evidence specifically indicating that prospectors lived on site. Further, the complex is located close enough to the townsite of Bachelor that the prospectors may have easily commuted to their work on foot. However, several food cans lay downslope from the shafts, suggesting that prospectors may have lived in wall tents on-site for a brief period of time. However, prospectors often kept salvaged cans for utilitarian purposes, such as containing drilling water.

Sunnyside Site Analysis

In terms of mining operations, the shaft complex encompasses the remains of a typical shallow, short-lived labor-intensive prospect operation. Overall, the remains reflect a severely limited investment of capital, yet an earnest attempt at exploring the property. The site was unproductive and abandoned after a short life. The paucity of artifacts, the lack of developed surface plants, and the small waste rock dumps from shallow underground workings reflect a brief occupation. The absence of cut nails, and an almost even ratio of cans constructed with inner-rolled and soldered side seams relative to those with lapped side seams, suggests that prospectors sank the shafts between 1891 and the mid 1890s. The site has sustained minor damage within recent years, however it constitutes a sound example of a small prospect operation.

White Star Mine
Site 5ML202

The White Star Mine is located approximately 600 feet northwest of the Happy Thought Mine, near the Amethyst Vein's north end. The site consists of the remains of two shaft operations. The White Star Shaft lies south, and the northern shaft was a prospect operation whose name is unknown. The terrain encompassing the site slopes north, and the area is vegetated with a dense aspen and spruce forest.

All of the site's structures, machinery, and equipment were removed log ago, and the shaft collars have collapsed, leaving large areas of subsidence. Archaeological features in the forms of cut-and-fill structure platforms, prospect pits, and associated artifacts characterize the White Star site. Further, the archeological remains clearly represent the mines' surface plants.

Mining Operations

Prospectors began sinking the White Star shaft either 1891 or 1892. Due to the remote nature of the Creede district and due to a lack of capital, prospectors developed the claim slowly in subsequent years. By 1893 the property owners, optimistic that they would strike the rich Amethyst Vein, formed a mining company and commenced sinking a shaft in earnest. The White Star outfit erected a conventional surface plant to support work in the shaft, and it consisted of sinking-class components. The prospect shaft adjacent and north appears to have experienced similar development.

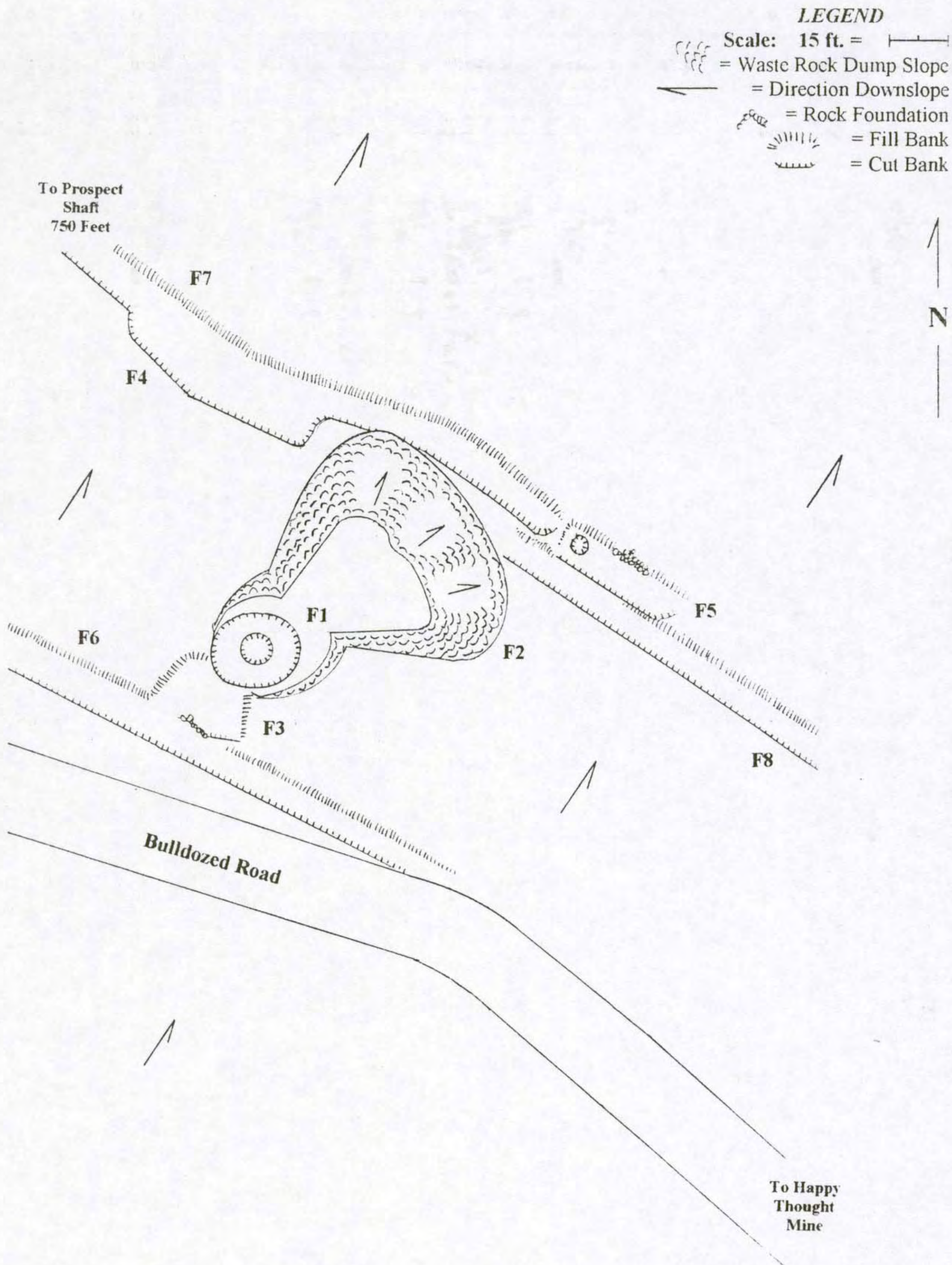
The mine workings underneath the White Star claim became part of an increasingly complex network by around 1900. The Happy Thought Mine, located southeast, and the Park Regent Mine, situated northwest, linked their underground workings with those of the White Star. In addition, during this time the Humphreys Tunnel, an extension of the Nelson Tunnel, reached the mine workings. The variety of entries underground improved ventilation via natural air currents, and they facilitated the exploration for ore. Because miners accessed the White Star's ore through the Humphreys Tunnel and the Happy Thought Mine, the White Star's shaft and surface plant became obsolete and fell into disrepair. By 1912 the White Star Shaft, and probably the adjacent prospect shaft, had decayed to the point of being unserviceable.[73]

Because the White Star property had limited ore reserves, the underground workings fell idle relatively early. Miners worked the property on a limited basis through the tunnel during the 1900s, and when the demand for industrial metals stimulated by World War I boosted metals prices, the White Star's workings came to life one last time. Mining ceased with the collapse of metals prices following armistice, and the claim fell silent, permanently.

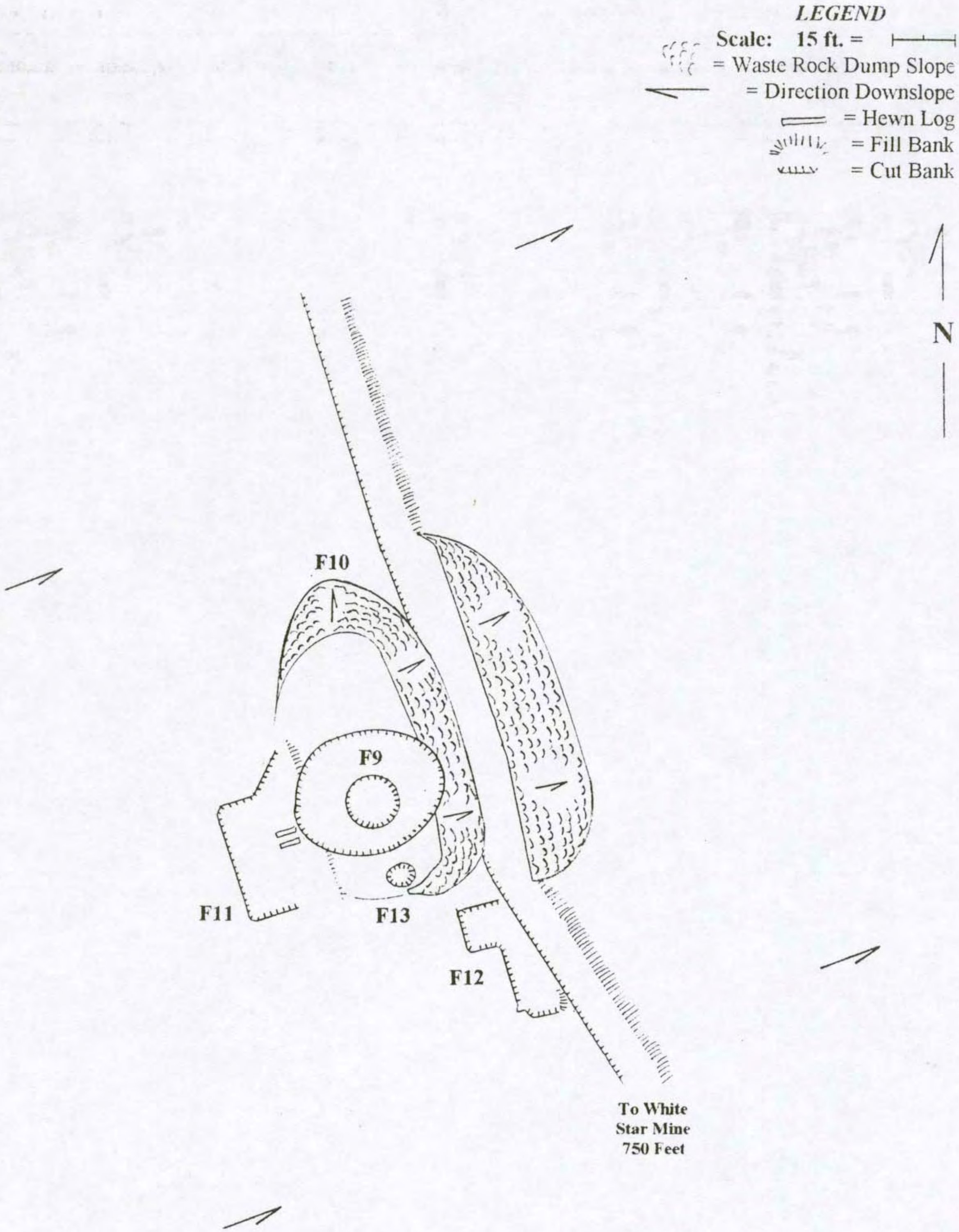
[73] Emmons, William H and Esper, Larsen S. *USGS Bulletin 718: Geology and Ore Deposits of the Creede District, Colorado* U.S. Geological Survey, U.S. Government Printing Office, Washington, DC 1923, p168.

WHITE STAR MINE

CREEDE MINING DISTRICT, MINERAL COUNTY, COLORADO



PROSPECT SHAFT, WHITE STAR CLAIM
CREEDE MINING DISTRICT, MINERAL COUNTY, COLORADO



The existing remains comprising the site clearly represent the physical constitution of the White Star Mine and the adjacent prospect shaft. Further, they provide a significant contribution to the history of the site in the wake of an almost total absence of archival documentation.

According to the material evidence, the White Star operation and the adjacent prospect outfit installed conventional Gilded Age sinking-class surface plants. The White Star's hoisting system was equipped for deep prospecting. The absence of hoist and headframe foundations indicates that the system consisted of a steam donkey hoist and a simple headframe. Donkey hoists and their upright boilers came from the manufacturer assembled on a single chassis, and they were intended to be portable. As a result, donkey hoists required no foundations.

The prospect outfit adjacent to the White Star Shaft erected a hoisting system that consisted of a 4 by 6 foot single drum steam hoist bolted onto a timber foundation, and a simple headframe. A hoist of such a size generated 15 horsepower, and it had the capability to raise one ton at a speed of 250 feet per minute.[74] The absence of a masonry boiler setting indicates that the prospecting outfit used a locomotive boiler. Because the hoist required approximately 15 to 20 boiler-horsepower to run, the outfit had to use a boiler at least 3 feet in diameter and 11 feet long to provide the hoist with adequate steam.[75] A lack of boiler clinker at both shaft complexes indicates that mine workers fired the boilers with cordwood rather than coal. Cordwood probably was plentiful only during the Creede district's early years.

Both mining operations enclosed their machinery and the necessary blacksmith shops in small frame hoist houses. The White Star's hoist house was approximately 20 by 25 feet in area, and the shop was equipped with a free-standing pan forge and hand-powered appliances. The adjacent prospect outfit's hoist house was approximately 20 by 30 feet in area, and the shop was like that of the White Star operation.

Both mining outfits used ore cars on mine rail lines for moving rock and equipment. The waste rock dumps' flat top surfaces and footprints reflect the use of such transportation systems.

Residence

No direct evidence exists that indicates the crews that worked for both mining operations lived on-site. Both shaft complexes feature additional cut-and-fill platforms which supported frame buildings. The White Star Mine includes Features 4 and 5, and the adjacent prospect shaft includes Feature 12. The artifact assemblages associated with the platforms consist of only a few food cans each, which is not enough refuse to suggest inhabitation. However, heavy revegetation and humus coverage may obscure additional domestic items.

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[74] Twitty, Eric *Reading the Ruins* Masters Thesis, University of Colorado at Denver, 1999 p243.

[75] Twitty, Eric *Reading the Ruins* Masters Thesis, University of Colorado at Denver, 1999 p205.

White Star Mine Site Analysis

In terms of mining operations, the White Star Mine and the adjacent prospect operation reflect modest investments of capital, an earnest attempt at subsurface exploration, and conventional engineering. The mining companies equipped both shafts with simple, temporary-class surface plants. The simple nature of the surface plants and the absence of ore storage facilities indicate that the operations were unproductive. Further, the relatively small waste rock dumps reflect limited underground workings. Both shafts appear to have been abandoned after short lives. The site's overall light density of artifacts reflect brief occupations, and a lack of boiler fuel residue indicates that the steam machinery was used for a short time. A lack of cut nails and a set of food cans constructed with inner-rolled and solder side seams suggests that the mine's surface plant was abandoned in the mid 1890s, and not earlier.

Prospect Shaft, Name Unknown
Site 5ML348

The prospect shaft is located on the north edge of the Bachelor Townsite. All of the associated structures and equipment were removed long ago, and the site retains a low degree of historical integrity. Within recent years the site has suffered minor disturbance when someone used a bulldozer to widen a road passing through the site. The site lies on the border of open meadow and an aspen and spruce forest.

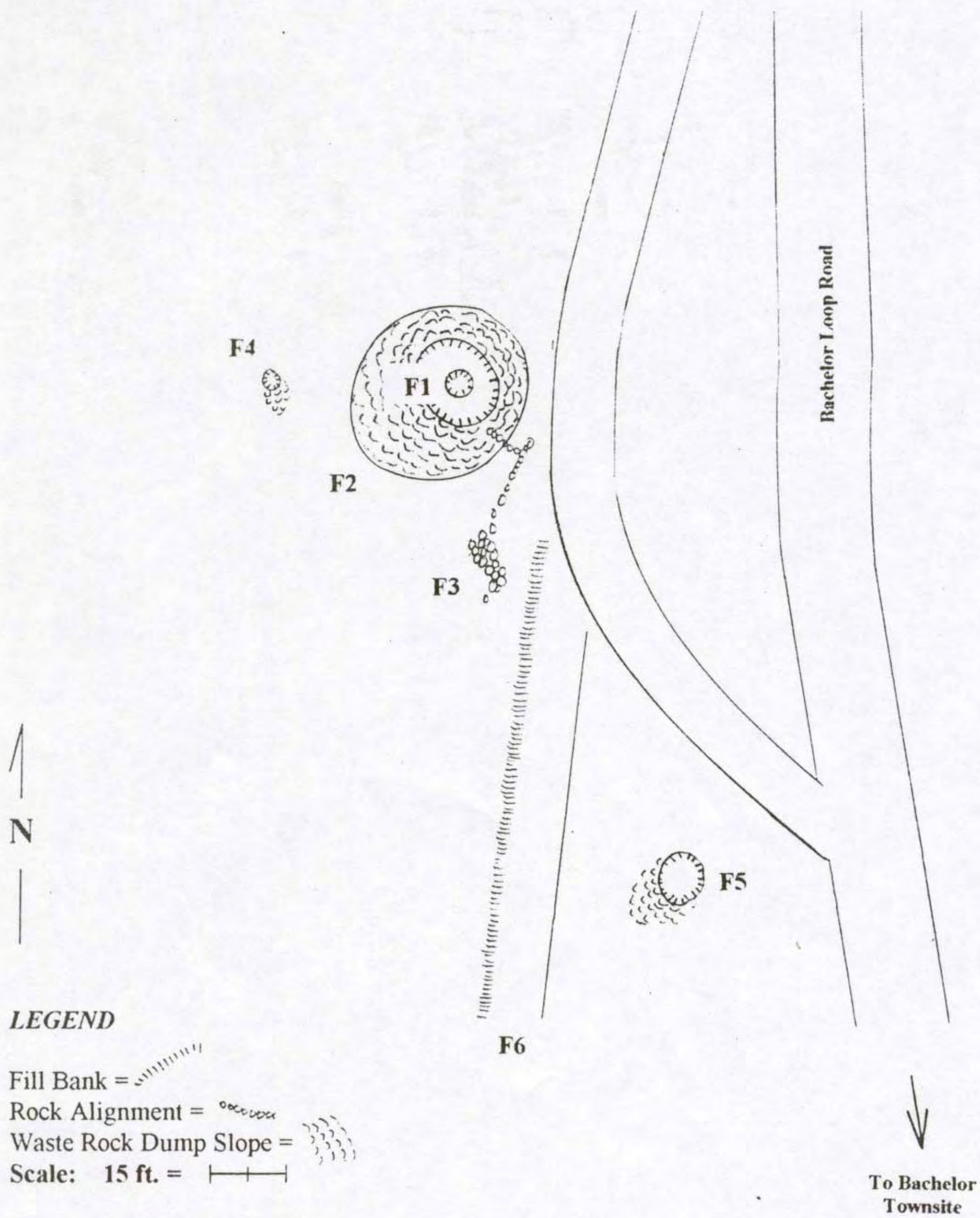
Mining Operations

Historically, the operation was a typical, primitive, small exploratory prospect shaft. The lack of a developed surface plant indicates that the prospectors relied on only the most elementary and impermanent facilities to support work underground. Specifically, they used a hand windlass for hoisting, and possibly a field shop equipped with basic blacksmith hand tools to maintain and manufacture tools and hardware. The small waste rock dump reflects shallow, limited underground workings.

Residence

The prospect shaft complex lacks evidence indicating that prospectors lived on site. In addition, the complex is located close enough to the townsite of Bachelor that the prospectors may have easily commuted to their work on foot from a residence in town.

PROSPECT SHAFT, NAME UNKNOWN
CREEDE MINING DISTRICT, MINERAL COUNTY, COLORADO



Site Analysis

The site represents the remains of a typical shallow, short-lived labor-intensive prospect operation. Overall, the prospectors who sank the shaft suffered from severely limited capital, yet they made an earnest attempt at subsurface exploration. The shaft was unproductive and abandoned after a short life, which is reflected by the paucity of artifacts and lack of waste rock. Absence of cut nails and the presence of wire nails suggests that the prospectors worked the shaft between around 1892 and the Silver Crash of 1893. The degree to which the site has revegetated and suffered erosion reflects early abandonment.

The site encompasses several other historic features in addition to the shaft. The roads that pass through the site are part of a main artery that extended from the town of Bachelor to mines on the north portion of the Amethyst Vein. Feature 6 is historic in nature, and the other roads are part of the current Bachelor Loop road. The site also features the remains of a fenceline (Feature 3), represented by alignments of fieldstones.

CHAPTER 8 EVALUATIONS AND RECOMMENDATIONS

Amethyst Shaft
Site 5ML247

The Amethyst Shaft complex is eligible for listing in the National Register of Historic Places. The site possesses a moderate degree of physical integrity, and it meets National Register Criteria A through D.

Within recent years someone used heavy equipment to obliterate the areas encompassing and south of the shaft, and they widened the road passing upslope from the shaft house platform.

In terms of *Criterion A*, the Amethyst Shaft complex is associated with events that have made a contribution to the broad pattern of our history. The Amethyst Mine was the wealthiest and one of the oldest operations in the Creede Mining District, one of America's most productive silver-lead mining areas. In this context, both the mine and the Creede Mining District played an important part in the technological, geographic, economic, and commercial patterns typical of the Western mining frontier.

The Amethyst Mine produced a high volume of silver and industrial metals, which is meaningful on national, state, and local levels. The resultant profits lent credibility to and fostered speculation in Colorado mining during the Gilded Age and Great Depression. Further, the industrial metals that the mine produced provided materials for manufacturing, especially during both world wars.

The Amethyst Mine served as the focal point of several innovative technologies and mining engineering projects, which contribute to the site's significance. The mine became a link in the two mile long Nelson Tunnel, driven to facilitate deep haulage and drainage. The Amethyst Mine's link with the Nelson Tunnel made the operation part of a complex and unique ore extraction system. Making the initial connection from the Nelson Tunnel to the Amethyst Shaft proved problematic because the shaft's sump was flooded, threatening to inundate the tunnel below. The Nelson company's engineers proposed using long-hole diamond drills to bore small drain holes into the shaft's sump. Diamond drills, now commonly used for deep geological sampling, were in a developmental stage during the late 1890s, when they were used to penetrate the Amethyst Shaft. During the late 1890s Amethyst miners used stoper drills to bore blast-holes into the ceilings of the mine workings. At that time, stoper drills were an innovative drilling technology, and they served as one of the foundations upon which all modern rockdrills and jackhammers are currently based. Few mines used stoper drills at such an early time. By the 1920s stoper drills became a main-stay technology in mines.

Last, the Amethyst Mining Company at first shipped its ore directly to smelters in Pueblo, Colorado, and to Missouri for refining. By around 1900, the mining company concentrated its ore in a small mill on West Willow Creek, and shipped the concentrates to smelters for refining. The shipment of ore, and later the concentrates, reflects the mine's ties to complex economic, commercial, and transportation systems in the Midwest and the East. In addition, in erecting a concentration mill which was powered by both steam and electricity, the Amethyst Mine played a role in the early development of milling technology.

In terms of *Criterion B*, the Amethyst Shaft complex is associated with persons significant to our past. Specifically, Nicholas C. Creede located the Amethyst Mine in 1891. Creede played a major role in the discovery and development of many of the district's best mines. Creede sold a principal share in the property to a trio of investors, including David H. Moffat, U.S. Army Captain L.E. Campbell, and Denver & Rio Grande Railroad general manager Sylvester T. Smith. David H. Moffat was a Colorado mining baron, railroad magnate, and business financier. Moffat played a principal role in the development of the Rocky Mountain West, and through his political connections he helped influence federal policy toward mining, railroads, and the business climate in the West.

In terms of *Criterion C*, the Amethyst Mine embodies the distinctive characteristics of a large, well-capitalized, advanced, and highly productive Western metals shaft mine. While the site consists primarily of archaeological remnants, the scope and nature of the former mining operation can be ciphered out of the extant material culture. The site presents a sound example of both a typical Gilded Age mechanized steam-powered surface plant, and a rare Gilded Age electric-powered operation, when the mine was upgraded during the 1910s. Based on evidence of both forms of technology, the site can be viewed as illustrating the transition of mining technology over time.

The Amethyst Shaft complex includes unique architectural elements, which contribute to the site's eligibility. Specifically, the site encompasses a standing ore sorting house. The structure is a sample of a Western mining vernacular industrial building, and of a technology specific to manually concentrating silver ores.

In terms of *Criterion D*, the Amethyst Shaft complex is very likely to yield information important to the interpretation and understanding of Western mining and its participants. First, the site encompasses a collapsed assay and administrative office. The associated privy pits and the cut bank surrounding the office probably contain meaningful buried cultural deposits. Second, the structural debris comprising the collapsed building may overlie material culture which can shed light on assaying and mining administration. Last, the Amethyst Mine's underground workings probably contain internal structures and artifacts which can contribute greatly to a currently dim understanding of mining engineering and the mine as a workplace.

Management recommendations suggest efforts to collect further information, to stabilize extant structures, and to define acceptable disturbance to the site in light of possible environmental remediation. Specifically, the area encompassing the assay shop and office, and the associated privy pits (Features 11, 12, and 13) may include buried cultural deposits, which should be excavated. The standing ore sorting house (Feature 14) is in danger of collapsing, and should be stabilized. Last, the portions of the site which have suffered disturbance within the recent past may provide sufficient area for water run on/ run off control systems.

Amethyst Tunnel
Site 5ML247

The Amethyst Tunnel complex is eligible for listing in the National Register of Historic Places. The site possesses a high degree of physical integrity, and it meets National Register Criteria A through D. Because the mine is located in a unique natural setting and features an intact surface plant, the site possesses an ambience uncommon to most Western mines.

In terms of *Criterion A*, the Amethyst Tunnel complex is associated with events that have made a contribution to the broad pattern of our history. In general, the Amethyst Mine was the wealthiest and one of the oldest operations in the Creede Mining District, one of America's most productive silver-lead mining areas. In this context, both the mine and the Creede Mining District played an important part in the patterns typical of the Western mining frontier.

The Amethyst Mine produced a high volume of silver and industrial metals, which is meaningful on national, state, and local levels. The resultant profits lent credibility to and fostered speculation in Colorado mining during the Gilded Age. Further, the industrial metals that the mine produced provided materials for manufacturing, especially during both world wars.

The Amethyst Tunnel was driven in 1928 to tap the mine's upper workings, and is therefore a part of the Amethyst complex. The increased production afforded by the tunnel lent credibility to and fostered speculation in Colorado mining during the Great Depression and afterward, when the tunnel was active.

The Amethyst Mine's operators shipped their ore to smelters in Missouri for refining, which reflects the complex economic, commercial, and transportation ties that Western mines had with milling and manufacturing centers in the Midwest and the East.

Last, the Amethyst Tunnel complex was active during the Great Depression, and was part of the pattern of a resurgence of metals mining in the West following President Franklin Delano Roosevelt's signing the Gold and Silver acts into law in 1934. The subsequent wave of mining provided jobs to out-of-work miners and laborers, and it supported the economy in the West.

In terms of *Criterion B*, the Amethyst Tunnel complex is associated with organizations significant to our past. Specifically, the Emperius Mining Company purchased the Amethyst properties in 1939. Emperius purchased most of the Creede district's principal mines during the Great Depression and extracted ore using economies of scale, and in so doing kept mining alive in the district.

In terms of *Criterion C*, the Amethyst Tunnel complex embodies the distinctive characteristics of both a well-capitalized, advanced, and highly productive Depression-era Western metals tunnel mine, and a Gilded Age ore reduction mill. The site consists of archaeological remnants and many standing structures associated with the tunnel, and it includes the foundations for the Amethyst Mill. Because the Amethyst Tunnel functioned from 1928 until the 1970s, the site can be viewed as illustrating the transition of mining technology over time.

The Amethyst Tunnel complex includes several historic structures, including a barn, a compressor house, an explosives magazine, and an ore sorting house. The structures are unique examples of Western mining vernacular architecture, and the ore sorting house represents a process specific to manually concentrating silver ores.

In terms of *Criterion D*, the Amethyst Tunnel complex is very likely to yield information important to the interpretation and understanding of Western mining and its participants. Specifically, the Amethyst Mill foundation and the encompassing area may conceal buried deposits that can shed light on Gilded Age ore reduction milling. Little is currently known about the field application of such milling in the West, and in Colorado.

Management recommendations suggest efforts to collect further information, to stabilize extant structures, and to define acceptable disturbance to the site in light of possible environmental remediation. Specifically, the area encompassing the Amethyst Mill foundation (Features 28-33) may include buried cultural deposits, which should be excavated. The standing ore sorting house (Feature 16) is in danger of collapsing, and should be stabilized. Log cribbing walls retain portions of the mine's waste rock dumps out of West Willow Creek's channel, and they are in danger of collapsing. The walls should be reinforced. In addition, the culvert directing the creek past the Amethyst Tunnel portal should be enlarged to minimize risk of flooding the site. Water run on/ run off diversion efforts should minimize disturbance to the site.

Annie Rooney Mine
Site 5ML343

The Annie Rooney Mine is eligible for listing in the National Register of Historic Places. The site possesses a great degree of physical integrity, and it meets National Register Criteria A through D. In terms of *Criterion A*, the Annie Rooney Mine is associated with events that have made a contribution to the broad pattern of our history. The Annie Rooney Mine was one of the oldest prospect operations in the Creede Mining District, which was one of America's most productive silver-lead mining areas. Miners drove the adit around 1890 in search of the Amethyst Vein. In this context, both the mine and the Creede Mining District played an important part in the patterns typical of the Western mining frontier.

In terms of *Criterion B*, the Annie Rooney site is associated with persons significant to our past. Specifically, in 1892 the Last Chance Mining & Milling Company, owned principally by Henry O. Wolcott, purchased the property. As a businessman and speculator, Henry O. Wolcott influenced Colorado mining, as well as business and finance in the Rocky Mountain West. As a senator, Wolcott impacted the shaping of Federal policy toward mining, economics, and politics in the West, and especially Colorado.

In terms of *Criterion C*, the Annie Rooney site embodies the distinctive characteristics of a type of well-capitalized and advanced Gilded Age deep prospect adit operation. While the site consists primarily of archaeological remnants, the scope and nature of the former mining operation can be ciphered out of the extant material culture. The site includes evidence of a small, mechanized steam-powered surface plant, and as such, it serves as a sound example of Gilded Age mining engineering. Because the mine's surface plant was abandoned in the early 1890s after a short operating period, the site serves as a fine example of a circa 1890 mechanized adit operation and associated residential complex.

In terms of *Criterion D*, the Annie Rooney Mine is very likely to yield information important to the interpretation and understanding of Western mining and its participants. Specifically, the site's privy pit, the trash dump, and the residential building platforms probably conceal buried deposits that can shed light on the lifestyles of circa early 1890s prospecting and mining crews living at remote locations.

Management recommendations suggest efforts to collect further information and to define acceptable disturbance to the site in light of possible environmental remediation. Specifically, the residential platforms and the mine's privy pit (Features 11-14) may include buried cultural deposits, which should be excavated. No portion of the site should be disturbed by water run on/ run off diversion efforts, because the features are sensitive and closely spaced.

Bachelor Mine
5ML80

The Bachelor Mine, which consists of upper and lower tunnel complexes, is eligible for listing in the National Register of Historic Places. Both sites possess physical integrity, and they meet National Register Criteria A through D.

The lower tunnel complex retains a higher degree of integrity than does the upper tunnel complex. Within recent decades, someone used a bulldozer to scrape down a portion of the upper tunnel's waste rock dump, they graded a road part way down the dump's flank, and they widened the mine's access road. The lower tunnel's surface plant, however, remains virtually undisturbed. Regardless of the disturbance, because of the mine's unique natural setting and the intact nature of both tunnel complexes, the site possesses an ambience uncommon to most Western mines.

In terms of *Criterion A*, the mine is associated with events that have made a contribution to the broad pattern of our history. The Bachelor Mine was one of the wealthiest and oldest operations in the Creede Mining District, which was one of America's most productive silver-lead mining areas. In fact, the claim was the second staked in the Creede district. The Bachelor Mine served as a significant component of the Creede Mining District, which played an important role in the technological, geographic, economic, and commercial patterns of the Western mining frontier.

The mine produced a high volume of silver and industrial metals, which is meaningful on national, state, and local levels. The resultant profits lent credibility to and fostered speculation in Colorado and Western mining during the Gilded Age and Great Depression. Further, the industrial metals that the mine produced provided materials for manufacturing, especially during both world wars. In this context, both the mine and the Creede Mining District played an important part in the patterns of supplying raw materials to America's booming manufacturing industry.

The Bachelor Mining Company at first shipped its ore directly to smelters in Pueblo, Colorado, and to Missouri for refining. By around 1900, the mining company concentrated its ore in the Humphreys Mill on West Willow Creek, and shipped the concentrates to smelters for refining. The shipment of ore, and later the concentrates, reflects the complex economic, commercial, and transportation ties that Western mines had with financial, milling, and manufacturing centers in the Midwest and the East.

Last, the Bachelor Mine employed a variety of innovative solutions to solve the problems of mining in inaccessible and remote areas, and in so doing, the mine played an important role in the development and advance of mining technology. Specifically, the Bachelor Mining Company's engineers developed the ore bodies through three principal tunnels, including the Nelson Tunnel, they used an advanced aerial tramway to move ore to the railhead at North Creede, and they erected two mechanized surface plants to support work underground. The Bachelor Mine's link with the Nelson Tunnel made the operation part of a complex ore extraction system. Last, during the 1890s the Bachelor Mining Company erected an electrical generating and compressed air plant at a time when electric technology was in a nascent state, which contributed to the field applications of this power source.

In terms of *Criterion B*, the Bachelor Mine is associated with persons significant to our past. Specifically, John C. McKenzie and H.M. Bennett located the Bachelor claim in 1878. The prospectors played a major role in the discovery and opening of the district. McKenzie sold the property to a group of investors including mining and railroad magnate David H. Moffat, U.S. Army Captain L.E. Campbell, Denver & Rio Grande Railroad general manager Sylvester T. Smith, and Senator Thomas Bowen.

In terms of *Criterion C*, the Bachelor Mine embodies the distinctive characteristics of a large, well-capitalized, advanced, and highly productive Western metals tunnel mine. The upper and lower tunnel sites consist of a combination of archaeological remnants and standing structures dating primarily from the 1890s to the 1930s. The upper tunnel complex includes surface plant components dating from the original boom-era operation, and additional components installed during the district's 1930s revival. Considered separately, the surface plant components reflect large Gilded Age and Depression-era tunnel operations, and when viewed together, the components can be compared and contrasted to reflect constants and changes in mining technology and engineering over time. The lower tunnel's surface plant, inaccessible by road, was little altered from its construction around 1900. The associated archaeological remains and the standing structures present a rare, undisturbed, and highly intact example of a large, well-engineered circa 1900 tunnel operation.

Both the upper and lower tunnel complexes include a variety of standing buildings typical of and unique to Western mining. The upper tunnel complex features a large ore sorting house and aerial tramway terminal that mine workers built in 1940, and three small explosives magazines erected in the 1900s, 1930s, and the 1950s, respectively. The magazines are typical of those erected at other Western metals mines, while the ore sorting house and tram terminal are unique. Further, the ore sorting house serves as an excellent example of manual ore concentration processes, and the tram terminal represents vernacular mechanical engineering and a complex pre-automobile transportation system.

The lower tunnel complex features a collection of noteworthy buildings, including a large ore sorting house, an aerial tramway terminal, a large shop and change house, a barn, a dynamite thaw house, and an explosives magazine. The ore sorting house and aerial tramway, erected in the late 1890s, are the unique work of a master engineer. Both structures, in sound condition, are excellent and very rare examples of the types of massive wooden industrial buildings typical of Gilded Age metals mining. Further, the ore sorting house serves as an excellent example of manual ore concentration processes, and the tram terminal represents vernacular mechanical engineering and a complex transportation system. Few Gilded Age aerial tramway terminals remain standing in the West, lending importance to the terminal at the lower Bachelor Tunnel.

The shop building and the dynamite thawing house, erected in the late 1890s, are unique examples of large, vernacular industrial mine facilities. In general, such structures dating to this time period are rare among extant Western mine complexes, which adds to the site's importance. In specific, the thawing house was a facility few Western mines spent capital erecting.

In terms of *Criterion D*, the Bachelor Mine is very likely to yield information important to the interpretation and understanding of Western mining and its participants. First, the upper tunnel site encompasses privy pits and a trash dump which were associated with a large boarding house. The pits and the dump probably contain meaningful buried cultural deposits which can shed light on the lifestyles of mine crews living at remote operations. Last, the mine's underground workings probably contain internal structures and artifacts which can contribute greatly to a currently dim understanding of mining engineering and the mine as a workplace.

Management recommendations suggest efforts to collect further information, to stabilize extant structures, and to define acceptable disturbance to the site in light of possible environmental remediation. Specifically, the privy pits associated with the residential complex (Feature 22) may include buried cultural deposits, which should be excavated. All standing structures at both tunnel complexes are in danger of collapsing and should be stabilized. In particular, dry rot has damaged the foundations for both ore sorting houses, the aerial tram terminals, and the shop building, and they are in the greatest danger. Last, the portions of the site which have suffered disturbance within the recent past may provide sufficient area for water run on/ run off control systems.

Commodor Mine: Tunnel No.1
Site 5ML344

The Commodor Mine's Tunnel No.1 is eligible for listing in the National Register of Historic Places. The site possesses physical integrity because it has remained virtually undisturbed, and it meets National Register Criteria A through D. In terms of *Criterion A*, the Tunnel No.1 site is associated with events that have made a contribution to the broad pattern of our history. The Tunnel No.1 was one of the oldest prospect operations in the Creede Mining District, which was one of America's most productive silver-lead mining areas. In this context, both the mine and the Creede Mining District played an important part in the patterns typical of the Western mining frontier.

Miners drove the adit around 1891 to tap the Amethyst Vein. In the late 1890s, miners drove the Commodor Tunnel No.5, and linked it with the workings underlying Tunnel No.1. In accomplishing this, Tunnel No.1 became part of a complex mine that was one of the most productive in the Creede district.

The Commodor Mine produced a high volume of silver and industrial metals, which is meaningful on national, state, and local levels. The resultant profits lent credibility to and fostered speculation in Colorado mining during the Gilded Age and Great Depression. Further, the industrial metals that the mine produced provided materials for manufacturing, especially during both world wars. Last, the Commodor Mining Company shipped its ore to smelters in Pueblo, Colorado and to Missouri for refining, which reflects the complex economic, commercial, and transportation ties that Western mines had with financial, milling, and manufacturing centers in the Midwest and the East.

In terms of *Criterion B*, the Commodor Mine's Tunnel No.1 site is associated with persons significant to our past. Specifically, in 1892 the A.E. Reynolds purchased the property. Reynolds was a mining magnate who invested heavily in San Juan silver mines, and his capital facilitated mining throughout southwest Colorado. In 1900 David M. Moffat's syndicate, which included U.S. Army Captain L.E. Campbell, Denver & Rio Grande Railroad general manager Sylvester T. Smith, and Senator Thomas Bowen, purchased a controlling interest in the Commodor Mining Company. In 1935 the Emperius Mining Company purchased the mine as part of an acquisition campaign. Emperius is significant to the Creede district because it kept many mines operating long after the area went into decline.

In terms of *Criterion C*, the Tunnel No.1 site embodies the distinctive characteristics of a type of modestly capitalized Gilded Age deep prospect adit operation. While the site consists primarily of archaeological remnants, the scope and nature of the former mining operation is clearly represented by the extant material culture. The site includes evidence of a small surface plant, and as such, it serves as a sound example of simple Gilded Age mining engineering. The site also includes a dynamite thawing house, erected in the late 1890s. In general, such structures dating to this time period are rare among extant Western mine complexes, which adds to the site's importance.

In terms of *Criterion D*, the Tunnel No.1 site may yield information important to the interpretation and understanding of Western mining and its participants. Specifically, the area downslope from a collapsed shop building may conceal buried deposits that can shed light on the lifestyles of circa early 1890s prospecting and mining crews. Last, the mine's underground workings probably contain internal structures and artifacts which can contribute greatly to a currently dim understanding of mining engineering and the mine as a workplace.

Management recommendations suggest efforts to collect further information, to stabilize extant structures, and to define acceptable disturbance to the site in light of possible environmental remediation. Specifically, the area downslope from the collapsed shop building (Feature 3) may include buried cultural deposits, which should be excavated. The standing dynamite thaw house (Feature 5) is in danger of collapsing, and should be stabilized. Last, the area upslope from the site features a bulldozed road that may provide sufficient area for water run on/ run off control systems. The site should not be disturbed due to sensitive and closely spaced features.

Commodor Mine: Tunnel No.5
Site 5ML80

The Commodor Mine's Tunnel No.5 complex is eligible for listing in the National Register of Historic Places. The site possesses a high proportion of physical integrity, and it meets National Register Criteria A through D.

Mining and other activities within the last 50 years have damaged and erased portions of the original operation's surface plant. However, the surface plant components dating from the 1930s operation, and later, possess a high degree of integrity. The mine complex is unusually expansive and intact, and it possesses an ambience rare among typical historical Western mine sites.

In terms of *Criterion A*, the Tunnel No.5 complex is associated with events that have made a contribution to the broad pattern of our history. The Commodor Mine was one of the wealthiest and the longest-lived operations in the Creede Mining District, which was one of America's most productive silver-lead mining areas.

The tunnel was driven in the late 1890s to tap the Commodor Mine's upper workings. The mine produced a high volume of silver and industrial metals, which is meaningful on national, state, and local levels. The resultant profits lent credibility to and fostered speculation in Colorado mining during Gilded Age and the Great Depression, and afterward. Further, the industrial metals that the mine produced provided materials for manufacturing, especially during World War II.

The Commodor Mine's operators shipped the ore to smelters in Pueblo, Colorado and to Missouri for refining, which reflects the complex economic, commercial, and transportation ties that Western mines had with milling and manufacturing centers in the Midwest and the East.

Last, the Commodor Mine was active during the Great Depression, and was part of a pattern of a resurgence of metals mining in the West following President Franklin Delano Roosevelt's signing the Gold and Silver acts into law. The wave of mining provided jobs to out-of-work miners and laborers, and it supported the economy in the West.

In terms of *Criterion B*, the Commodor Mine is associated with persons significant to our past. Specifically, in 1892 A.E. Reynolds purchased the property. Reynolds was a mining magnate who invested heavily in San Juan silver mines, and his capital facilitated mining throughout southwest Colorado. In 1900 David M. Moffat's syndicate, which included U.S. Army Captain L.E. Campbell, Denver & Rio Grande Railroad general manager Sylvester T. Smith, and Senator Thomas Bowen, purchased a controlling interest in the Commodor Mining Company. In 1935 the Emperius Mining Company purchased the mine as part of an acquisition campaign. Emperius is significant to the Creede district, because it kept many mines operating long after the area went into decline.

In terms of *Criterion C*, the Tunnel No.5 complex embodies the distinctive characteristics of a type of well-capitalized, advanced, and highly productive metals tunnel mine. In general, the site consists of archaeological remnants and many standing structures, and as such, the site serves as a sound example of a Gilded Age and a Depression-era tunnel operation. Because the Tunnel No.5 functioned from the late 1890s until the 1980s, the site can be viewed as illustrating the transition of mining technology over time.

The site's historic structures include 3 compressor houses, 3 generator houses, an office, and 2 ore sorting houses. The structures are unique examples of Western mining vernacular architecture, and the ore sorting houses represent a process specific to manually concentrating silver ores. In particular, the site's large ore sorting house is the unique work of a master engineer. The structure's enormous size and its complexity define it as being rare in the mining West.

In terms of *Criterion D*, the Commodor Mine features underground workings probably containing internal structures and artifacts which can contribute greatly to a currently dim understanding of mining engineering and the mine as a workplace.

Management recommendations suggest efforts to collect further information, to stabilize extant structures, and to define acceptable disturbance to the site in light of possible environmental remediation. Specifically, many of the standing buildings contain piles of artifacts which should be collected before unauthorized personnel remove the items. The standing structures in the site's north portion are in danger of collapsing and should be stabilized. The standing structures in the south portion of the site should be examined for stability. The flume system that carries West Willow Creek through the site provides an inadequate carrying capacity, and must be enlarged. If not, the entire north portion of the site is a risk of being destroyed during high water years. Further, the log cribbing that retains the mine's waste rock out of the creek is heavily eroded and is in danger of collapse. Should this occur, the integrity of the site's south portion will be compromised. The cribbing should be repaired or replaced. Last, the portions of the site which have suffered disturbance within the recent past may provide sufficient area for water run on/ run off control systems.

Del Monte Mine
Site 5ML204

The Del Monte Mine is eligible for listing in the National Register of Historic Places. While the site possesses limited physical integrity, it meets National Register Criteria A, C, and D.

Within recent years someone used a bulldozer to push waste rock into the shaft, compromising the integrity of portions of the waste rock dump and the shaft collar. In addition, numerous small piles of earth and rock were deposited on the site's south portion, obscuring the area around the hoist and boiler setting remnant.

In terms of *Criterion A*, the Del Monte Mine is associated with events that have made a contribution to the broad pattern of our history. The mine was one of the oldest prospect operations in the Creede Mining District, which was one of America's most productive silver-lead mining areas. Miners drove the shaft around 1891 to tap the Amethyst Vein. As such, the Del Monte Mine was a constituent of a mining district important to the Western mining frontier.

In terms of *Criterion C*, the Del Monte Mine embodies the distinctive characteristics of a type of modestly-capitalized, simple metals shaft mine. In general, the site consists of archaeological remnants, and as such, the site serves as a sound example of a Gilded Age shaft operation. Most of the mine's principal surface plant components are represented by the material culture.

In terms of *Criterion D*, the Del Monte Mine is very likely to yield information important to the interpretation and understanding of Western mining and its participants. Specifically, the site's privy pit and the residential building platforms may conceal buried deposits that can shed light on the lifestyles and foodways of circa early 1890s prospecting and mining crews.

Management recommendations suggest efforts to collect further information and to define acceptable disturbance to the site in light of possible environmental remediation. Specifically, the privy pit and the areas encompassing the residential platforms should be excavated.

Happy Thought Mine
Site 5ML202

The Happy Thought Mine site is eligible for listing in the National Register of Historic Places. The mine complex possesses a great degree of physical integrity, and it meets National Register Criteria A through D. The principal disturbance to the site occurred years ago when someone used a bulldozer to widen the existing road passing through the site.

In terms of *Criterion A*, the Happy Thought complex is associated with events that have made a contribution to the broad pattern of our history. The Happy Thought was an early and one of the wealthiest operations in the Creede Mining District, which was one of America's most productive silver-lead mining areas. As such, the mine played a role in the broad pattern of the Western mining frontier.

The Happy Thought Mine produced a high volume of silver and industrial metals, which is meaningful on national, state, and local levels. The resultant profits lent credibility to and fostered the pattern of speculation in Colorado mining during the Gilded Age and Great Depression. Further, the industrial metals that the mine produced provided materials for manufacturing, especially during the first world war.

Last, the Happy Thought Mine served as the focal point of several innovative technologies and mining engineering projects. The mine served as a link in the two mile long Nelson Tunnel, driven to facilitate deep haulage and drainage, and in so doing, the mine became part of a complex ore extraction system. During the late 1890s the Happy Thought's miners used stoper drills to bore blast-holes into the ceilings of the mine workings. At that time, stoper drills were an innovative drilling technology, and they served as one of the foundations upon which all modern rockdrills and jackhammers are currently based. Few mines used stoper drills at such an early time. By the 1920s stoper drills became a main-stay mining technology. Last, around 1900 the Happy Thought Mine's operators erected a concentration mill at the mine, and they shipped the concentrates to smelters in Pueblo, Colorado and to Missouri for refining. By erecting a mill on-site, the Happy Thought Mine participated in the development of ore reduction technology in the West.

The fact that the mine's owners shipped at first ore, then concentrates for refining reflects the complex economic, commercial, and transportation ties that Western mines had with financial, milling, and manufacturing centers in the Midwest and the East.

In terms of *Criterion B*, the Happy Thought is associated with persons significant to our past. Specifically, mining and railroad magnate David H. Moffat, U.S. Army Captain L.E. Campbell, and Denver & Rio Grande Railroad general manager Sylvester T. Smith purchased the property in 1894.

In terms of *Criterion C*, the Happy Thought Mine complex embodies the distinctive characteristics of a type of large, well-capitalized, advanced, and highly productive Western metals mine and residential complex. While the site consists primarily of archaeological remnants, the scope and nature of the former mining operation is clearly visible in the extant material culture. The site includes evidence of a typical mechanized steam-powered mine surface plant erected during the 1900s. As such, the site presents a sound example of Gilded Age steam-powered mining engineering, and Gilded Age e mill engineering.

In terms of *Criterion D*, the Happy Thought Mine complex is very likely to yield information important to the interpretation and understanding of Western mining and its participants. First, the site encompasses privy pits, trash-filled prospect shafts, and platforms that supported an assay and administrative office and residential buildings. The privy pits, the platforms, and the shafts probably contain meaningful buried cultural deposits. Last, the mine's underground workings probably contain internal structures and artifacts which can contribute greatly to a currently dim understanding of mining engineering and the mine as a workplace.

Management recommendations suggest efforts to collect further information and to define acceptable disturbance to the site in light of possible environmental remediation. The site's northern privy pit and the residential platforms should be excavated.

Last Chance Mine
Site 5ML345

The Last Chance Mine complex is eligible for listing in the National Register of Historic Places. The site possesses a high degree of physical integrity, and it meets National Register Criteria A through D.

The most significant disturbance to the site occurred within the last several decades when someone widened the existing access road with a bulldozer, and when nearly all of the waste rock dump was removed for processing. Regardless, the site possesses ambiance.

In terms of *Criterion A*, the Last Chance complex is associated with events that have made a contribution to the broad pattern of our history. The Last Chance Mine was one of the wealthiest and oldest operations in the Creede Mining District, which was one of America's most productive silver-lead mining areas. As such, the mine played a role in the broad patterns typical of the Western mining frontier.

The mine produced a high volume of silver and industrial metals, which is meaningful on national, state, and local levels. The resultant profits lent credibility to and fostered the pattern of speculation in Colorado mining during the Gilded Age and Great Depression. Further, the industrial metals that the mine produced provided materials for manufacturing, especially during both world wars. Last, the Last Chance Mining & Milling Company shipped its ore to smelters in Pueblo, Colorado, and to Missouri for refining, which reflects the complex economic, commercial, and transportation ties that Western mines had with financial, milling, and manufacturing centers in the Midwest and the East.

The Last Chance Mine served as the focal point of several innovative mining engineering projects. The mine became a link in two mile long Nelson Tunnel, driven to facilitate deep haulage and drainage, and in so doing, the operation became part of a complex ore extraction system.

Making the initial connection from the Nelson Tunnel to the Last Chance Shaft proved problematic because the shaft's sump was flooded, threatening to inundate the tunnel below. The Nelson company's engineers proposed using long-hole diamond drills to bore small drain holes into the shaft's sump. Diamond drills, now commonly used for deep geological sampling, were in a developmental stage when used to penetrate the shaft.

In terms of *Criterion B*, the Last Chance Mine complex is associated with persons significant to our past. Specifically, in 1891 Theodore Renniger and his party located the Last Chance Mine. In the same year, Renniger's associates sold their shares in the property to the Last Chance Mining & Milling Company, owned principally by Henry O. Wolcott. As a businessman and speculator, Henry O. Wolcott influenced Colorado mining, as well as business and finance in the Rocky Mountain West. As a senator, Wolcott impacted the shaping of Federal policy toward mining, economics, and politics in the West, and especially Colorado.

In terms of *Criterion C*, the Last Chance Mine complex embodies the distinctive characteristics of a large, well-capitalized, advanced, and highly productive Western metals mine. While the site consists primarily of archaeological remnants and structural ruins, the scope and nature of the former mining operation is clearly represented.

The site includes the remains of the largest, most powerful steam-powered surface plant in the Creede district. Physical evidence indicates that the surface plant changed little from when it was erected around 1891. As such, the site presents a relatively undisturbed example of advanced, early 1890s steam-powered mining engineering. Specifically, the site encompasses a collapsed two-post headframe, a unique double drum direct drive steam hoist foundation, a collapsed shaft house and ore sorting house, and an industrial privy building.

In terms of *Criterion D*, the Last Chance Mine complex is very likely to yield information important to the interpretation and understanding of Western mining and its participants. First, the site encompasses residential building platforms, privy pits, and associated trash dumps which probably contain meaningful buried cultural deposits. Excavation may shed light on the lifestyles of Western mining crews living and working at remote locations. Second, the structural debris comprising the collapsed shaft house may overlie material culture which can contribute to the operation of a large mine. Last, the underground workings probably contain internal structures and artifacts which can provide data that can enhance a currently dim understanding of mining engineering and the mine as a workplace.

Management recommendations suggest efforts to collect further information, to stabilize extant structures, and to define acceptable disturbance to the site in light of possible environmental remediation. The residential complex's privy pits and trash dump should be excavated. The structural debris comprising the shaft house remnant should be cleared away to expose the structure's floor.

Nelson Tunnel
Site 5ML346

The Nelson Tunnel site is eligible for listing in the National Register of Historic Places. While the site possesses limited physical integrity, it meets National Register Criteria A through D.

Within the last several decades, West Willow Creek flooded and destroyed the area immediately surrounding the tunnel portal. In subsequent years operations at the Commodor Mine, adjacent and north, erected a complex drainage system designed to flume West Willow Creek past the tunnel portal. They erected hewn log cribbing walls and a culvert for the creek, they dumped waste rock around the creek bed, and they used heavy equipment to redeposit more rock around the tunnel's surface plant area.

In terms of *Criterion A*, the tunnel complex is associated with events that have made a contribution to the broad patterns of our history. The tunnel was a major engineering endeavor initiated in 1892 to strike at depth the wealthiest operations in the Creede Mining District, which was one of America's most productive silver-lead mining areas. When completed, the tunnel served as a trunkline in a complex system of ore extraction, concentration, and shipping. Miners entered the underground workings through the tunnel, travelling up to two miles. Pipes for the input of fresh air and compressed air for drilling entered the tunnel, and drainage water exited the tunnel. Nearly all of the ore mined on the Amethyst Vein rolled out the tunnel in trains, and it traveled to the Humphreys Mill at North Creede for concentration. The concentrates were subsequently shipped to Pueblo, Colorado and to Missouri for refining. Such complex systems of extraction, processing, and shipping were rare in the mining industry. The Nelson Tunnel was an engineering feat recognized among mining engineers throughout the United States.

The mines on the Amethyst Vein produced a high volume of silver and industrial metals which was hauled through the Nelson Tunnel. In this light, the tunnel and the production it facilitated are meaningful on national, state, and local levels. The resultant profits realized from the ore lent credibility to and fostered patterns of speculation in Colorado mining during the Gilded Age and Great Depression. Further, the industrial metals produced provided materials for manufacturing, especially during both world wars.

The Nelson Tunnel caused an abrupt shift in the demographics of the Creede Mining District, which lends importance to the site. When completed, the tunnel began to serve as the main point of access to the mine workings on the Amethyst Vein, and mining companies virtually abandoned their surface plants in the high country. As a result, the population of miners moved down from the towns and company boarding houses near the mines to Creede and North Creede, which are near the Nelson Tunnel's portal.

In terms of *Criterion B*, the Nelson Tunnel complex is associated with persons significant to our past. Specifically, In 1892, when the Creede district enjoyed its first boom, Charles F. Nelson organized the Nelson Tunnel Company. Nelson is important to the Creede district because he discovered the Soloman Mine, which was one of the first major mines. To fund the Nelson Tunnel project, Nelson solicited subscriptions from the owners of the principal mines on the Amethyst Vein, including David H. Moffat's syndicate, Henry O. Wolcott's syndicate, and A.E. Reynolds.

In terms of *Criterion C*, the Nelson Tunnel site embodies the distinctive characteristics of a large, well-capitalized, and advanced Western mine. The site also exhibits characteristics of being part of a complex ore extraction system. While the site consists primarily of archaeological remnants, the scope and nature of the former mining operation can be ciphered out of the extant material culture. The site includes evidence reflecting basic mine surface plant components, and it includes a railbed and trestle, and a flume that extended to the Humphreys Mill.

In terms of *Criterion D*, the Nelson Tunnel complex is very likely to yield information important to the interpretation and understanding of Western mining and its participants. First, within recent years someone laid a veneer of redeposited waste rock over a portion of the Nelson Tunnel's surface plant remnant. The waste rock may obscure machine foundations installed near the tunnel. The foundations supported air compressors, a water-powered generator, and other machines. Little is currently known about early electric generation, and about other mine machinery, and exhuming the foundations at the Nelson Tunnel may contribute significantly to extant body of knowledge. Last, the tunnel's underground workings contain internal structures and artifacts which can contribute greatly to a currently dim understanding of mining engineering and the mine as a workplace.

Management recommendations suggest efforts to collect further information, to stabilize extant structures, and to define acceptable disturbance to the site in light of possible environmental remediation. First, the waste rock overlying the surface plant area should be scraped off to expose foundations and artifacts. Second, the ore sorting facility and the rail trestle should be stabilized. Third, West Willow Creek's channel should be improved to prevent flooding and further erosion.

Last Chance Tunnel No.2

The Last Chance Tunnel No.2 is not eligible for listing in the National Register of Historic Places. Due to mining activity and earthmoving in the recent past, the site has lost nearly all of its physical integrity. In addition, the tunnel appears not to be associated with important persons, it is not an outstanding example of a Western mining operation, nor is it likely to yield further information.

New York Mine

The New York Mine is not eligible for listing in the National Register of Historic Places. Due to mining activity and earthmoving in the recent past, the site has lost all of its physical integrity.

Park Regent Mine
Site 5ML209

The Park Regent Mine site is eligible for listing in the National Register of Historic Places. The mine complex possesses a high degree of physical integrity, and it meets National Register Criteria A, C, and D. The primary disturbance to the site manifests as a portion of the mine's waste rock dump that was removed by heavy equipment within the recent past. The remainder of the site is intact.

In terms of *Criterion A*, the Park Regent complex is associated with events that have made a contribution to the broad pattern of our history. The Park Regent was a moderately wealthy and early operation in the Creede Mining District, which was one of America's most productive silver-lead mining areas.

The Park Regent produced silver and industrial metals, which is meaningful on national, state, and local levels. The resultant profits lent credibility to and fostered speculation in Colorado mining during the Gilded Age. Further, the industrial metals that the mine produced provided materials for manufacturing, especially during World War I.

Last, the Park Regent's operators attempted to concentrate the ore in a mill erected at the mine in 1895. Although the mill was a failure, by erecting the facility on-site, the Park Regent participated in the development of ore reduction technology in the West. In addition, the facility was the first ore reduction mill erected in the Creede district. The fact that the mine's owners ultimately shipped the ore to Missouri reflects the complex economic, commercial, and transportation ties that Western mines had with financial, milling, and manufacturing centers in the Midwest and the East.

In terms of *Criterion C*, the Park Regent Mine site embodies the distinctive characteristics of a large, well-capitalized, advanced, and highly productive Western metals mine. While the site consists of archaeological remnants, the scope and nature of the former mining operation is clearly represented by the extant material culture. The site includes evidence of a typical mechanized steam-powered mine surface plant and ore reduction mill. As such, the site presents a sound example of Gilded Age steam-powered mining and milling engineering. Last, the Park Regent Mine served as the terminus of the two mile long Nelson Tunnel, which was a significant engineering feat driven to facilitate deep haulage and drainage. In so doing, the Park Regent Mine became part of a complex ore extraction system on the Amethyst Vein.

In terms of *Criterion D*, the Park Regent Mine complex is very likely to yield information important to the interpretation and understanding of Western mining and its participants. First, the site encompasses privy pits, residential building platforms, and associated trash dumps. The privy pits, the platforms, and the trash dumps probably contain meaningful buried cultural deposits which may shed light on life in Western mining camps. Last, the mine's underground workings probably contain internal structures and artifacts which can contribute greatly to a currently dim understanding of mining engineering and the mine as a workplace.

Management recommendations suggest efforts to collect further information and to define acceptable disturbance to the site in light of possible environmental remediation. The privy pits and the structure platforms should be excavated.

Prospect Shaft, Sulphide No.5 Claim
Site 5ML347

The prospect shaft site on the Sulphide No.5 claim is eligible for listing in the National Register of Historic Places. The shaft complex possesses a high degree of physical integrity, and it meets National Register Criteria A, C, and D. In terms of *Criterion A*, the shaft site is associated with events that have made a contribution to the broad pattern of our history. The shaft was a small and early prospect operation in Creede, which was one of America's most productive silver-lead mining districts. In addition, the shaft is a manifestation of the waves of prospecting endemic to the Western mining frontier.

In terms of *Criterion C*, the prospect shaft site embodies the distinctive characteristics of a small, poorly capitalized, short-lived Western prospect operation. While the site consists of archaeological remnants, the scope and nature of the former mining operation is clearly represented by the extant material culture. The site includes evidence of a typical labor-intensive mine surface plant that relied on a horse whim for a hoist. The site also includes evidence of brief inhabitation.

In terms of *Criterion D*, the prospect shaft site on the Sulphide No.5 claim is very likely to yield information important to the interpretation and understanding of Western mining and its participants. The site encompasses residential and industrial building platforms which may shed light on life and prospecting in Western mining camps.

Management recommendations suggest efforts to collect further information. The building platforms should be excavated.

Prospect Shaft Complex, Sunnyside Claim
Site 5ML80

The prospect shaft complex on the Sunnyside claim is eligible for listing in the National Register of Historic Places. The shaft complex possesses a high degree of physical integrity, and it meets National Register Criteria A, C, and D. In terms of *Criterion A*, the shaft site is associated with events that have made a contribution to the broad pattern of our history. The shafts were parts of small and early prospect operations in Creede, which was one of America's most productive silver-lead mining districts. The shafts are a manifestation of the prospecting endemic to the Western mining frontier.

In terms of *Criterion C*, the prospect shaft site on the Sunnyside claim embodies the distinctive characteristics of small, poorly capitalized, short-lived Western prospect operations. While the site consists of archaeological remnants and a dilapidated building, the scope and nature of the former mining operations are clearly represented by the extant material culture. The site includes evidence of a typical labor-intensive mine surface plants that relied on hand windlasses for hoists. The site also includes evidence of brief inhabitation.

In terms of *Criterion D*, the prospect shaft site on the Sunnyside claim is very likely to yield information important to the interpretation and understanding of Western mining and its participants. The site encompasses industrial building platforms which may shed light on life and prospecting in Western mining camps.

Management recommendations suggest efforts to collect further information and to stabilize the extant structure. The area in and around the building should be excavated.

White Star Mine
Site 5ML202

The White Star Mine site is eligible for listing in the National Register of Historic Places. The mine complex possesses a high degree of physical integrity, and it meets National Register Criteria A, C, and D. In terms of *Criterion A*, the White Star complex is associated with events that have made a contribution to the broad pattern of our history. The White Star Mine and the adjacent prospect shaft were small and early prospect operations in Creede, which was one of America's most productive silver-lead mining districts. In addition, miners extracted ore from the depths of the White Star claim, once it had been penetrated by the Nelson Tunnel. While the White Star's isolated production of silver and industrial metals was small, the mine is meaningful on national, state, and local levels due to its contribution. The property was involved in the typical pattern of speculation in Western mining during the Gilded Age, and the industrial metals that the mine produced provided materials for manufacturing, especially during World War I.

In terms of *Criterion C*, the White Star Mine and the adjacent prospect shaft embody the distinctive characteristics of small, marginally capitalized, and simple Western deep prospect operations. While the site consists of archaeological remnants, the extant material culture clearly represents the scope and nature of the former mining operations. The site includes evidence of typical labor-intensive surface plants equipped with sinking-class hoisting systems. As such, the site presents a sound example of a type of Gilded Age steam-powered mining engineering. Last, the White Star site served as a link on the two mile long Nelson Tunnel, which was a significant engineering feat driven to facilitate deep haulage and drainage. In so doing, the White Star Mine became part of a complex ore extraction system on the Amethyst Vein.

In terms of *Criterion D*, the White Star complex is very likely to yield information important to the interpretation and understanding of Western mining and its participants. First, the site encompasses privy pits and platforms that supported residential and industrial buildings. The privy pits and the platforms probably contain meaningful buried cultural deposits which may shed light on life and prospecting in Western mining camps. Last, the mine's underground workings probably contain internal structures and artifacts which can contribute greatly to a currently dim understanding of mining engineering and the mine as a workplace.

Management recommendations suggest efforts to collect further information. The privy pits and the structure platforms should be excavated.

Prospect Shaft, Name Unknown
Site 5ML348

The prospect shaft site is not eligible for listing in the National Register of Historic Places. The shaft possesses limited physical integrity, and it fails to meet National Register Criteria. The shaft appears not to be associated with important persons or events, it is not an outstanding example of a prospect operation, nor is it likely to yield further information.

CHAPTER 9 PROJECT SUMMARIES AND CONCLUSION

The Amethyst Vein's principal historic mine sites are rich in material remains and historical integrity. This legacy lends itself well to the interpretation of the individual mines, as well as shedding light on broad patterns and trends of mining on the Amethyst Vein. In some senses, the patterns that apply to the Amethyst Vein's mines carry over to the rest of the Creede district, because the Amethyst Vein was the district's principal ore body and saw the most intensive and longest operation. The data collected during the inventory of the Amethyst Vein's principal historic mines is particularly valuable because it serves to compliment and clarify existing archival information, which tells only part of Creede's story. Some of the broad patterns of mining on the Amethyst Vein are discussed below.

Mining Operations

The historic mines on the Amethyst Vein reflect the influence of six basic patterns endemic to the historical Western hardrock mining industry. The patterns are:[1]

1. Equipping and operating a mine was a function of money. Mining properties with great promise were able to inspire the caliber of investors capable of providing ample capital for development. The wealthiest investors equipped their mines with the biggest and best surface plants.
2. Large and complex surface plants reflect large ore reserves. Investors financed the erection of large surface plants at mines with large ore reserves in hopes of maximizing production while minimizing operating costs. Small surface plants reflect limited production.
3. The time period during which a mine operated influenced how and to what degree it was equipped. Mines that were active late in a district's life tended to be better equipped than those active early in the district's life.
4. Structural geology influenced how miners and engineers set up and operated a mine. Steeply dipping veins were more conducive to being developed through shafts. The topography overlying an ore vein, determined by structural geology, influenced the type of surface plant that engineers built. Flat terrain was conducive to sinking shafts, while steep terrain was suited for driving tunnels.
5. The geographic locations of mining operations influenced the degree to which they were developed and equipped. Mining operations located near commercial centers and close to the richest portions of the vein were more apt to attract wealthy investors, and hence a greater degree of capital.
6. The physical climate influenced how miners and engineers set up a mine. Operating throughout the year required substantial buildings to shelter a mine's critical surface plant facilities, while prospect operations that were active only during warm months could afford simple and small structures.

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[1] Twitty, Eric *Reading the Ruins* Masters Thesis, University of Colorado at Denver, 1999 p364.

In terms of the first and second influential factors discussed above, the historic mine sites on the Amethyst Vein reflect the relationship between investors' financial status, capital investment, and the composition of the mines' surface plants. Wealthy and powerful investors acquired the Amethyst Vein's richest operations, and they supplied ample capital to fund the development of substantial underground workings supported by well-appointed surface plants. Specifically, David H. Moffat and his syndicate purchased the Amethyst Mine in 1891, the Bachelor Mine in 1892, the Happy Thought Mine in 1894, and the Commodor Mine in 1900. According to both archaeological remains and archival information, shortly after the Moffat syndicate acquired each property, it financed the erection of substantial, well-equipped production-class surface plants to boost ore production. In a similar fashion, the Wolcott family purchased the Last Chance Mine in 1891, and according to both archaeological remains and archival information, shortly afterward it financed the erection of the Creede district's most powerful and advanced surface plant. In the early 1890s A.E. Reynolds, another silver baron, purchased the Commodor Mine and the New York Mine. He supplied less capital for development than the Moffat and Wolcott syndicates did for their properties, which is mirrored by archaeological remains and by archival information.

The other historic sites on the Amethyst Vein, including the Del Monte Mine, the Sunnyside Claim, the Sulphide No.5 Claim, the Park Regent Mine, and the White Star Mine were not owned by prominent investors, and the existing remains of their surface plants reflect a lack of capital. The Del Monte and White Star operations both featured small surface plants comprised of a combination of sinking and production-class components. Further, both sites lack physical evidence of ore production. The Park Regent Mine was equipped with a modest production-class surface plant, and it features evidence of only minor ore production. The surface plants on the Sunnyside and Sulphide No.5 claims reflect limited capital, no ore production, and brief occupations.

The Amethyst Vein's principal historic mines reflect patterns regarding the influence of operating timeframes. According to archaeological remains and archival information, nearly all of the mines began as modest operations in the early 1890s. The productive mines expanded in size during the late 1890s, the marginal mines remained static, and the unsuccessful claims were abandoned. During the 1910s the prominent operations contracted while the marginal operations totally collapsed. The prominent operations expanded again in the 1930s.

The Commodor No.1 Tunnel, the Annie Rooney Mine, and the prospect shafts on the Sunnyside and the Sulphide No.5 claims the are good representations of the simple beginnings experienced by all of the Amethyst Vein's prominent mines. The remains existing at these sites indicate that the operations' surface plants consisted of relatively inexpensive temporary components. The small waste rock dumps reflect shallow exploratory underground workings. While the Amethyst, the Bachelor, the Del Monte, the Happy Thought, and the Park Regent mines began simple, their owners injected capital and upgraded the surface plants with a combination of sinking-class and production-class components.

The material remains comprising the Amethyst Vein's largest mine sites reflect a sudden and significant upgrade and expansion of surface plants during the late 1890s. This trend was part of an effort on the part of the mine owners to produce ore in economies of scale. They attempted to produce ore in large volumes to offset the decrease in silver's value in the wake of the Silver Crash of 1893 to maintain profitability. The Amethyst, the Bachelor, the Commodor, the Happy Thought, and the Park Regent mine sites all reflect the trend of expansion and upgrade during this time period. The Last Chance Mine was not upgraded because the Wolcott syndicate financed the construction of a massive production-class surface plant capable of bringing massive quantities of ore to daylight at the beginning of operations. The above sites share the trait of having been wealthy producers. The mines on marginal portions of the vein were not upgraded, and they saw little expansion.

By the late 1900s the Amethyst Vein began to show signs of exhaustion, and the principal mining companies feared that the costs of production would soon outweigh profits. In response, they suspended operations and leased their properties to groups of independent miners, who paid the owners either a fee or a royalty per ton of ore mined. In so doing, the property owners shifted operating costs over to the lessees. Capital-poor, the lessees neglected the surface plants associated with the mines and accessed the underground workings though the Nelson Tunnel, which cost them less money. The impact that the Nelson Tunnel held for the district is discussed in greater detail below. With the overall decrease in activity on the Amethyst Vein, mining contracted during the 1910s, and it slowed even more during the 1920s. The remains of Amethyst Vein's biggest mine sites mirror the decrease in activity during the 1910s. The remains of the marginal mines indicate that these properties had been abandoned by the 1900s.

In 1934, at the depths of the Great Depression, President Franklin Delano Roosevelt signed the Silver Purchase Act into law, which provided artificial price supports for the white metal. The Act stimulated silver mining in the West, and miners reopened the Amethyst Vein's principal mines. The Amethyst, the Bachelor, the Commodor, and the Last Chance mine sites all possess evidence reflecting a reinvigoration of mining by 1934, after approximately 10 years with little previous activity. The marginal properties that possessed little ore remained silent.

The mine sites on the Amethyst Vein show the influences that structural geology had on how engineers set up the mines. First, the structural geology impacted the area's topography. Bachelor Mountain is part of a volcanic rock formation, and it possesses typical volcanic characteristics. The mountain features a flat top bordered by steep, rocky slopes. Mining engineers working on the vein's north portion, where the terrain was flat, found that sinking shafts to tap the vein was best. Engineers at the vein's south end, where it passed close to Bachelor Mountain's steep flanks, found that tunnels were best for development. Specifically, all of the mines north of the Last Chance were shaft operations, while all of those south were tunnel operations. In terms of being a geological structure, the Amethyst Vein pitched steeply eastward, which was conducive to being developed via inclined shafts, or undercut with tunnels at the vein's south end where the terrain was steep. In keeping with the vein's pitch, the Last Chance, the Happy Thought, and the Park Regent shafts were inclined. The Amethyst, Del Monte, and White Star shafts may have been inclined as well.

The Amethyst Vein's historic mine sites illustrate the influence of geographic location on the constitution of their surface plants. The best-equipped and heaviest producing properties on the vein are clustered together. The Last Chance, the Amethyst, and the Happy Thought mines lie in close proximity, and the Commodor and Bachelor mines are near each other. Because of a tight geographic distribution, these operations fostered the growth of two townsites, Bachelor and Weaver. The mines farther north on the vein received less attention, they were more remote, and were less accessible. These factors compounded problems attributed to a lack of capital.

The Amethyst Vein's historic mine and prospect sites reflect the mining companies' responses to the influence of weather on mining operations. All of the prominent mines operated throughout the year, which required both sheltering vital surface plant components in heated structures, and maintaining transportation arteries for the input of supplies and the output of ore. Archaeological remains and archival data indicate that all of the principal producing operations featured surface plants equipped for work during winter. The surface plants at both of the Bachelor tunnels and at the Annie Rooney Mine featured substantial frame buildings enclosing the tunnel portals and shops, and the principal shaft operations featured shaft houses enclosing the hoisting systems. All of the principal mine sites featured additional buildings that functioned as barns, change houses for the miners, storage, ore processing, and to thaw dynamite frozen by winter temperatures.

All of the principal mining operations, including the Amethyst, the Bachelor, the Commodor, the Happy Thought, the Last Chance, and the Park Regent mines, maintained networks of broad wagon roads for the delivery of supplies and drayage of ore. In addition, the Bachelor and the Amethyst mines were equipped with aerial tramways to haul ore, which were nearly impervious to weather.

All of the principal mines and the deep prospect operations, including the Del Monte and Annie Rooney mines, provided residential facilities for their mine crews. In so doing, the companies ensured that they had a workforce on hand through all seasons. By living in company housing, the mine crews did not have to commute far on foot or horseback during the winter.

The small prospect operations included in the survey reflect activity only during the warm months. The prospect shafts on the Sunnyside and the Sulphide No.5 claims featured small structures which offered little protection against the weather. Several of the shafts on the Sunnyside Claim, and the horse whim on the Sulphide No.5, appear to have been exposed to the weather. The shafts at the White Star site also appear to have been ill equipped for winter conditions. In addition, all of the above operations lack transportation links that were reliable in all seasons.

The mine sites recorded on the Amethyst Vein fit broad patterns regarding the application of mining technology. The outfits engaged in prospecting and deep exploration relied on conventional Gilded Age machines, equipment, and facilities to support work underground. Further, they followed convention and equipped their surface plants with relatively inexpensive, small, and portable temporary-class facilities. The sites that reflect such practices include the Annie Rooney Mine, the Commodor Tunnel

No.1, the White Star Mine, and the prospects on the Sunnyside and the Sulphide No.5 claims.

The mining companies that worked the productive properties on the Amethyst Vein also applied conventional Gilded Age technology. They equipped their surface plants with production-class components capable of supporting deep, intensive underground work. The largest operations, such as the Amethyst, the Bachelor, the Commodor, the Happy Thought, and the Last Chance included plant facilities designed to maximize production and minimize operating costs over protracted periods of time. These mines, by no coincidence, were also the biggest producers backed by the wealthiest investors.

Several of the Amethyst Vein's principal mining companies strayed from Gilded Age convention and applied innovative and highly progressive technology. In the 1890s the Bachelor Mining Company erected a central electrical and air compressor plant on the bank of West Willow Creek below the mine workings. At that time, electrical technology was in a nascent state and was progressive engineering. By around 1900, when miners began driving the Commodor Tunnel No.5, David Moffat's Commodor Mining Company erected another generating plant near the Bachelor's powerhouse. At this time the Amethyst Mining Company wired its new mill near Weaver for power. All of the above historic sites feature archaeological and archival evidence reflecting this early use of electricity.

Plumbing compressed air to the mines from central compression plants for drilling was another progressive engineering endeavor. According to conventional Gilded Age practices, mining companies installed an air compressor near the mine opening and plumbed the air underground. The Bachelor Mining Company, the Commodor Mining Company, and the Nelson Tunnel Company strayed from convention. The Bachelor and Commodor outfits combined their compressor plants and powerhouses. As a result, engineers had to apply calculation for plumbing the compressed air from the plants thousands of feet into the mine workings. The Bachelor's engineers had the added variable of laying the air line from the powerhouse on West Willow Creek far upslope to the tunnels. The situation at the Nelson Tunnel was also extreme. For a subscription, the Nelson Tunnel Company offered to supply compressed air for drilling to mines accessed via the tunnel, which were up to two miles away. Engineers and expert pipemen had to construct a labyrinth of underground plumbing into the various mine workings.

The completion of the Nelson Tunnel had a significant impact on mining the Amethyst Vein. The Nelson Tunnel, which is the umbrella name that includes the Wooster and Humphreys extensions (see the Nelson Tunnel site summary), linked all of the principal mines on the Amethyst Vein at great depth. As the mining companies exhausted the upper reaches of the Amethyst Vein, they began developing deeper ore lying above the tunnel level.

The tunnel served a number of functions crucial to the Amethyst Vein's mining outfits. The tunnel acted as a drain, it facilitated ventilation, and was a conduit for compressed air plumbing and electrical wiring. But most important, the tunnel was the funnel through which ore flowed, and the primary access for miners working in the deep stopes. When the tunnel passed through the claims on the Amethyst Vein, miners drove raises upward into the ore body, which facilitated the use of gravity to draw the blasted ore down into underground ore bins. They tapped the bins into ore trains for the trip out of the underground.

The mining companies on the Amethyst Vein responded to the gravity-drawn means of extracting ore from their claims in one of two ways. The capital-poor operations attempted to minimize operating costs by abandoning their old surface plants in favor of accessing their claims from deep within the Nelson Tunnel. The highly productive operations, on the other hand, viewed the Nelson Tunnel as a means to increase ore production beyond the capacity of their extant surface plants. They relied on the Nelson Tunnel and on their shafts to maximize the tonnages of ore brought to daylight. The Amethyst Vein's historic mine sites currently exhibit evidence reflecting these trends. The Happy Thought, the Park Regent, and the White Star mines all were abandoned in the 1900s, shortly after the tunnel granted their miners access to the workings. The Amethyst, the Bachelor, and the Last Chance mines, on the other hand, continued to use their surface plants into the 1910s, long after the tunnel had penetrated their workings.

The Nelson Tunnel prolonged mining the Amethyst Vein. In the late 1900s the mining companies found that they had extracted the richest and most accessible ore. As the value of the remaining payrock declined, so did profits, while operating costs remained static. The mining companies determined that leasing the mines to groups of miners for either a fee or a royalty per ton of ore provided them with income and absolved them of having to maintain costly surface plants. By nature, leasing outfits tended to be capital-poor, and most were not able to finance the operation of traditional surface plants. As a result, they used the Nelson Tunnel as the primary access because it cost much less. They continued to mine ore in the old stopes and use gravity to draw the payrock down into underground ore bins at the Nelson Tunnel level. This permitted them to continue to profit from declining ore values. Archival information indicates that companies of lessees continued to work of the marginal properties until the close of World War I, while lessees worked the richest mines into the 1920s. The material remains comprising the Amethyst Vein's mine sites indicates that the surface plants associated with the marginal operations were abandoned during the 1900s, and the surface plants associated with the big operations were abandoned in the 1910s.

The Amethyst Vein's mine sites include evidence reflecting the resurgence of mining during the Great Depression. After President Franklin Delano Roosevelt signed the Silver Purchase Act into law in 1934, lessees reopened the vein's richest properties. However, capital was scarce during the Great Depression and the mining outfits attempted to work the properties using the least expensive means. Because shafts required much capital to equip and maintain, the Depression-era operations accessed the old mine workings through tunnels, which presented lower costs. The historic mine sites on the Amethyst Vein exhibit evidence reflecting this trend. In the 1930s miners reactivated the Bachelor Mine's tunnels, the Last Chance Tunnel No.2, and the Commodor Tunnel No.5. In addition, a leasing company drove a new tunnel from near the townsite of Weaver into the Amethyst Mine's upper workings. The remains of these Depression-era operations indicate that the mining operations did not spend lavish sums of money on complex surface plants to support work underground. The plants associated with these tunnels consisted of modest facilities. The Emperius Mining Company acquired the principal mines on the Amethyst Vein during the latter half of the 1930s, and it upgraded the surface plants that served the Commodor No.5 and the Amethyst tunnels. Emperius did so to produce ore in economies of scale. None of the shafts on the Amethyst Vein were reopened, and the material evidence at the shaft sites reflects this.

Residence

Nearly all of the principal historic mine sites on the Amethyst Vein feature the remains of associated residential complexes. While the structures were removed long ago, the complexes are represented by cut-and-fill building platforms, highly intact artifact assemblages, and unexcavated privy pits. This material evidence is important, because it appears to be the sole source of data that speaks about the mine workers who called the Amethyst Vein's mines their workplace. The information gathered during the survey revealed trends regarding the natures and durations of occupations by the mine crews.

During the initial development of some of the Amethyst Vein's mines, the mine crews that worked the properties erected small cabins which were sufficient to house the limited number of workers then employed. When the properties changed ownership and the mining companies geared up for significant development, they hired larger crews. To house the greater numbers of workers, the mining companies had to erect bunkhouses and additional residential frame buildings. The Annie Rooney Mine best exemplifies the sequence of residential facilities. The site features several platforms inhabited by prospectors during the property's initial development, and a bunkhouse platform inhabited slightly later. The Happy Thought and the Park Regent mines both feature residential complexes that include at least one residential platform that appears to predate the others.

Once the mining companies commenced operations in earnest, they erected bunkhouses and fed the work crews in dining halls. Usually, one large building served these two functions. The sizes of the bunkhouses were relative to the extent of the mining operation. The large mines kept big crews employed, and they erected substantial structures to accommodate the workers. Some mines, such as the Bachelor, the Happy Thought, the Last Chance, and the Park Regent built detached frame buildings in addition to bunkhouses to provide ample living space. The largest and wealthiest mines, including the Bachelor and the Last Chance, equipped their bunkhouses with running water.

The artifact assemblages associated with the residential complexes reflect the preparation of large quantities of food, and the consumption of meals in a dining hall setting. All of the bunkhouse platforms feature associated refuse dumps, and they typically include numerous institutional-sized food cans (6 inches in diameter and 6¾ inches high), and large butchered bones such as beef femurs and pelvises generated by preparing voluminous servings of stews and roasts. The artifact assemblages also include numerous heavy tableware fragments, known as *hotelware*, which was typically used in dining halls.

The artifact assemblages associated with the residential complexes reflect the nature of the populations. The abundance of food cans and relative paucity of miscellaneous and decorative domestic items is representative of groups of single miners working at a remote location. Only the Bachelor Mine deviated from this trend. The artifact assemblage associated with the Bachelor Mine's bunkhouse platform includes a few decorative domestic items, especially glass vessels, fine tableware fragments, and corset stays. These items reflect inhabitation by a woman, who probably served as the mine's cook and hostler.

During the early 1890s, on the Amethyst Vein the typical mine worker's diet was slightly different than that consumed in the late 1890s. The Del Monte and the Annie Rooney mines were abandoned early in the district's history, and they include early domestic dumps slightly different in composition from those that at the mines active during the late 1890s. Specifically, the abundance of food cans reflects the consumption of preserved vegetables, fruits, and meat, which was supplemented with grain products. A lack of butchered bone suggests that the mine crews ate little fresh food. The reliance on preserved foods was necessary during the early 1890s because transportation and commercial infrastructures were in a nascent stage, and fresh food was not yet widely available.

By the mid 1890s the Amethyst Vein's mining companies fed their crews a hearty Victorian diet similar to that consumed in other Western mining districts. A combination of food cans and butchered bones reflects the consumption of meals that emphasized vegetables, fruits, and fresh meats. Further, the bones consisted primarily of cuts for beef-based stews and roasts. At that time, miners preferred beef to other types of meat.[2] The wealthiest mining companies also served mutton and chicken. A significant number of baking powder cans and baking utensils indicate that mine cooks also prepared baked goods, probably including bread, biscuits, pancakes, and pastry dough. The mining companies undoubtedly supplied the cooks with fresh fruits and vegetables, such as apples, peaches, potatoes, and corn. Cooks probably prepared meals which required flour, corn meal, other grains, and beans. However, the packaging for fruits, vegetables, beans, and grains was perishable, and is therefore absent from the artifact assemblages at the Amethyst Vein's mine sites.

Contrary to popular stereotypes, the miners that worked at the Amethyst Vein's principal operations openly consumed little alcohol. With the exception of the Bachelor Mine, the domestic artifact assemblages associated with all other mines included only a paucity of liquor bottle fragments. At these operations, mine workers consumed beer, wine, champagne, and liquor in very modest quantities. The trash dump associated with the Bachelor Mine's bunkhouse includes numerous liquor bottle and jug fragments. However, the overall quantity of liquor vessels was not unusually high.

The completion of the Nelson Tunnel became a watershed for the settlement patterns on the Amethyst Vein. The vein's mining companies housed their workers on-site from the early 1890s until the 1900s. In addition to on-site boarding, mine workers lived in the townsite of Bachelor at the vein's south end, they inhabited a cluster of houses centered around the Amethyst and Last Chance mines, and they resided in Weaver, in West Willow Creek's canyon. Once the tunnel became the principal point of entry into the various mine workings and the mining companies downscaled activities at their surface plants, the population naturally shifted to the towns of North Creede and Creede, near the tunnel portal. The domestic artifact assemblages at the mine sites mirror

[2] Conlin, Joseph *Bacon, Beans, and Glantines* University of Nevada Press, Reno, NV 1986 p11.

the relocation of populations of miners during the 1900s. Few domestic dumps contain items post-dating around 1910.

The Amethyst Vein's miners continued to live in Creede and North Creede after mining revived in the 1930s. While mining resumed at the Last Chance Tunnel No.2, the Commodor Tunnel No.5, and at the Amethyst Tunnel, which were relatively far from the Creede settlements, the automobile rendered the commute relatively short. As a result, the Amethyst Vein saw little post-boom residential occupation.

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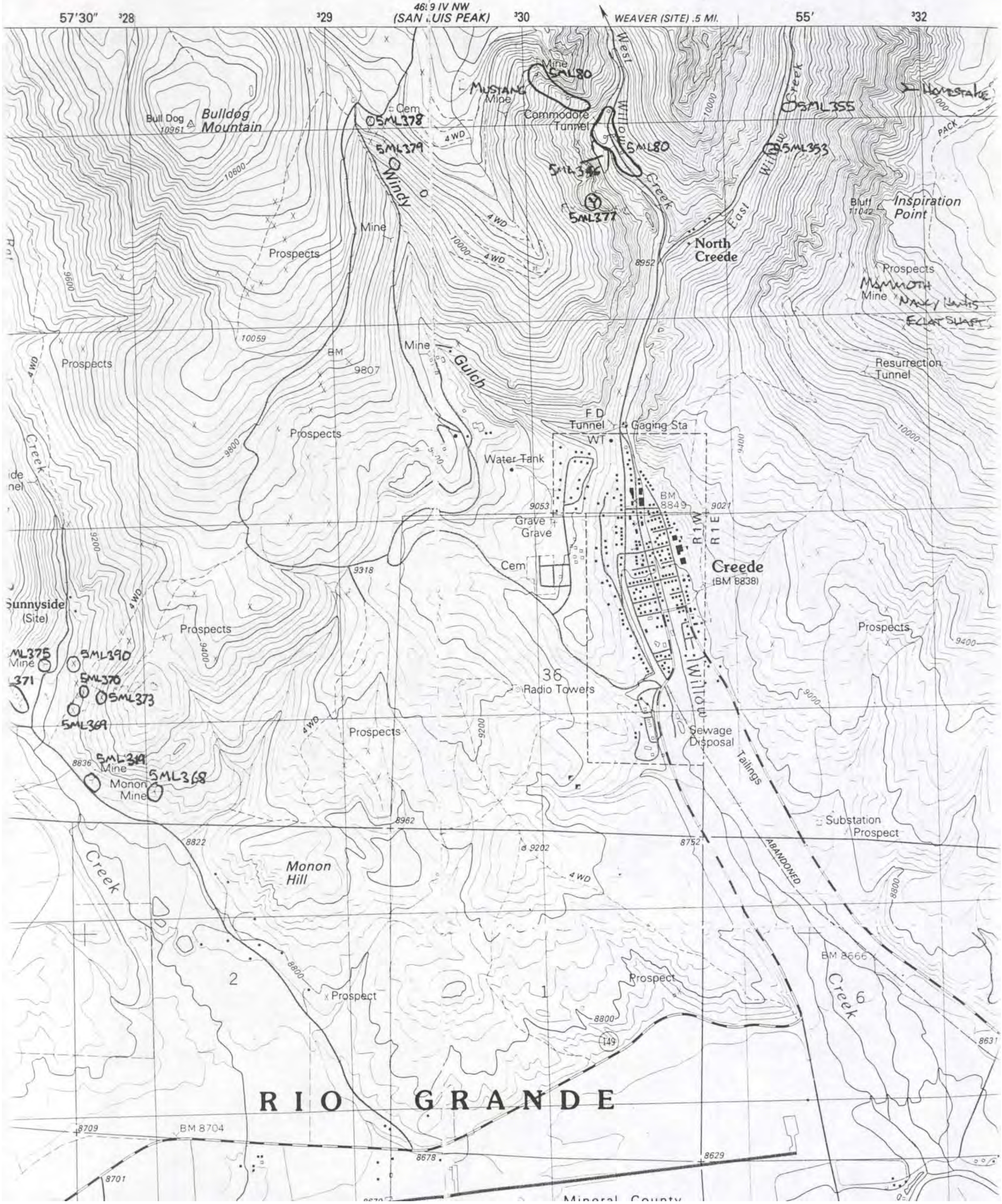

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East Willow Creek
5ML355
5ML353
HOMESTAKE
Bluff
11042
Inspiration Point
North Creede
8952
Prospects
Mine
MAMMOTH
NANCY HANKS
ECLAT SHAFT
Resurrection Tunnel
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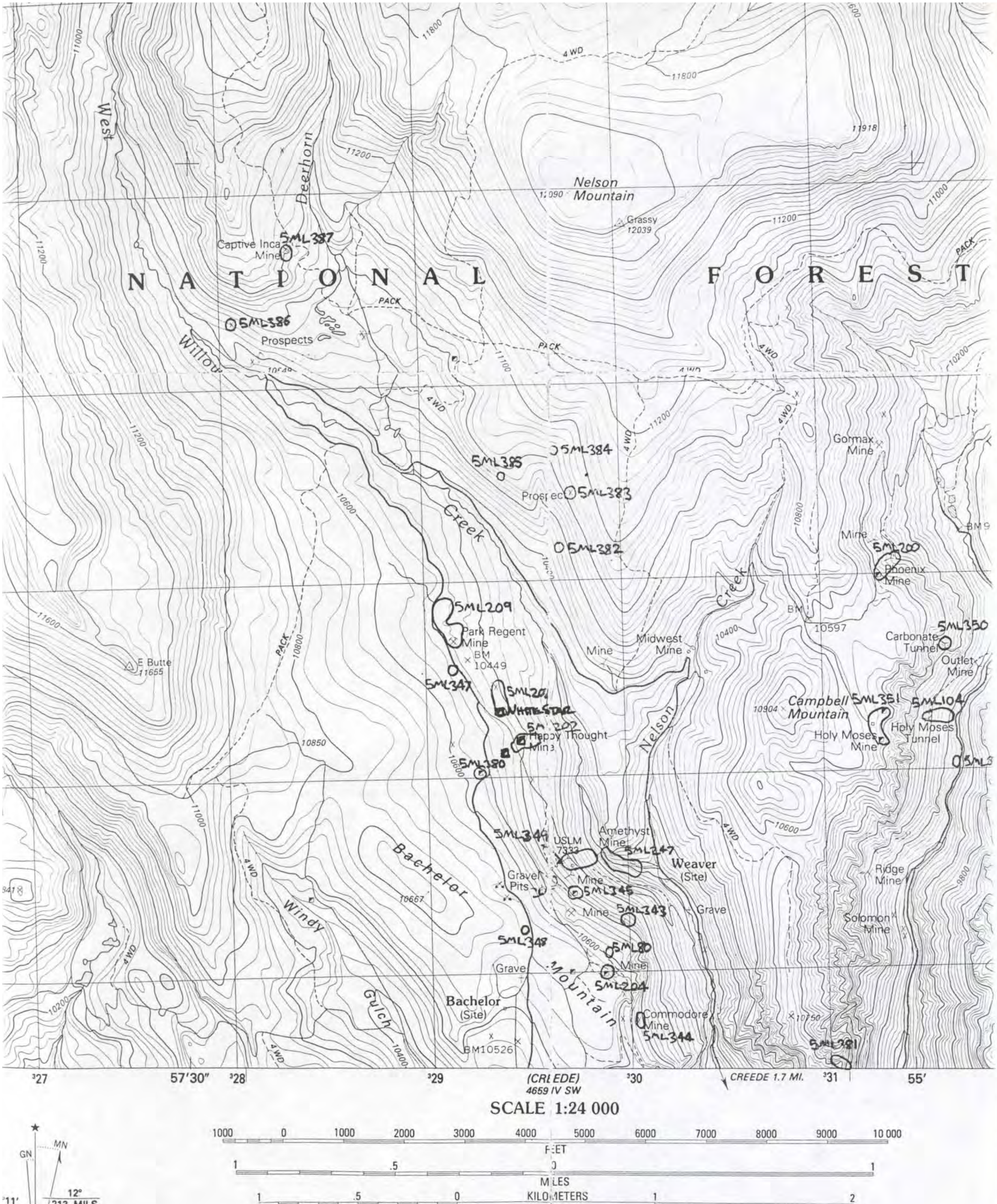

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