GOLD HILL ABANDONED MINE RECLAMATION PROJECT
(AMR/045/909) CULTURAL RESOURCE SURVEY
TOOELE COUNTY, UTAH

by

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of the
OFFICE OF PUBLIC ARCHAEOLOGY

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Office of Public Archaeology
Richard K. Talbot, Director
Brigham Young University
Provo, Utah 84602

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Salt Lake City, Utah 84114

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Abstract

During the late fall of 2004 and winter of 2005, the Office of Public Archaeology, Brigham Young University (OPA), completed documentation and historic site assessments on 196 mine openings located on Bureau of Land Management, State, or private patented land near the historic town of Gold Hill in western Tooele County, Utah. The mine sites are under consideration for rehabilitation under the Utah Division of Oil, Gas and Mining's (DOGM) Abandoned Mine Reclamation Program (AMRP). Most of the mines in the project area resulted from exploration and extraction activities associated with the hard rock base metal and precious metal mining boom in the late nineteenth and early twentieth centuries in the western United States. Many of the sites are relatively modest in scope while others are larger and demonstrate long-term use. Those that retain integrity and have sufficient material remains to convey significance and/or yield additional data are recommended as contributing resources within a regional historic context associated with the theme of hard rock mining as a facet of American frontier settlement and exploration. At a local level, hard rock mining played an important role in this part of Tooele County from about 1875 through the 1960s (though limited mining continued to the present), but in particular from about 1900 to 1950, and substantially influenced the course of local history and economic development. The significance of the sites has been assessed within these local and broader regional contexts.

Treatment of the sites determined to be eligible for the National Register of Historic Places should be conducted in such a way as to preserve as much of the historic fabric as possible of these sites so that they can be studied and interpreted as evidence of the historic hard rock mining process and its contribution to the broad patterns of our national history.

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Introduction

Project Description

Between November 2004 and March 2005 the Office of Public Archaeology (OPA), under contract to the Utah Department of Natural Resource's Division of Oil, Gas and Mining (DOGM), carried out an intensive examination and survey of 196 abandoned precious metal and base metal mine sites in the northern Deep Creek Range, in the vicinity of the town of Gold Hill, Utah (Figure 1). The mines are located primarily on patented mine claims or on land administered by the US Department of Interior, Bureau of Land Management (BLM), Salt Lake Field Office. A few of the mines are on State land administered by the School and Institutional Trust Lands Administration. The project was designated as the Gold Hill Abandoned Mine Project.

A literature review and file search at the Utah Division of State History and at the BLM was conducted by OPA personnel in November 2004, immediately prior to commencement of fieldwork. In addition to information acquired at these sources, crucial baseline data on each of the properties was provided by DOGM, who furnished detailed descriptive information, as well as location and access data for each opening. The literature review found record of a number of cultural resource inventories and a few previously recorded archaeological sites within the actual project area, primarily in the area within or immediately adjacent to the town of Gold Hill. These previous archaeological surveys conducted in the area are summarized in Table 1.

Locations for all of the mines to be assessed were plotted in advance on standard USGS 7.5' series topographic maps using the information provided by DOGM in order to aid in field relocation. In addition to the primary task of field documentation and assessment of the mine sites, OPA carried out historic research in an effort to develop an accurate and detailed historic context for each mine and to assess the role of precious and metallic mineral mining on a regional basis. Mining records were examined at the Tooele County Recorder's Office in Tooele. Additional research was conducted at Brigham Young University Harold B. Lee Library, and at the Utah Division of State History Library and Archives.

The Gold Hill Abandoned Mine Reclamation Project is located at the northern end of the Deep Creek Range of western Utah, primarily in the area to the northeast, east and southeast of Gold Hill. It primarily takes in the area east of Gold Hill Wash and north of Rodenhouse Wash. The mines involved in the project are distributed over an area roughly 20 square miles in size, though mines are not evenly distributed throughout this area; the acreage actually affected by mining is substantially smaller than the project boundary.

Definitions

The following definitions or explanations, some provided by or paraphrased from DOGM guidelines, directed the inventory work and explain the procedures employed during this project for site examination, documentation, categorization, and NRHP eligibility determination.

Project Area

The Project Area defines the geographic area within which AMRP has identified mine openings. The Project Area boundary usually generously circumscribes the mines, often following lines of major topographic features. Consequently the Project Area is usually much larger than the area actually affected or the area to be inventoried.

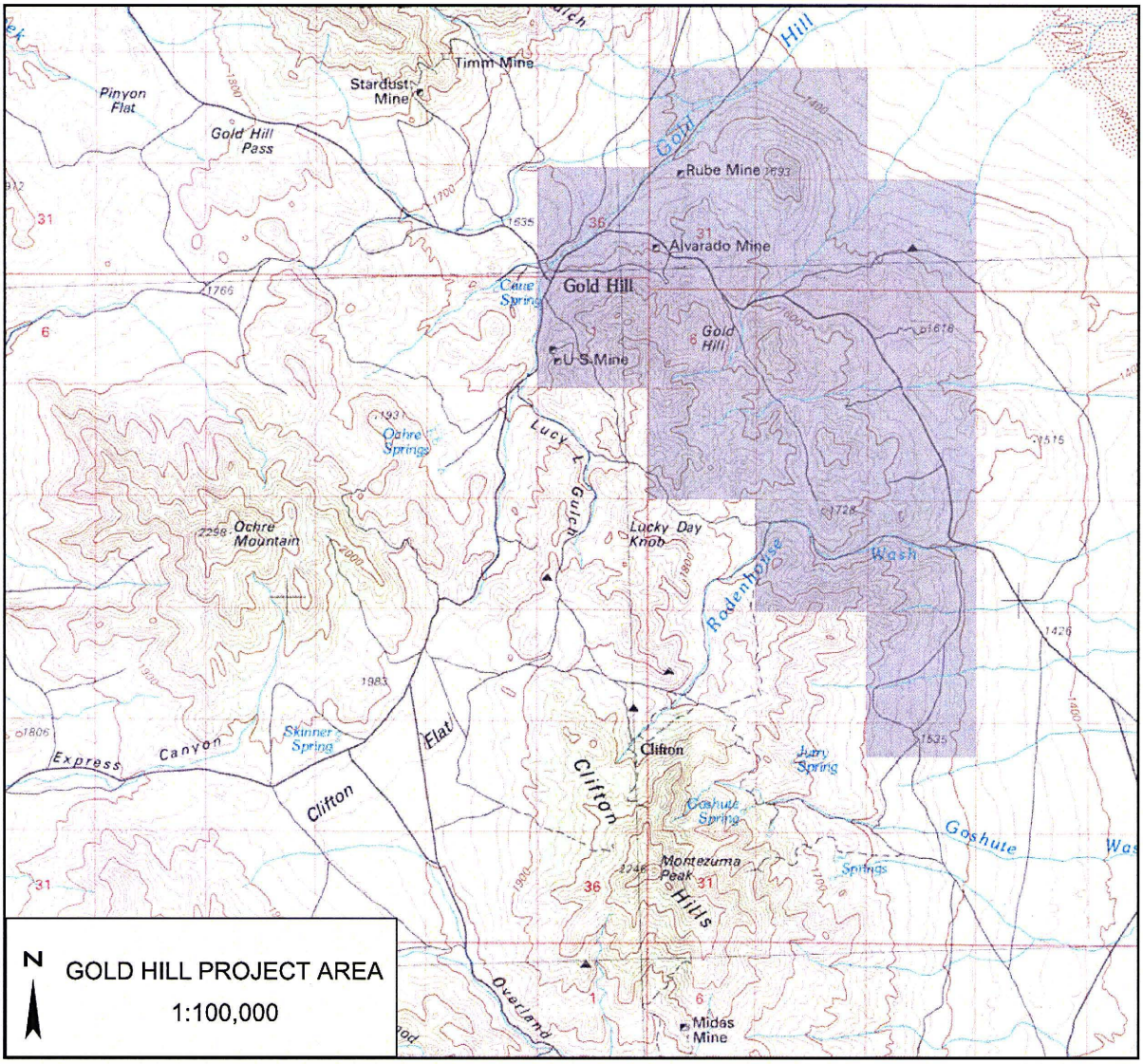

Figure 1. Gold Hill project area.

DOGM Mine Numbers

A separate numbering system is employed by the Division of Oil, Gas and Mining to designate each opening. In their system, mining features identified for inclusion in the Utah Abandoned Mine Reclamation Program are designated by tag numbers which provide a short-hand reference for each opening. This reference number is unique and is descriptive of the feature and its location. The documentation of the mines was undertaken through the completion of an Intermountain Antiquities Computer System (IMACS) site form tied to the Division of State History site number, but careful attention was paid to also link all documentation to the state tag designations employed by DOGM as well.

The DOGM state tag number system is briefly explained here since the numbers are used throughout the documentation to refer to specific features. In this numbering system, each mine opening or feature is identified by a unique site identification number which follows a standardized format. The identification

Table 1. Previous Projects in the Gold Hill Project Area

State Project No.	Agency	Project Description	Legal Location	Reference
99-BL-0018	BLM	Gold Hill Landscape Rock Sale	T7S R17W Sec 19	Kreusch 1999
00-JB-0438	JBR	Beehive-Wendover to Garrison	T7S R17W Sec 30, 31 T8S R17W Sec 1	Jensen et al. 2001
01-BL-0021	BLM	Gold Hill Landscape Rock Mine	T7S R17W Sec 19	Hunsaker 2001
02-BS-0700	Baseline Data	Wendover to Garrison Fiber Optic	T7S R18W Sec 36 T8S R18W Sec 1	Gourley 2003
04-PD-0254	PIII	Kiewit Project Inventory	T8S R17W Sec 19	Knoll 2004
04-PD-0513	PIII	Kiewit Addition Project	T8S R17W Sec 18,19,20, 29 & 30	Birnie and Knoll 2004a
04-PD-0668	PIII	Proposed IBA Drill Hole Project	T8S R18W Sec 19, 29 & 30	Birnie and Knoll 2004b

number (ID or state tag number) is a three part designation consisting of seven digits followed by two letters followed by three final digits. The first digit indicates the mine location in relation to four quadrants formed by the Salt Lake baseline and meridian (SLBM). Townships north and east of the SLBM are coded "1." The other three quadrants are numbered in counter clockwise order (NE= 1, NW= 2, SW= 3, SE= 4). The second and third digits indicate the township, the fourth and fifth digits indicate the range, and the sixth and seventh digits indicate the section. These numbers are followed by letters indicating the type of mine opening (H= horizontal adit, I= inclined adit, V= vertical shaft, SH= subsidence hole, PR= prospect, HP= horizontal prospect, VP= vertical prospect, PT= open pit, TR= trench). In the case of shafts and adits, the final letter designates whether the mine is open (O) or closed (C). These letters are followed by numbers that are sequential numbers assigned as the openings were encountered during the field inventory. Thus, site number 4060318HO003 is located in the southeast quadrant of the state and is the third open adit (horizontal opening) inventoried in Township 6 South, Range 3 East, Section 18.

A cross-reference of all DOGM numbers and their associated State History archaeological site numbers is included in Appendix B.

Closed Mine Openings

Closed mine openings are mine workings that have been determined to have no safety issues and will not be subjected to closure activities. These do not need to be surveyed or recorded because they are not part of this specific proposed action. However, ...closed mine openings (can be included) as part of historic landscapes or sites if they are adjacent to open mines. The AMRP, through the engineering survey report, has already collected important data for closed as well as open mines including GPS points, measurements and photographs of each mine opening.

Area of Potential Effects (APE)

The APE for each project (is) determined by AMRP and the federal land managing agency. The survey areas are subsets of the larger APE (see survey area descriptions below).

Survey Area

The survey area will include each mine opening plus a 30-meter radius around the opening. Extending the survey area beyond the 30-meter radius will be necessary under two circumstances: 1) where there is a need for heavy machinery access between existing roads requiring any cross country or

off road or trail travel, which in the case of the current project involves a 30 meter wide transect from an existing maintained or well-used road to the opening, sufficient to provide an inventoried corridor for the machinery; and 2) a 30-meter buffer around the boundary where the archeological site extends beyond the original 30-meter radius. It is not sufficient to just look at the immediate vicinity of the mine opening. Features and activity areas nearby that are associated with that mine's operation must also be included. Where associated features or areas of mine activity extend beyond the 30-meter radius, they must be included, along with an additional 30-meter buffer around them. Dumps and/or spoil piles are usually considered to be part of the archeological site so the buffer should begin at toe of the dump.

Site Definition

The definition of an archeological site as used here follows the BLM definition (BLM 2002) with regard to materials proximity and association, and is considered by AMRP "an area of contiguous and associated features or artifact distributions." This could include a single mine opening, a series of adjacent mine openings, or a larger area of surface modification that could be defined as a historic landscape or a historic district, (although) the official terminology of a "Historic District" or its subset, a "Historic Landscape" (is not) used unless the site has been nominated as such to the National Keeper.

Subsurface Remains

The AMRP recognizes that some mines may contain underground remains such as tracks, ore cars, and machinery. Since safety issues prohibit consultants from entering abandoned mines, potential underground cultural resources need not be considered. However, the fact that subsurface remains may be present, and will likely remain entombed, can be discussed in the site recordation.

Site Assessment Categories

The mining properties assessed during this project were evaluated on the basis of cultural integrity, cultural sensitivity, and potential to yield additional data. A ranking system was developed which combined these factors in order to allow each mine to be assigned to one of four categories expressive of the site's significance and sensitivity. Isolated features or finds, as described later, are by their very limited nature the least significant finds and are not eligible for the NRHP. The remaining categories represent archaeological sites that are here defined as Category 1, 2, or 3. The Category 1 sites are typically the least significant sites, while the Category 3 sites are usually the most significant. The category definitions are presented below.

Category 1 mines are characterized by sites of a very modest character. They typically include openings and perhaps prospects that possess few or no other additional cultural elements other than the opening itself and some limited waste, but more waste than allowed for with Isolated Features. These sites may include a small range of associated artifacts, but there are no additional features or structures. Most Category 1 sites could be closed with little impact to anything other than the actual mine openings themselves.

Category 2 mines are characterized by more extensive archaeological remains that typically consist of one or more openings associated with additional limited features, such as ore chutes, retaining walls, timber framing, or other mining related developments of a limited nature. These sites may posses a more extensive range of associated artifacts. These mines are typically eligible under Criterion A of the National Register of Historic Places and reclamation efforts pose some risk to the features associated with the mine openings.

Category 3 mines represent the most extensive type of property identified in the Gold Hill Abandoned Mine Project. They include sites which posses more complex structural elements, such as

associated buildings, extensive ore handling features, walls, timber bracing, or extensive quantities of related artifacts. These sites are likely eligible at least under criteria A and D and have potential to yield additional information and may be suitable for interpretation. Closure activities would definitely have to accommodate adjacent cultural materials that might be impacted by rehabilitation efforts.

Mine Openings as Isolated Finds

A single mine opening may be recorded as an Isolated Find rather than a site if associated cultural aspects are extremely limited. The following guidelines (are) used to determine if a feature can be recorded as an isolated find rather than a site.

IF Guidelines

1. Features present include an opening and an associated spoil pile, with little else. Minor prospects might be present.
2. The associated spoil pile must be smaller than 75 cubic meters or 98 cubic yards (as previously recorded by the mining engineers).
3. The mine opening cannot have had a popular name or a history of mineral production, though the claim name may be known.
4. No mining-associated features such as retaining walls, sorting piles, associated paths or roads, chiseled support holes, framed portals, rails, complex dumps, or windlass or head-frame debris can be present.
5. No structures or debris scatters such as cabin foundations, artifact dumps, domestic trash, or debris from blacksmith shops, boarding houses, offices, latrines or assay offices can be present.
6. An exception to Numbers 4 and 5 is that small amounts of nails, dimensional lumber or other artifacts such as tin cans or glass may be present.

For the current project, per agreement with the BLM archaeologist (Laird Naylor, personal communication, 2004), small debris scatters within a 10 m radius of the opening, consisting of mostly singular or homogeneous materials, such as not more than 10 cans, or perhaps fewer cans and a few small glass shards, perhaps miscellaneous wood fragments, are considered minor and insufficient to qualify as an "artifact dump." Larger, more heterogeneous scatters, however, are considered dumps.

Methods

The project was carried out under the direction of Richard K. Talbot, director of OPA, under authority of Federal Antiquities Permit Number 04-UT-54624 and Utah State Project Number U-04-BC-1237bps. Richard Talbot and Lane Richens were field directors and served as crew chiefs. Additional project participants included Scott Ure, Deborah Harris, Cady Jardine, Chris Watkins, Craig Freeman, Holly Raymond, and Aaron Woods, all of whom are Brigham Young University students. Historic research was conducted by Deborah Harris. Computer graphics, maps, and GIS support for report production were provided Scott Ure. Debbie Silversmith, OPA business manager, was responsible for technical editing of the manuscript and final document preparation.

Each of the subject mines was located in the field using the data provided by Spectrum Engineering to DOGM, including GPS coordinates, plotted map locations, descriptive information and photographs. The field documentation work involved driving or hiking directly to the mine opening. In a few instances somewhat lengthy hikes were required to reach some of the sites. Vehicle access to a few portions of the project area is relatively difficult or impossible. Generally, however, most mines were situated in close

proximity to a passable road. Topography was wide ranging in the various localities of the project area, but was generally dominated by moderate slopes and a few steeper mountain sides or canyons. The project was not assigned until the late fall of 2004, and engineering records for portions of the project were not available until January of 2005 when field conditions were not favorable to inventory work. Thus, the project field work was initiated in November of 2004 and then finished in the late winter of 2005 when field conditions improved.

Once an opening was located, field crews conducted an intensive examination of the area surrounding the mine to identify any related cultural features or artifacts. As specified by contract stipulations, investigation of underground mine workings was not undertaken due to the risk factors involved. Accordingly, features and artifacts on the interior of the shaft or adit other than those visible from the outside were not examined. At several of the mines there were multiple closely related openings which were grouped into a single archaeological site for the purposes of documentation. A minimum of a 30 m buffer zone around each defined site boundary was examined, as described above. The area between sites and their associated buffer zones was considered to be out of the project area and was not examined. Accordingly, no systematic survey was conducted outside the boundaries of the defined sites and away from the subject openings previously identified by DOGM for the purposes of confirming the presence or absence of other historic or prehistoric cultural material not immediately associated with the project openings. The exception to this was when sites were located away from maintained or well-used roads, in which cases an access corridor 30 m wide was surveyed from the nearest road to the site, to allow machinery entry. Borrow source areas for any of the openings proposed for backfill closure were not considered within the surveyed areas. Further inventory of borrow source areas would need to be conducted if borrow material is required for specific openings, though typically the waste material associated with openings is sufficient to use for sealing an opening.

Each site was recorded using standard Intermountain Antiquities Computer System (IMACS) site forms, and including Global Positioning System (GPS) generated location data, site sketch maps, and digital photography. Site locations were plotted on 7.5 minute series USGS maps using both GPS data and information provided by DOGM. In the field, individual mine openings were relocated on the basis of map plots and Universal Transverse Mercator (UTM) coordinates provided by DOGM. During the actual survey those coordinates were checked using Garmin eTrek or Garmin GPS40 GPS receivers, and corrected (a very rare occurrence) when necessary.

Most historic hard rock mining districts consist of a scattered patchwork of roads, prospects, openings, ore transportation and processing features, and less frequently, habitation features and even the remains of business or commercial structures. These cultural materials are often widely spread in the area surrounding the actual mine openings, and may require large amounts of time and money to document completely. Examples of these types of archaeological features do occur in the Gold Hill area both within and outside the boundaries of the specific project openings, and therefore not all were documented. However, this more complex fabric of related cultural manifestations really does constitute a part of the regional framework within which these sites were considered.

Regulatory Setting

The Division of Oil, Gas and Mining (DOGM) administers the Surface Mining Control and Reclamation Act of 1977 under the auspices of the Office of Surface Mining (OSM) through the Abandoned Mine Reclamation Program (AMRP). The program was developed in order to reclaim land and water resources adversely affected by past coal mining and left abandoned or inadequately restored. Today the AMRP protects public heath and safety from hazards at all abandoned mines and restores lands

damaged by past, unregulated mining. The program is funded by a federal tax on coal produced in the state. OSM ensures that all Utah AMRP actions comply with the requirements of the National Environmental Protection Act (NEPA) and other applicable federal laws. The AMRP program is managed in accordance with the Federal Office of Management and Budget Circular No. A-102 and applicable state guidelines. Federal environmental and historic preservation laws apply both because the program draws on federal funds, and in the case of the Gold Hill Project, because some of the subject sites are located on federally managed land.

The National Environmental Policy Act of 1969 (42 U.S.C. 4371 et seq) established a formal federal policy to preserve natural, as well as historical and cultural aspects of national heritage when monies from federal agencies are used. Regulations for implementation of the act have been issued by the Council on Environmental Quality (40 CFR Part 1502.16[g]). The regulations require that federal undertakings and federally funded state undertaking that have the potential to impact historic and cultural properties must make an assessment of the consequences of such actions. The intent of this legislation is to preserve cultural and archaeological sites, and to direct agencies into selecting alternatives that lessen unavoidable impacts, but not necessarily to prevent appropriate actions that entail adverse effects to cultural resources and sites. The regulations do require, however, that impacts be recognized and minimized or mitigated whenever possible.

Additional federal legislation governing the protection of historic properties includes the Antiquities Act of 1906, the National Historic Preservation Act (NHPA) of 1966, the Archaeological and Historical Preservation Act of 1974, the Archaeological Resources Protection Act of 1979, and the American Indian Religious Freedom act of 1978. Although NEPA is the broadest of the cultural resource authorities, Section 106 of the National Historic Preservation Act is the most specific of the cultural resource regulations, and provides guidelines to federal agencies, state, and private entities in regards to the appropriate treatment of historic properties affected by federally funded undertakings.

The National Historic Preservation Act of 1966 (amended in 1992) authorizes the Secretary of the Interior to "expand and maintain a National Register of Historic Places (NRHP) composed of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, engineering, and culture" as well as all documentation, artifacts, and remains related to these properties (Title 1, Section 101 (a)). Properties meeting the requirements stated in the NHPA are eligible for listing on the National Register of Historic Places. The determination of the significance and eligibility of historic properties is to take place in cooperation with the State Historic Preservation Officer, who also consults with federal agencies in the mitigation of impacts to NRHP properties and to "advise and assist in the evaluation of proposals for rehabilitation projects that may qualify for Federal assistance" (NHPA 1966 Title 1, Section 101, paragraph 8). Implementing regulation for Section 106 have been promulgated by the Advisory Council on Historic Preservation (ACHP) and are codified at 36 CFR 800.

Determinations of eligibility are made on the basis of standards recommended by the National Park Service for evaluating properties for inclusion in the National Register of Historic Places (NRHP) pursuant to the requirements of 36 CFR part 63 and 36 CFR 800.4(c). The NRHP criteria are established as the appropriate standards for determining the significance of archaeological sites for compliance with the requirements of the Section 106 process (36 CFR 800.4[c]). The significance assessments for the sites examined for the Gold Hill Abandoned Mines Project are presented below. The criteria used follow the published guidelines, and the appropriate criteria for each site recommended as eligible are noted.

> "The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and:
>
> (a) that are associated with events that have made a contribution to the broad patterns of our history; or

(b) that are associated with the lives of persons significant in our past; or

(c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

(d) that have yielded, or may be likely to yield, information important in prehistory or history." (36 CFR 60.4)

Historic mining properties constitute a unique type of archaeological site that is distinct from many of the other kinds of historic sites that are typically the topic of identification and assessment actions pursuant to the National Historic Preservation Act. Historic mining locations are typically comprised of multiple mine openings which may be relatively widely scattered and yet interrelated. The surface manifestations frequently represent only a small visible indicator of what may be much more extensive underground workings. Yet for the purposes of Section 106 matters, only the surface manifestations of mining related activities are usually considered when making determinations of eligibility. The extent, condition, and nature of underground workings can not usually be considered due to the dangers and difficulties of accessing abandoned mine properties for the purposes of documenting and studying them.

Mining properties are subject to a wide range of impacts that can alter their appearance and impact integrity. These include abandonment, exposure to harsh environmental conditions, vandalism, and historic salvage operations, all of which can affect mining properties and often result in sites that are composed of rather modest manifestations which only partially reflect the original character of the site. Common examples of these impacts include collapse of buildings and mine openings, removal and salvage of equipment and machinery, and salvage of railroad and ore car tracks. It is important therefore to recognize that the NRHP eligibility criteria allow consideration and acceptance of "significant and distinguishable entities whose components may lack individual distinction" (Noble and Spude 1992:19).

The National Register Bulletin *How to Apply the National Register Criteria for Evaluation* (Shrimpton 2002) makes the following specifications regarding each of the National Register Criteria:

A. *"Mere association with historic events or trends is not enough, in and of itself, to qualify under Criterion A–the property's specific association must be considered important as well. Often, a comparative framework is necessary to determine if a site is considered an important example of an event or pattern of events"* (Shrimpton 2002:Section IV)

The historic context developed for mining in the Gold Hill region demonstrates that the mining and other cultural resources in and around the town of Gold Hill generally were 1) part of a historic trend important to the establishment, growth, and eventual decline of the town itself; and 2) part of a trend of hard rock mineral extraction in the 1800s and 1900s that played an important role in regional economic developments. Whether or not specific sites consisting of a single mine or a cluster of mines are strongly associated with those trends and are important examples of them, and whether or not they maintain sufficient integrity to convey historic significance, are the measures used in our evaluations of each site.

B. *"In order to qualify under Criterion B, the persons associated with the property must be individually significant within a historic context.....the individual associated with the property must have made some specific important contribution to history."* (Shrimpton 2002:Section IV)

Sites with direct association to one or more individuals important within a local, state or national historic context, and that specifically are illustrative of why the individuals are considered important, are the evaluative measures for this criterion. Further, the site integrity must be of such that it still portrays the basic physical characteristics that were present during the individual's life.

C. *"To be eligible under Criterion C, a property must meet at least one of the following requirements: the property must embody distinctive characteristics of a type, period, or method of construction,*

represent the work of a master, possess high artistic value, or represent a significant and distinguishable entity whose components may lack individual distinction. (These) requirements should be viewed within the context of the intent of Criterion C; that is, to distinguish those properties that are significant as representatives of the human expression of culture or technology (especially architecture, artistic value, landscape architecture, and engineering)." (Shrimpton 2002:Section IV)

Properties associated with the current project are directly or indirectly related to the technology of mineral extraction. Architecture and engineering related features are clearly the technological expressions most appropriately considered relative to the distinctiveness of these sites. For the most part these consist of head frames above openings, and/or associated mining-related facilities whose integrity is still intact.

D. *"Criterion D requires that a property 'has yielded, or may be likely to yield, information important in prehistory or history.' Most properties listed under Criterion D are archeological sites and districts, although extant structures and buildings may be significant for their information potential under this criterion. To qualify under Criterion D, a property must meet two basic requirements: The property must have, or have had, information that can contribute to our understanding of human history of any time period; (and) the information must be considered important."* (Shrimpton 2002: Section IV)

The Gold Hill mining or mining-related sites are highly variable relative to time and effort put into their excavation, associated facilities construction, and use. Many are little more than minimal prospecting efforts of very short duration. Others involve considerably more effort and are more likely to have contributed to the economic impetus of mining in the region. Generally the smaller, limited effort sites–at least individually–are unlikely to have information important and contributory to an understanding of human history. The larger effort sites, on the other hand, may contribute addition important information on area mining history, either through more thorough examination of the physical remains of those sites, or through additional research related to the mines and mining efforts associated with the sites.

Integrity of the Gold Hill sites

The boom and bust nature of the Gold Hill mining history has resulted in a relatively intact integrity for most of the project area sites. Specifically, post-boom reclamation has been minimal throughout the area, with the exception of the obvious demolition and de-construction of some of the bigger sites, and in particular the Gold Hill mining site itself. As a result, all of the sites documented here maintain integrity of location and setting; fewer retain integrity of design, materials, workmanship, feeling, and association. The smaller sites, typically consisting of one or two openings, are the more likely to retain such integrity simply because a good share of these are in hard to access locations, and in any case were never complex operations but rather comparatively brief exploratory efforts.

Environmental Context

Geology

The general Gold Hill project area is located in northwestern Utah, at the north end of the Deep Creek Range. The Deep Creek Range extends a distance of approximately 45 miles, with the Dutch Mountain area just north of the town of Gold Hill as the far northern end of the range. The range is situated immediately west of the Great Salt Lake Desert, along the Utah-Nevada State line. The highest point in the range is Ibapah Peak at approximately 12,109 ft asl, while the town of Gold Hill is situated at only ca. 5,300 ft asl.

The project area lies in one of the more intensively mined regions of the state, and contains mineral resources of national caliber and significance. The Gold Hill area is one of the oldest mining localities in the state and has a unique geological history. The sediments, which are severely thrusted, comprise a relatively complete stratigraphic sequence from lower Cambrian through Lower Triassic with a total thickness of about 30,000 feet. (Figure 2). They have been intruded by a quartz monzonite stock and porphyry dikes, and include acidic lavas and pyroclastics of Tertiary age. Rocks include sedimentary, igneous (intrusive and extrusive) and metamorphic types. The structural elements include folds, fractures and the emplacement of an igneous body (El-Shatoury and Whelan 1970).

The structural history of the quadrangle is complex. Structural analyses conducted by Nolan in 1935 identified several phases of tectonic activity, all of which have significantly affected the mineralization of the region. Eardley (1962) pointed out the significance of Nolan's work in making clear the complexity of deformation in its geanticlinal areas, noting that the structural history is characterized by at least four and possibly five phases of folding and faulting. Each of these phases is composed of an initial stage in which compressive forces were active and a final stage in which normal faulting was dominant. The first two phases predate the Eocene by a long interval of erosion and are regarded provisionally as Cretaceous. It is probable that they are related to the Nevadan and Post-Nevadan Cretaceous disturbance to the west and to the sinking of the Utah trough during the time that the Indianola, Kelvin, Aspen, and Frontier and other formations were deposited in it.

Recent studies by Lovering at Eureka, Utah, show the same succession of events (Eardley 1962). The geologic histories of the Gold Hill district and the Tintic Mountains near Eureka are considered typical of the east central part of the Great Basin Province. The region, a geosyncline during the Paleozoic and a broadly uplifted geanticline during the Mesozoic, has been subjected to intense compressional forces and severe deformation. (El-Shatoury and Whelan 1970).

There are three types of mineralized veins present in the Gold Hill area: quartz-carbonate-adularia, quartz, and calcite. The first type is confined to the quartz monzonite stock; the other two occur both in the quartz monzonite and the surrounding rocks. According to the geological study performed by El-Shatoury and Whelan, the

> *"Quartz-carbonate-adularia veins are restricted to Gold Hill quartz monzonite stock. They are found in the central part of the main mass and are concentrated in the area of Rodenhouse Wash. A few veins of the same type occur on the Reaper claims, about two miles southwest of the Rodenhouse Wash and north to Clinton. ...The veins show a wide variation in their physical and mineralogical characteristics. They vary in thickness from a fraction of an inch to several feet. Their strike length varies from a few inches to about 1,400 feet, interrupted by a slight change in strike and intermittently covered by float of the same material. ...Megascopically, they are fine-grained, stained brown on the weathered surfaces but milky white on fresh surfaces with fine hematitic bands stained light brown. Some of the veins show minute microlitic cavities in which minute euhedral, colorless and brown quartz crystals protrude.... Generally, banding is more distinct in the thin veins than in the thick ones, which are jointed and fractured* (1970:11, 13).

> *Quartz veins occur in the quartz monzonite and in the surrounding limestone areas. In some places they cut the aplite dikes and hence are younger. Quartz veins cutting the limestone are generally fine stringers a few inches wide and occupying joint planes. In the quartz monzonite, they are generally of larger dimensions and occupy fissures. They are fine-to-medium grained, grayish to milky white in color, and occasionally show brownish to red staining. ... Quartz veins also occur as a microscopic feature, cutting all rock units studied and carrying economic quantities of scheelite, chalcopyrite, bismuth and gold. They have been worked in the Lucy L mine, in the Wilson mine about two miles southwest of Gold Hill village, and in the Doctor group of claims adjoining the Yellow Hammer mine. According to Nolan (1935), metallic minerals are native bismuth, bismuthinite (both partially oxidized to bismutite), pyrite, and native gold, all in a matrix of quartz* (1970:15).

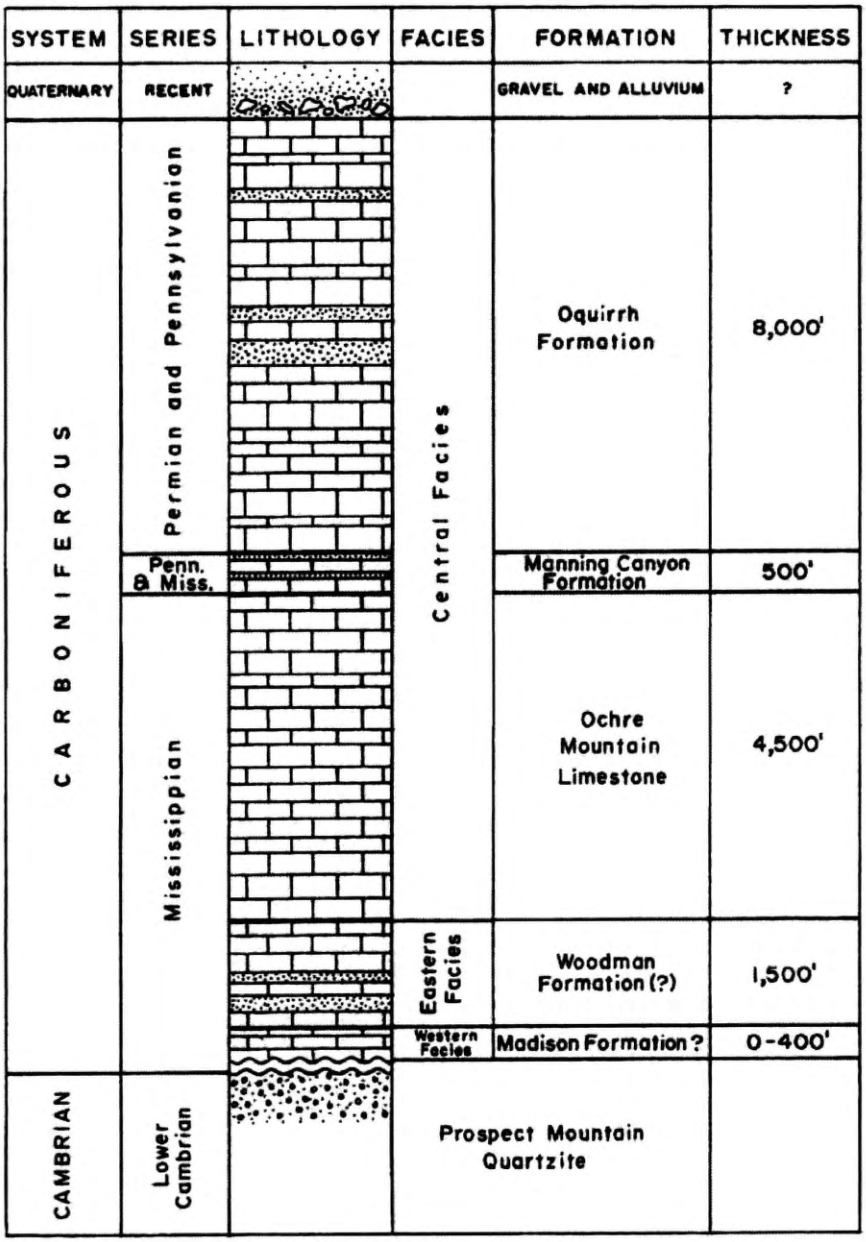

Figure 2. Stratigraphic Units Occurring in the Vicinity of Gold Hill, Utah (adapted from Nolan, 1935).

The confinement of the ore bodies to fracture zones in the quartz monzonite, and to the contact zones between quartz monzonite and the Carboniferous Ochre Mountain limestone and the Oquirrh Formation, gives a strong indication of the role of the igneous intrusion as a source of the ore-forming fluids. The quartz monzonite stock is marked by a group of fractures filled with mineable replacement deposits, veins, and dikes. Intersecting veins and dikes may indicate fracturing at different times. Measurements of the strikes and dips of the berylliferous quartz-carbonate-adularia veins centered around Rodenhouse Wash disclose that they occupy fissures with a general northeast strike" (1970:25).

According to Nolan, these three fissure types can be correlated according to their strike and dip with a regional distribution and type of mineralization. He also noted that "the nonmineralized faults and sheer zones showed a strong tendency to strike either nearly east or nearly north. In the mineralized group there was no uniformity in strike or dip within a group, nor was there any pronounced regional pattern of fracturing discernable" (El-Shatoury and Whelan 1970:25). Kemp and Billingsley (1892) also noted that upper ore body in Gold Hill is controlled by a northeasterly fracture which dips to the northwest, and aresenate deposits follow a group of fractures that strike 10 to 30 degrees north and dip about 70 degrees northwest.

The correlation between faults and sheer zone direction has made it possible to plot the ore deposits according to their projected metal associations. El-Shatoury and Whelan (1970) recognized differing bands of mineralization around a central zone characterized by high-temperature mineral assemblages of Scheelite, molybdenite, and chalcopyrite. These bands occur outward from this central zone in the following sequence: tungsten-molybdenum-copper, copper, copper-gold, copper-lead-arsenic, and lead-zinc-gold. Understanding the dynamics of this banding can assist in predicting the areal presence of certain minerals. According to El-Shatoury and Whelan:

> *"The tungsten-molybdenum-copper zone occupies a narrow belt comprising the areas around the Yellow Hammer, Reaper and Doctor claims north of Clifton and extends north to cover the Rustler, Frankie and Lucy L mines. This zone coincides with a belt of normal faulting which may represent the primary channels through which the quartz monzonite was intruded. The ore minerals of this zone consist of scheelite, molybdenite and chalcopyrite with their oxidation products. The quartz monzonite host rock is replaced by black tourmaline, actinolite, garnet, apatite, and perthite in varying proportions* (1970:25).
>
> *The tungsten-molybdneum-copper zone grades into the copper zone with the loss of scheelite and molybdenite. The ore minerals are chalcopyrite and pyrite and their oxidation products in a gangue of black tourmaline, garnet, perthite, and actinolite. This zone comprises a narrow area to the west of the scheelite-molybdenite zone and is developed by the prospect workings of the Victory and Gold Bond claims* (1970:25, 29).
>
> *The copper-gold zone to the north is of a different mineralogy and is of the contact metasomatic type. Ore minerals are native gold and chalcopyrite in a gangue of wollastonite, garnet, zoisite, diopsite, magnetite, and pyrite. This zone is exposed by the workings of the Bonnemore and Undine prospects to the southeast. The Cane Spring and Alvarado mines are of the same nature* (1970:29).
>
> *The copper-lead-arsenic zone marks the replacement deposits developed by the workings of the United States and Gold Hill mines. The Copperopolis (Bamberger) mine is included in this zone on the basis of the description of the mineralogy of the ore and on the identification of conichalcite in the mine dump and its vicinity* (1970:29).
>
> *The outermost zone is characterized by the lack of copper and the predominance of lead, zinc, and gold. This zone is not a continuous belt, but is rather defined as two fringe zones marking the eastern boundary of the area. The northern part of this zone is developed by the Rube Lead and Rube Gold mines, and adjacent prospects of the Silver and Gold Mining Company. The southern part of this zone is developed by the workings of the Climax and Success mines* (1970:29).

Thus, evidence of a direct relationship among the types of mineral deposits in the Gold Hill area with the quartz monzonite intrusion is demonstrated by the nature of the contact metasomatic deposits, the replacement deposits in the quartz monzonite, and by the hydrothermal type veins directly related to the intrusive body. Northeast-trending fractures are important conduits for ore solutions and are sites of ore deposition. The close of hydrothermal activity and mineral deposition is represented by the quartz-carbonate veins localized in the quartz monzonite in the vicinity of the Reaper mine and in Rodenhouse Wash. (El-Shatoury and Whelan 1970).

Stokes (1986:182) has also summarized the geological context of the Gold Hill region. A brief summary of his work is detailed here to provide a context for the historic mining activities documented during the project.

> *"The Gold Hill area is located in the southwestern corner of Tooele County, a few miles from the Nevada border. Mines in the area have produced gold, silver, copper, lead, zinc, tungsten, arsenic, and bismuth valued at more than $3 million. There were several boom periods but Gold Hill is now little more than a ghost town. Intrusive and extrusive rocks appear to be intimately related to the ore deposits. An intrusive quartz monzonite stock and associated projections with a total surface area of about 24 square miles makes up most of the east-central part of the mountains. The Gold Hill intrusive is a composite stock; the older component is Jurassic (152 million years) in age and the younger is middle Tertiary (38 million years). A great many porphyry dikes cut the stock and enclosing sediments, and strong metamorphism has affected the intrusion and its surroundings. Small patches of extrusive rock that are clearly remnants of once larger bodies are preserved in the area. Both flows and agglomerates can be identified; they are chiefly latite or trachyte with minor basalt and rhyolite.*
>
> *The valuable mineral constituents are found in pipe-like deposits, veins, and replacement bodies. The replacement bodies, chiefly in limestone, have yielded copper-lead-silver ores and small quantities of tungsten and the veins have been mined for moderate amounts of tungsten, copper, and gold. More than 100 minerals have been recognized in the ore bodies and metamorphic rocks. Many Gold Hill area minerals are relatively rare and much sought after by collectors. The town of Gold Hill is one of Utah's best preserved ghost towns."*

Flora and Fauna

The Gold Hill Project area flora and fauna are consistent with those found widely distributed in the high-desert climate zones of the eastern Great Basin. They are only briefly summarized here. Grayson (1993:33) notes that there are well over 600 species of vertebrates native to the Great Basin, including mammals, birds, snakes, lizards, frogs, turtles, and fish. The project area falls within the Great Basin Faunal Area defined by Durrant (1952:480). The Great Basin Faunal Area, like all those defined for the state, is distinguished and defined largely by factors involving physiographic characteristics which have affected the evolution and spread of animals throughout the region. Durrant found that each of his defined areas were distinctive because certain species were restricted to it, and in most cases, served the defined areas served as centers for subspecies differentiation. The Great Basin Faunal Area is the largest in the state, and comprises most of the western half of the state. In terms of mammalian fauna, the area is distinct for at least one species found no where else in the state, and some 42 subspecies which are wholly or nearly restricted to this area (Durrant 1952:488). The animals found in the project area include a relatively wide variety of both large and small mammals, birds, and reptiles, including: deer, antelope, rabbits, lizards, snakes, birds of prey, and other associated species, as well as some fish in the perennial water courses, though the closest significant water source to Gold Hill is the Fish Springs area well to the southeast. While the fauna were probably economically significant during the prehistoric period, their variety and distribution were probably of much less significance to historic peoples involved in mining pursuits.

Due to the minimal span of elevational ranges covered in the project area, the floral community is not very diverse. The lower elevation sites in the northern project area are characterized by shadscale, Indian ricegrass, cheat grass, phlox and snakeweed. The central project area is generally slightly higher and contains more sage, rabbitbrush, ephedra, and various grasses. The southern project area contains sage, occasional juniper, cliffrose and occasional fruiting shrubs. These all certainly would have been economically important to the prehistoric inhabitants of the area, and were probably expeditiously used by the historic occupants as well.

Historical Context

"The search for gold is the most entertaining and hopeful occupation on Earth, and it makes all men silly if they are not already in that pleasant state" (Peck 1959:60)

Mining In the United States

Conditions suitable for ore deposits are common only in limited areas of the world, and even where conditions are ideal, ore bodies are the exception rather than the rule. The sporadic occurrence of these ore deposits, then, makes the discovery of large mineralized regions very important. As noted above, economically important mineral and coal resources in the eastern United States were restricted mainly of rich deposits of coal and iron-bearing ores, along with limited localized precious mineral lodes, mostly found within the Appalachian mountain area (Bergendahl et al. 1981; Wallace 1976). The igneous origin of metals and the tendency for igneous activity to be associated with geologic crustal uplifting suggests that metal-ore bearing regions are often mountainous. Significantly, the western United States is characterized by numerous large, igneous mountain ranges and regions of crustal uplift. Due to this, a vast majority of the major mineral-bearing deposits within the United States have been identified throughout the western region of the nation.

A mine is an "excavation made in the earth for the purpose of extracting useful minerals" (Gregory 1980:18). While the definition seems simplistic, the process of constructing a safe and economically viable mine is complicated and varied. A number of different techniques and approaches to mining were utilized throughout the historic mining period. The archaeological manifestations of these activities are dependent upon and reflective of these different processes.

Mines in general can be divided into four classes: underground (hard-rock), surface (open pit), alluvial (placer) and non-entry (well/drilling). All four types of mines are found within the western United States, and all have been employed for the extraction of minerals, although wells have generally only been used, in terms of precious metal development, for the solution mining of copper. Mining methods most closely associated with precious metal procurement are placer (Sutter's Mill, Clear Creek), open-pit (Bingham), and underground (Comstock, Ophir, the extended Bingham mines, and the current Gold Hill mines).

Placer or alluvial mining relates to the recovery of heavy minerals that have been eroded out of their primary ore deposits and then concentrated, primarily by water action, into streambeds below gravel deposits and above the bedrock. These deposits are made possible because of the comparative differences between the specific gravity of precious minerals as compared to ordinary rock, gravel and sand. For example, diamond and gold dust have specific gravity weights of 21.4 and 19.3, respectively, whereas the average specific gravity weight non-mineral rock is 2.6. This means that as moving water slows, sometimes even fractionally, the heaviest material it is carrying will be dropped out (deposited) and concentrated, particularly at bends or more level areas within a streambed. These minerals, particularly when occurring in stream banks or terraces, can be mined by washing the materials down a sluice, which carries away the lighter materials, leaving the precious minerals behind. This is also the theory and method behind gold-panning, just that the process takes place on a much smaller scale. It was these types of finds which fueled the initial gold rushes into California, the Rockies and Alaska, and kept alive the drive for expansion across the west (Gregory 1980; Wyman 1979).

'What a clover-field is to a steer, the sky to a lark, a mudhole to a hog, such are new diggings to a miner.' So, in 1862, wrote *The Oregonian* about the large numbers of men who roamed the West in a tireless search for precious metal. Once the great California gold strike of 1848 had shown what riches the

Western earth could hold, hordes of Americans hurried to every other promising corner of the wilderness (Wallace 1976:6). One such explorer was George Jackson, a miner whose impact on the mining west was significant.

On January 6, 1859, George Jackson found himself dangerously short of food in the snowy Rockies 30 miles west of Denver. He had just decided to quit his gold hunting and head toward Denver when he chanced upon some hot mineral springs near Clear Creek. The springs had melted the snow, and the area was surrounded by mountain sheep which were grazing on the exposed vegetation. Taking advantage of the opportunity, Jackson shot one of the sheep in order to feed himself, then made the decision to devote one more day to his hunt for gold. The next morning Jackson resumed his hunt along the south fork of Clear Creek, scanning the frozen stream bed for a gravel bar, where any yellow flakes from upstream might be trapped. In his travels he had seen many such so-called placer formations. Late in the day Jackson spotted a promising gravel bar, hacked out some slushy sand with his knife and panned it in his tin drinking cup, the only suitable implement he had at hand. He swished water around in the cup until all the light sand was washed out. Left in the cup were a few tiny but heavy yellow flakes: gold and no mistake. Jackson panned several more handfuls of sand, collecting a vial of gold dust and one small nugget worth $10 in Denver at current market levels.

Being short of equipment and supplies, Jackson could not really work his find until the spring thaw, so he concealed the evidence of his activity and marked a tree 76 paces to the west, identifying the site so that he could return later and work the claim. In his diary he wrote:

> *"If only I had a pick and pan instead of a hunting knife and the cup, I could dig out a sack full of the yellow stuff. My mind ran upon it all night long. I dreamed all sorts of things - about a fine house and good clothes, a carriage and horses, travel, what I would take to the folks down in Old Missouri and everything you can think of - I had struck it rich! There were millions in it!"* (Wallace 1976:19).

George Jackson was partly right. The Clear Creek area would yield more than $100 million worth of gold in 60 years. But like most prospectors, he overestimated his personal gain. The strike did not make him rich -- only a little more comfortable. On his return to the gravel bar in May, he and a few partners panned $1,900 in dust in six days work; not long after, Jackson sold out for an unknown sum, probably modest. Nevertheless, Jackson had discovered the first major gold field in the West's immense interior wilderness (Wallace 1976).

> *Gold had always been a good story, and opportunists of all sorts turned it to their own advantage. In towns along the Mississippi and Missouri rivers, merchants had done a brisk business outfitting gold seekers for the 600- or 700-mile journey. No fewer than 17 writers, most of whom had never seen the Rockies, rushed into print with guidebooks to the chimerical gold mines, which they loosely named after the region's best known terrain feature: Pikes Peak. One journalist, D.C. Oakes, extolled the ease and comfort of the trip, and other assured his readers that 'Gold is found everywhere you stick your shovel.'*
>
> *By April 1859, a torrent of prospectors - estimated at 100,000 - had set out for the "New Eldorado," most of them ill-equipped and ignorant of the hazards they faced. Their wagons, painted with the slogan "Pike's Peak or Bust," broke down in the prairie. Many 'fifty-niners' got lost, perished of thirst, hunger, disease, or Indian raids. About half of the emigrants never reached the Rockies, or turned back bitterly crying "fraud." . . . By mid-May...the tide of "go-backers" reached its crest, and it seemed that the search for gold was over. But then, two miners from the south fork of Clear Creek came into Denver, full pouch of gold dust in hand, saying: "Here's a sample of our stuff. We're taking out nearly $2,000 a week up on the south fork"* (Wallace 1976:8).

The Clear Creek strike made by George Jackson, and the gold rush that it precipitated, opened up a new chapter in the saga of western mining. In the hectic half century that followed the Colorado

discoveries, the continent's mountain bound interior - from the Rockies to the Sierra Nevada and the Cascades, and from Canada to Mexico - was crisscrossed by legions of prospectors and miners, who flung up hundreds of outposts in the unpopulated uplands that the forty-niners had ignored in their rush for the Pacific. "It was," wrote prospector William Parsons, "a mad, furious race for wealth, in which men lost their identity almost, and toiled and wrestled, and lived a fierce, riotous, wearing, fearfully excited life: forgetting home and kindred; abandoning old, steady habits; acquiring restlessness, craving for stimulant, unscrupulousness, hardihood, impulsive generosity, and lavish ways" (Wallace 1976:8).

No one knew how many freelance prospectors and wage-earning miners took part in the adventure; in the race from strike to strike, many of these entrepreneurs circulating in the unsettled areas of the frontier seldom stayed put long enough to be counted. But their strikes increased at a staggering rate. By 1866, a scant seven years after Jackson's find on Clear Creek, miners had organized more than 600 far-flung mining districts in an effort to regulate their own affairs until some official government reached their remote camps. And that was merely the beginning. According to a careful estimate, the West may have had as many as 100,000 mining districts by 1900. Most of the strikes were small and short-lived; the boom-and-bust cycle often ran its full course in less than a decade. But in dozens of rich areas, prospectors and miners wrung enough wealth from the earth to strain their own willing credulity" (Wallace 1976:21-22).

The Mining Industry in Utah

"The history of mining in the West (goes) back to the very beginning of the Mormon development of Utah. . . . President Lincoln, recognizing the vast wealth of the west said, 'Utah will yet become the treasure house of the nation." (Carter 1939:1). However, the mining industry, which eventually played an extremely important part in the development of Utah, played little role in the lives of the early pioneers. These first settlers did not come west for material riches, but were seeking a place of refuge. The first priority of these pioneers was to build permanent, self-sustaining communities based on agriculture, home industries, homes, churches and schools; and Brigham Young, who often declared that the mountains of Utah were filled with precious metals, discouraged prospecting in order that strong communities could be fully established before any mining industry should be developed (Carter 1939). This placed Utah in contrast to many other western states whose early colonization and foundations lay primarily in economic forces driven by mining. The unique foundation established by the Mormons in Utah perhaps altered the way in which mining would unfold as a factor in the state's development, but it did not preclude the fact that Utah would enjoy tremendous growth and economic development at least in part due to its natural resources.

The history of mining in Utah has been summarized into four broad periods or phases:

1) Production by the pioneers of minerals suitable to their isolated, home-industry, agricultural economy – 1847 to1869.

2) Mining and smelting of lead, silver, gold, joined by copper and zinc in the latter stages – 1869 to1940 – largely for export trade.

3) Mining and processing of metals and nonmetallic minerals to meet needs of rapidly growing Western States area – (iron, gypsum, phosphate, cement, salt, potash, clays, etc.) – 1940 to present.

4) Uranium, potash and oil and gas development – 1948 to present (Utah Mining Association 1967:9)

The key developments of the mining history of the state will be summarized briefly in each of these periods in order to develop a broad historical outline for the project area.

Pioneer Period Production — 1847 to 1869

As already noted, the early economic emphasis of the Mormon colonists of Utah was decidedly agrarian and explicitly "anti-mining." The Mormon ecclesiastical leaders were relatively unified in their belief that agriculture and horticulture were a more trustworthy basis for the types of millenialist religious communities that they were trying to establish in the Great Basin. Mining was seen as a somewhat threatening distraction to the objective of building stable, prosperous egalitarian communities. In a very real sense, the survival of the early colonists during the first crucial years was dependent upon their success in establishing agricultural pursuits, and anything else constituted a distraction that could not be afforded. This led to an official policy that discouraged mining pursuits, but did not overtly prohibit them.

In light of this general bias against mining in the core area of Latter-day Saint settlement along the Wasatch Front, it is interesting to note that Mormons in California were involved in the first discovery of gold at Sutter's Mill in 1848. Shortly after the main body of Latter-day Saints left Nauvoo, Illinois, in 1846, the federal government requested that Brigham Young raise a contingent of approximately 500 male members of the church to serve in the U.S. Army. Congress had declared war with Mexico on May 12, 1846, and President James K. Polk was anxious to assert U.S. control over Upper Mexico and California, and needed additional military forces to carry out his plan. The group of men raised from the Mormon immigrants camped in Iowa became known as the Mormon Battalion. The group was outfitted in Fort Leavenworth, and was sent west to provide support for support for General Stephen W. Kearny, commander of U.S. forces in the western United States. The Battalion marched overland from Fort Leavenworth to Santa Fe, New Mexico, and from there to San Diego, where they arrived in January of 1847. The men were officially discharged at Los Angeles on July 16, 1847. Most of the men began preparations to head east to meet up with the main body of the LDS Church, which had arrived in the Salt Lake Valley in early July of that same year. However, a message was received from Brigham Young asking those men without families to remain in California for the winter to work. Some of the men made their way north to Sutter's Fort on the Sacramento River, where they took contracts to work for Sutter in his business ventures. At least six of the eleven men present at the first discovery of gold at Sutter's lumber mill in January 1848 were Mormons who had been members of the Battalion. This find sparked the beginning of the California Gold Rush. Although some of the Battalion members wanted to stay on in California, most returned to the Salt Lake Valley as soon as possible.

The Mormon Battalion was not the first group of Latter-day Saints to arrive in California. A group of 238 church members under the direction of Samuel Brannan sailed from New York on February 4, 1846 headed to California, arriving at Yerba Buena (San Francisco) in July 1846. From there, the group was supposed to travel east to meet up with the main body of Mormon immigrants moving overland from Nauvoo. Brannan, the leader of this group of Mormons who had sailed from New York to California, strongly urged the church leadership and other pioneers to come further west to make their fortune. However, Brigham Young declared to the people "Do not any of you suffer the thoughts to enter your minds that you must go to the gold mines in search of riches. That is not the place for the Saints" (Carter 1939:1). During the period of the early colonization of Utah, Young was concerned that the rush to obtain riches would not only harm the effort to build safe and successful communities, but he was also apprehensive about the effects of influx of miners and gold-seekers on Utah pioneers (Rickard 1932).

Some limited development of minerals and metals was pursued with the permission, and under the direction of, Church leaders, as it met the needs of the developing agriculture and home industry base. Iron ore deposits were discovered by the Parley P. Pratt exploration party in Iron County in 1850. Beginning in 1851, the deposits were the focus of an active, but largely unsuccessful effort to produce iron. In 1854, the Territorial Legislature offered a reward of $1000 for the first discovery of commercial coal within 40 miles of Salt Lake City. By the mid-1860s coal from Summit County was available in Salt Lake City at $40.00 per ton (Utah Mining Association 1967:6). Other early efforts involved attempts to find suitable lead sources for bullets, and the extraction of salt from area around the Great Salt Lake.

The gold rush of 1849 drew many classes of prospectors and people to California. Since Salt Lake City was the one "oasis" in the desert crossing, many immigrants made their way through the city, some becoming temporary residents before resuming their journey west. Although records dating back to 1859 confirm that the United States government was aware of the vast mineral potential of the Utah Territory, the "rich and extensive placer deposits that were the first incentive to mining in many western camps were lacking, and the lode deposits, though many of them were very rich, required extensive machinery for profitable exploitation" (Butler et al. 1920:118). These challenges, together with the established anti-mining stance taken by the political and religious leaders of the territory slowed the development of any serious efforts at mining in the territory.

The commencement of the first intensive efforts related to mineral exploration and mining in Utah dates to the arrival of Colonel Patrick E. Connor in October, 1862 (Butler et al. 1920; Rickard 1932). Connor, who commanded a force of approximately 750 United States soldiers, was dispatched to the Territory with the explicit orders to control "Indian depredations," but also undoubtedly with the secondary objective of keeping an eye on the Mormons, whom the federal government distrusted (Carter 1939:8), and to offer protection to prospectors and overland immigrants. Upon their arrival, the soldiers immediately established Camp Douglas on a bench east of and overlooking Salt Lake City (Butler et al. 1920). Shortly thereafter, Colonel Conner [he was promoted to General in 1863] organized the West Mountain Mining District. He then published a "circular to the world that 'the strongest evidence that the mountains and canyons in the territory of Utah abounds in rich veins of gold, silver, copper and other materials, and for the purpose of opening up the country to a new, hardy and industrious population, deems it important that prospecting for minerals should not be untrammeled, but fostered by every means'" (Carter 1939:8-9). Colonel Connor, however, was not only concerned with encouraging mineral prospecting, but also with promoting immigration to the Utah territory, as he considered the pervasive Mormon presence in the region to be "troublesome" and he appears to have strong intentions to dilute Mormon influence in the Territory by encouraging the immigration of non-Mormon "gentiles" into the region (May 1989:204; Rickard 1932). In a July, 1864 report to the War Department, Connor stated:

> *"As set forth in former communications, my policy has been to invite hither a large Gentile population, sufficient by peaceful means and through the ballot box to overwhelm the Mormons by force of numbers, and thus wrest from the Church - disloyal and traitorous to the core - the absolute control of temporal and civic affairs. . . . With this in view I have bent every energy and means of which I was possessed, both personal and official, toward the discovery and development of the mining resources of the territory, using without stint the soldiers of my command . . ."* (Carter 1939:9).

Connor encouraged his troops to spend their time prospecting, and he used government funds to publish the *Union Vedette*, a pro-mining periodical that touted the prospects of Utah's mineral wealth. Connor also organized the first mining districts in Utah in 1863 in connection with the first claims on silver veins in the Bingham area (May 1989:204). The earliest discoveries of rich deposits of silver, lead, copper and zinc in Bingham Canyon were made by George B. Olgivie, Archibald Gardner and soldiers from Camp Douglas (Ellsworth 1985; Carter 1939; Rickard 1932). These finds prompted a prospecting rush, strongly supported by the Connor and the Camp Douglas soldiers, which lasted for three years. It is possible that, were it not for Colonel Connor and the soldiers of Camp Douglas, it might have been many years before the mineral resources of Utah would have been successfully mined. According to Rickard,

> *"In the summer of 1864 the West Jordan Mining Company was incorporated under the laws of California, and a tunnel was started, at $60 per foot. In the same year, the first smelting furnace was constructed by General Connor, who enlisted the help of friends in California; but they were inexperienced, save in placer mining, and failed completely in this venture. In June, 1864, another mining district, named the Rush Valley, was organized. This covered the western slope of the Oquirrh range, leaving the eastern side to the West Mountain district. Vigorous prospecting ensued; but these early operations languished, in spite of the discovery of several handsome*

outcrops of argentiferous lead mineral, because so many obstacles stood in the way of profitable mining" (Rickard 1932:188).

Although claims were made and deposits discovered, the costs of mining were prohibitive until the arrival of the railroad in 1869. Much of the mining that took place during the 1847 to 1869 period, and during the period that followed, was carried out by small scale prospectors and self-employed entrepreneurs seeking to make their fortune. While some of these men were grubstaked by larger interests, many of them were totally independent, and worked at very small scale endeavors with limited capital and technological resources. These men were very much in the romantic mold of the solitary American miner of the Western frontier. Many of these men came west as part of the mining boom which began with the California Gold Rush of 1849 and continued through the early decades of the twentieth century. Individuals often prospected on their own, or as part of small organized groups, and conducted the initial work to prove up a claim. If marketable ore was discovered, they often sold out to better organized firms and consortiums which had the capital to exploit the deposits in an economically viable way. In this regard, the early mining in many of the Utah Districts simply paralleled a broader pattern found throughout much of the western United States.

Precious Metal Mining -- 1869 to 1940

Despite some early promising success with the discovery of ores in the West Mountain Mining District, Rush Valley District and other areas, most of the early efforts to develop profitable mines in the state failed due to its remote location and the high transportation costs associated with reaching distant markets. With the arrival of rail transport, mining became profitable and much more feasible throughout the state. The completion of the Union Pacific and Central Pacific railroads at Promontory, Utah, on May 10, 1869, placed Utah in a position to more advantageously exploit and market mineral resources. "On the advent of these railroads metal production became important, and as each branch line was completed, a notable increase in output was observed. Several smelting towns (Sandy, Midvale, Murray and Morgan) were built along the new lines south of Salt Lake [with the exception of Morgan which is actually located northeast of Salt Lake City on the Union Pacific line], and several smelters along the branch line to Bingham. The road from Sandy to Alta was also beneficial, and as the railroad extended southward other mining regions were benefited, notably the Tintic and several districts in Beaver County" (Butler et al. 1920:118). "The completion of the railroad communication (also) led to the mining of silver ore in Little Cottonwood Canyon, in the Wasatch Mountains, in 1864, by some of General Connor's men, but it was of no consequence until four years later" (Rickard 1932:189), when the Emma Mine was discovered. These early successes in the 1860 initiated the first real mining boom within Utah, and from this time on, towns grew up almost overnight (Ellsworth 1985; Herring 1979). Growth in some of these towns was, at some periods, overwhelming. In fact, the town of Bluff, Utah, blossomed from its normal population "of 175 to over 700 in only a few days" (Jensen 1966:97). Census figures for the years 1870 through 1920 indicate that, excepting the states of Arizona and Colorado, Utah generally had the highest number of workers identified as miners in the intermountain west region (Brown 1979). By 1917, 167 mining districts had been established throughout the boundaries of the state, with at least 50 consisting of significant, dividend-paying mining districts for both hard metal and soft rock mineral resources. Principal ores prospected consisted of copper, silver, lead, gold and zinc in order of importance (Butler et al. 1920).

Following the arrival of the railroad, in the early days of Utah mining, silver was the most economically important of the metal resources being extracted, and most of the rich silver-bearing ores were found in the Park City and Tintic mining districts (Butler et al. 1920; The Salt Lake Mining Review 1912). By the early 1900's, however, precious metal production had dropped considerably in proportion to the output of other metals. "In 1917 copper alone yielded considerably more than 67 percent of the total value" (Butler et al. 1920:129) of all metallic resources recovered in the state, the majority of which was recovered from mines within the Bingham (West Mountain) district (Butler et al. 1920:130).

"In Utah, as in many of the Western States, the earliest important metal production was of placer gold. Placer mining was begun at Bingham Canyon in 1865, and for some years yielded an important production" (Butler et al. 1920:131). Generally, however,

> *"...commercial placer operations in Utah have been generally unsuccessful or discouraging. . . . The only gold placers which have contributed largely to the state's gold output were right next door to most of the state's population - the Bingham mining district, southwest of Salt Lake City. Other placers have been worked in the state, notably in the La Sal Mountains, the Henry Mountains near Marysvale, and on the Colorado River and its tributaries"* (Parker 1966).

The Bingham placer operation, however, has been, and continues to be the most successful of the mining operations within the state of Utah. In terms of gold placer production, the Bingham Mine's highest production was reached from 1868 to 1872. By 1905, more than $1,000,000 in gold from stream gravels had been recovered from the Bingham mining district, with total statewide placer gold production equaling approximately $1,800,000 by 1920 (Parker 1966). Other gold resources had to be mined out of hard-rock mines.

Although the actual amounts of gold mined within the state were relatively small in comparison to the other mineral resources, it still remained an important state and national resource. Even though prospecting in order to get rich was forbidden by Brigham Young, "it is an irony of history that 100 years after the colonizers entered the valley, Utah would be mining 20 percent of the nation's gold production. The figure has been even higher - in 1934 it stood at 34 percent" (Woodward 1964:npn).

Mining For Western Growth – 1940 to present

The period from 1890 to 1920 marked a crucial phase in the development of Utah's economy, characterized by the commercialization of agriculture, emergence of a substantial business sector and the development of corporate mining and manufacturing (Poll et al.1989:429-430). While the single largest occupation of Utahns between 1890 and 1920 was agriculture, the leading export industry was mining. This growth of mining and manufacturing resulted in the state's integration into the national economy. While producers still struggled with the challenges of reaching distant markets, it was clear that the state was becoming a significant economic force in the region and a major producer even at the national level.

In 1949 Utah ranked second nationally in the production of copper, silver, and molybdenum, third in gold and lead, and seventh in zinc (Christy and Stowe 1981:197). By 1979 the state ranked first in the production of gold and beryllium, second in copper and vanadium, third in iron, fourth in molybdenum, and fifth in silver and uranium. In overall mineral production Utah has averaged about 2 percent of the national total. It reached a high point in 1916, when the state reached 2.84 percent of national production (Christy and Stowe 1981:197). In many sectors the state has continued to rank nationally in production of key minerals. In fact, during the years 1938 to 1948, Utah was consistently ranked within the top five gold producing states, and was actually ranked first in the amount of gold produced during the period 1946-1948 (Salt Lake Tribune 1938, 1944, 1948; Deseret News, 1947). Since 1943, Utah has averaged 22 percent of the gold production in the United States, and in 1944 reached a market high of 34 percent of national production. The state ranks consistently second in the production of copper and has also been a leader in the silver (Christy 1981:198).

Integration of the state's economy with the regional and national economies encouraged the development of mining and extraction efforts that directly served to meet the needs of the rapidly growing region of the western United States. The production focused in many cases on key non-metallic minerals such as salt, gypsum, clays, phosphate, potash, etc. The exploitation of these less glamorous materials has played a major role in the mining industry of the state since World War I.

Uranium and Fossil Fuels – 1948 to present

While Utah led the nation through much of the Post-WWII period in the production of several key resources, those production numbers have been drastically reduced since the end of the twentieth century. Although still economically important, some of the major industries have retracted as reserves have run out and production has declined. However, within the period of the last twenty years, "mining in Utah [still] accounts for almost nineteen percent of the nation's copper, two percent of the gold, fourteen percent of the silver, six percent of the lead and eight percent of the zinc" (Martin and Martin 1979:144-145).

Even as production of many of the precious minerals began to decline in the late 1900s, Utah saw increased importance in the development of resources related to energy and fossil fuels. The development of fossil fuels and other energy related resources is the final phase in the history of the state's mining, and runs concurrently with other developments taking place during the same time period in the other aspects of mining discussed above.

No commercial discoveries of oil or gas were made in the state until 1948, and there were few early indications of any substantial reserves of petroleum. Although the first oil exploration began in the state as early as the 1880s, and some gas and oil fields of limited value were found in Davis, Washington, and San Juan County, none of the finds resulted in meaningful commercial production. Sporadic exploratory activity continued, and as geological knowledge increased drillers were able to more accurately locate oil bearing strata (Ritzma 1981:211).

After the first commercially viable discoveries were made during 1948, production of oil jumped from nearly zero to a rate of over 115,000 barrels per day in 1958 (Utah Mining Association 1967:9). Numerous oil fields have been developed in Uintah, Duchesne and San Juan Counties. Interestingly, due to variations in the geologic structures throughout the state, the development of energy related minerals occurred primarily in those portions of the state that previously enjoyed little of the wealth from earlier mining success in the metallic and ferrous minerals.

Presently, Utah has more than 140 producing oil and gas fields. Annual oil production peaked at 41 million barrels in 1985, and totaled almost 14 million barrels in 2002. A high of 348 billion cubic ft of natural gas was produced in Utah during 1994, and 2002 natural gas production totaled 293 billion cubic ft. Exploration for oil was very active in the 1970's and 1980's while natural gas exploration activity was high from the 1980's to today (Utah Division of Oil, Gas & Mining, Stever Schneider, personal communication 2003). The industry continues to be heavily influenced by both domestic and foreign policy issues, environmental issues, and an increasingly integrated international market economy that strongly influences economic conditions which affect domestic exploration and production.

Utah consistently ranks in the top four states in the domestic production of uranium. The importance of this heavy metallic element was significantly and permanently changed during the World War II period with the development of nuclear weapons for military applications as well as the pioneering of nuclear reactors as a source of energy. The uranium industry underwent a major boom during the 1950s, largely in response to government sponsored exploration, milling and acquisitions programs. The Cold War period was dominated by federal government policies that significantly impacted the economics of the industry. By the mid-1960s the boom was over as the market collapsed in response to the end of government purchasing and the increasing availability of cheaper foreign sources for commercial reactors. Throughout the period of exploration and development of uranium in the state, activity was strongly influenced by both government manipulation of the uranium market, and to a lesser degree by other aspects of the law of supply and demand, and mining activities fluctuated accordingly. A record high production of uranium oxide was reached in 1958 with the production of 6.1 million pounds (Neff 1981:217). Although the uranium industry at present is seeing little activity in Utah, it has been a significant factor in various parts of the state in the past.

Mining in Tooele County

Mining played a more prominent role in the development of Tooele County than almost any other county in the state of Utah. Tooele County has more metal mining districts than any other Utah county – 22 in all, and the economic role that mining played was key in many of the historical developments that took place in the county (Utah Mining Association 1967:80). Although the Gold Hill mining region is historically very important, the mining districts located in the eastern portion of Tooele County contributed most significantly to its growth and the expansion of both population and industry. Accordingly, the principal features of mining in the eastern area of the county are summarized below.

The existence of silver ore near the Great Salt Lake had been known as early as 1857, but the strong anti-mining sentiments of the leadership of the LDS Church effectively thwarted any early exploration or exploitation of mining resources as already discussed above. The eventual development of an active mining economy in Tooele County, and elsewhere during the early history of Utah Territory is directly attributable to the influence of General Patrick Connor, who also played an instrumental role in introducing mining to Tooele County.

Early in the summer of 1863, a fragment of lead ore was found by a local settler, George Ogilvie, while he was logging in Bingham Canyon. Ogilvie took the samples to Camp Douglas near Salt Lake City, where Connor and the Third California Infantry were stationed. Acting on the information from Ogilvie, a group of soldiers from Camp Douglas, under the leadership of Captain A. Heitz, were able to locate a promising deposit of argentiferous galena and copper in Bingham Canyon on the east slopes of the Oquirrh Mountains. On September 17, 1863, the location of the find was claimed as the West Jordan, which was the first mining location made in Utah. The following year, the West Mountain Mining District, the first in the Territory, was organized. The district included the northern portion of the Oquirrh Range (Rickard 1932:184-185). Shortly after the District was officially designated, Connor met with several other interested parties at Archibald Gardner's Mill on the Jordan River, where they drafted up the laws and regulations of the new district, and elected Bishop Gardner the recorder of the district (Rickard 1932:186). With this clear indication that the mountain range contained geological deposits containing precious metals, the push to explore the remainder of the range began.

> *"West of Salt Lake City, attention turned quickly from Bingham on the eastern slopes of the Oquirrh Mountains to the western slope of that range. The mining town of Stockton was developed by General Conner in 1864, and in 1870 the Ophir mines were discovered immediately to the south. Still further south on the west slope of the Oquirrhs, the Tintic area was opened in 1870-71. The quicksilver deposits that led to settlement of Mercur, between the Ophir and Tintic mines, were not discovered until 1882. Separating silver from mercury was extremely difficult with the technology available, however, and it was not until 1893, with the discovery of the cyanide separation process, that the Mercur mines flourished, producing millions of dollars worth of gold, silver, and lead"* (Poll et al.1989:222).

In 1864, Connor located the first mining claim within the boundaries of Tooele County, the Honorine. During that same year, Connor established a small army post in Rush Valley which he named Camp Relief. The post quickly grew as a center for burgeoning mining activity on the west side of the Oquirrhs. A town was surveyed and laid out, and the first permanent house was built. Connor named the new community Stockton, in honor of his former place of residence in Stockton, California. In 1864, the Rush Valley Mining District became the first of several mining districts to be established in Tooele County (Atkin et al. 1986) by splitting the West Mining District at Gardner's Mill into two separate districts (Blanthorn 1998:121). By the fall of 1865, over 500 mining claims had been filed in the district. Over the next six years, several other important mines, such as the Ben Harrison, Argent, Calumet, Galena, King, Tip Top and Bluestone, were identified and developed.

As the mining industry increased in importance, the town of Stockton continued to grow. Patrick Connor built the first smelting furnace east of St. Louis in Stockton in order to handle the Rush Valley ores. Unfortunately, Connor and his supporters were more familiar with placer mining techniques and the Stockton smelter failed. In 1866, the more successful Monheim and John Smelters were built, which resulted in the increased importance of other municipal services and infrastructure. In fact, by 1866 Stockton had grown to 40 houses and over 400 inhabitants (Miller 1986:15) and would eventually boast the first electric lights in the state of Utah (Miller 1990).

Although Stockton was the first of the mining towns to be established in Tooele County, Ophir and Mercur probably became the most important. Ophir's population boomed to an estimated 6,000 in the 1870's due to mines that produced millions of dollars in silver, lead, zinc and gold. Several boom and bust cycles, as well as two major fires, affected growth in the town of Mercur (Powell 1994:559).

On 23 August 1870 the Rush Valley District was divided three ways. The northern portion was renamed the Tooele City District, and the southern portion became the Ophir District. The area in the middle remained the Rush Valley District, although later the designation was changed to the Stockton District (Blanthorn 1998:121).

A number of other districts were organized throughout the county during the late 1800s and early 1900s including the North Tintic (organized in 1902), Gold Hill-South Clifton (1868), Willow Springs (1891), Point Look Out (1896), Shambip (1870), Free Coinage (1895), Silver Islet (1872), Lakeside Mountain (1871), and Dugway (Blanthorn 1998). Few of these could compete with the prominence of the Ophir, Stockton, and Rush Valley Districts, which were the leading producers for the county. The total value of ore produced from mines in the Ophir-Rush Valley area between 1870 and 1927 was more than $43 million (Blanthorn 1998:127).

Mining in Tooele County continued to be driven mostly by non-Mormons, particularly the military personnel under General Connor. When Connor and his troops were mustered out of service on 30 April 1866, many others also left the Territory, mining in the county slowed considerably, and the town of Stockton went into a slow decline.

One of the major difficulties encountered by the mining districts in the county was their isolated location with the resultant difficulty and expense of getting their products to distant markets and processing facilities (Rickard 1932). When the transcontinental railroad was completed in 1869, it provided a significant boost to the development of the mining industry and mining ventures throughout the northern area of the Territory (Blanthorn 1998:122) by dramatically reducing the costs of transporting mined ore (Poll 1989 et al.:221). The increasing economic return made available by rail transportation encouraged the growth of large mining interests (such as the Bingham and Little Cottonwood Canyon mines) in all the mining districts of Utah.

Eli B. Kelsey, a Tooele resident, actively promoted mining in Tooele County and was able to attract capital investment for the mines and smelters of the county (Blanthorn 1998:122). By 1873, nine smelters were operating the in the Rush Valley District (Blanthorn 1998:122). Further development was facilitated as local railroads were constructed into the various mining districts of the county. By 1875 the narrow gauge Utah Western Railroad line was completed from Salt Lake City to the Lakepoint Station in Tooele County, and then extended south to the town of Stockton and to Bauer in 1883 (Miller 1986:131). Increased mining activity in the Tintic District stimulated by lower transportation costs also led to the organization of other rail companies, such as the Salt Lake & Western, the Utah and Nevada, the St. John and Ophir, and the Salt Lake and Mercur railroads (Carr and Edwards 1989:127-129). As rail service gradually spread throughout Utah, particularly in the areas of high population or high mining activity, and the Southern Pacific, Los Angeles and Salt Lake Railroad (later the Union Pacific) built its mainline to extend south of Stockton, the construction of spur lines was made feasible (Carr and Edwards 1989:137).

The late 1800s and early 1900s brought advances in mining technologies that led to a new boom in the towns of Mercur and Manning. Australian metallurgist William Orr developed a new process for recovering gold from refractory ores using a cyanide process. Results from a carload of Mercur ore demonstrated the applicability of the new process to the Mercur area ores. In 1899 the Consolidated Mercur Gold Mines Company was formed, a huge new mill was constructed, and electricity was brought in. The power was generated at a hydroelectric plant built by L.L. Nunn at the mouth of Provo Canyon, and was carried to Mercur by a high-voltage transmission line operating at 44,000 volts. It was the first extended high-voltage line in the world (Blanthorn 1998:145). With successful new mines, improved transportation and the introduction of power, the town of Mercur grew to over 2,500 inhabitants, prompting some to suggest that the county seat should be transferred to the town. This proposal was never successful, and became a moot point as Mercur's fortunes failed. A devastating fire in 1902 destroyed most of the commercial district, and the mills became less and less profitable as the ore played out. In March of 1913, the Mercur mine and the Golden Gate Mill were finally shut down due to diminishing profits and higher costs, and the town was completely abandoned (Powell 1994; Miller 1990).

As mining ventures were diminishing in Mercur, the Bingham mine continued to increase its production. An ore smelter was built east of Tooele in 1910 for the express purpose of processing ores produced by the Bingham Mine. The smelter operated for more than 60 years, attracting miners from southern and Eastern Europe, both diversifying the local ethnic/religious population as well as bringing further mining expertise to the area. The Tooele Valley Railroad was completed in 1909 to serve the smelter and provided additional mining-related employment to the people of the area. Mining continued to provide significant economic support to the Tooele Valley up to the late 1930's to early 1940's, when much of the land used in Tooele County was converted for the use of military installations (Powell 1994; Alexander 1995).

During the early part of the century, new mining technologies, such as gravity concentration through fine grinding and selective flotation were introduced, standardizing processing methods and further streamlining mining procedures. The streamlining reduced costs, helped to counteract the decreased yields of lower grade ores, and made it possible for some county mines to continue to operate into the 1950s (Miller 1986).

Recent efforts have been made to revive the languishing mining areas of the Oquirrh Mountains and to effectively continue the legacy of mineral exploitation that has been such an important part of the county's history. Although closed in 1913, the Mercur mine reopened in 1981, and with improvements in both mining technology and the construction of a new cyanide processing plant, the mine was relatively successful at processing relatively significant quantities of gold (Blanthorn 1998:149-150; Powell 1994:361), but the mine was closed again in 1997 due to decreasing profitability. Today the mine is closed and almost entirely reclaimed, with only a few buildings, ponds, and roads remaining from the once busy operation.

Over the course of the past 140 years, the mining industry has contributed heavily to the economy of Tooele County and the state of Utah, although the "higher grade, readily available deposits in Tooele County have been mined out, leaving remaining known deposits of generally low grade" (Utah Mining Association 1967:81). Tooele County's mining deposits are not limited only to silver and gold. The mining industry also produces significant amounts of lead, copper, zinc, cinnabar, antimony, magnesium, manganese, mercury and tungsten. Important non-metallic resources include building stone, clay, gem stones, gypsum, salt, sand and gravel, as well as oil and gas (Utah Mining Association 1967).

One of the most interesting aspects of the mining industry in Utah, particularly in the mining districts of western Tooele County, is that the major, precious metal–producing ore bodies are composed mainly of silver and lead rather than gold. "This combination of metals in the ores required special

treatment for their recovery, requiring smelters to recover the values in the ores. The smelters, in turn, stimulated the expansion of the railroads, which were needed to transport the ores and carry the supplies for the burgeoning industry" (United States Geological Survey 1964:9). The need for such heavy industry fueled both growth in both the State and Tooele County, encouraging the spread of an expanding population away from the city centers and into the rural landscape (Alexander 1995). The Gold Hill-South Clifton mining district, located in the Deep Creek region of western Tooele County, is perhaps the most important of these rural mining areas.

Historic Context of the Deep Creek Region

> *"For almost two hundred years, Americans have been fascinated by the notion of tying one coast to the other. Whether through national land acquisition, the building of transcontinental institutions that made travel or communication easier, or through individual journeys, we as a nation have been fixed on the idea of spanning the continent. This excitement started in the dawning years of the nineteenth century with the Louisiana Purchase and the Lewis and Clark expedition, and was a part of our national pride by the time California was admitted to statehood in 1850. By then the nations land holdings had filled in most of what makes up the lower forty-eight states today. In fifty years, the nation had tripled in size, and Americans who had looked westward from Kentucky found themselves standing on the far coast and looking westward out over the Pacific"* (Hokanson 1998:xv).

Utah is criss-crossed by historic trails, railroads, and roads – evidence of past explorers, national expansion, and the improving methods of communication and transportation across the West. Early explorers, such as Escalante, provided brief glimpses of the topography, environment, and possible resources available in western Utah. Military explorers, such as Beckwith and Gunnison, charted new routes from the known territories of the United States to the Pacific coast. The arrival of the Mormon pioneers heralded an explosion in local population and industry by those who came to stay in Utah, and also by ever increasing numbers of adventurers interested in obtaining untold riches found in California, west of the Great Desert. The trails they marked eventually became important in developing transcontinental routes of communication (Pony Express, Overland Stage) and transportation (various railroads, Lincoln Highway) across the United States.

Gunnison and Beckwith Trails

There are several accounts of early explorers who visited the region in order to evaluate the resources available there or to survey possible routes leading through the territory to California. In 1776, the Dominguez-Escalante expedition traveled most of the interior of the state of Utah, coming within 90 miles east of the Deep Creek Mountains (Bateman 1984). The early 1800's found trappers in the northern regions, and in 1825 Jim Bridger followed the Bear River until it emptied into the Great Salt Lake (Bateman 1984). The first known to attempt to cross the Great Basin, and its associated desert, was made by Jedediah Smith in 1827, and he approached the region in late June. Many other explorers and surveyors traversed the area, but in 1849, Captain Howard Stansbury traveled east across the Salt Desert and "concluded it was an unsuitable route. Therefore the Deep Creek country was isolated from exploration due to the remoteness from main routes of the times. For a while longer it remained the home of a small band of Goshutes and none else" (Bateman 1984:39).

Major Howard Egan played a prominent role in the discovery and exploitation of the Deep Creek area. "He explored the area in the 1850's and used it as his headquarters during the 1860s and early 1870's" (Bateman 1984:40). Captain John W. Gunnison and Lt. E.G. Beckwith also explored the region in an effort to identify and survey possible routes for the proposed transcontinental railroad under discussion in Washington, D.C. "In 1852-53, Captain John W. Gunnison was in charge of a US Government survey expedition along the 39th parallel in Utah. In autumn of 1853, Captain Gunnison was killed near Deseret,

Utah by a band ... seeking revenge for the death of a chief which had been perpetrated by passing emigrants. Lt. E.G. Beckwith took charge and obtained permission to continue the survey to the north, closer to the 41st parallel. The survey party was looking for a practical route for a transcontinental railroad, and Beckwith felt it should pass close to populated Salt Lake Valley" (Bateman 1984:41). This route, which travels through the Deep Creek Mountains, near Clifton, and back down to the town of Deep Creek (Ibapah), is noted on the 1875 Froiseth map of Utah as the 'Lt. E.G. Beckwith Route of 1853 (Froiseth 1875).

The presence of these early trails is truly significant in the development of western Utah -- particularly in the Deep Creek region. These trails, especially the Beckwith route, became the initial trails taken by individuals traveling into the region in search of the minerals found in the mountains, but more particularly, were the base routes for the mail and stage services which became so essential to the growth of western Utah and the West in general.

Mail Service in Utah: Chorpenning, The Pony Express, and the Overland Mail Company

With the discovery of gold in California in 1848, and the increasing political tensions of the 1850s leading to the Civil War, it became imperative to keep the Far West in the Union. When California was admitted as the 31st state in the Union on September 9, 1850, "she" entered as a "free' state. The US government, anxious to ensure that everything was done that would strengthen Californian ties to the northern states, was determined to provide a more dependable source of information from the east. News, especially, was very slow in reaching eager California readers, and a standing joke of the time was that events had already been forgotten on the East Coast before they were known on the West Coast (Carter 1960). In order to overcome this concern, more organized means of delivering the mail from the east and across the western territories of the United States had to be devised. As plans for the varying mail services were drawn up, it became clear that Salt Lake City should be the gateway between the eastern and western regions.

The first official mail to arrive in the Salt Lake Valley from the eastern United States arrived on Thursday, November 20, 1848, when Allen Compton, Dr. Ezekiel Lee, James Casto and John Smith arrived from Winter Quarters, Nebraska. Rather than being a government program, these men were called at a Mormon Conference on October 6, 1848, to carry the mail express to the Great Salt Lake Valley. Later, in 1849, the Postmaster-General established the first governmental post office in Salt Lake Valley and appointed Joseph L. Heywood as Postmaster (Carter 1960; Hafen 1926).

The first government contract to carry mail overland between Sacramento, California and Salt Lake City was awarded to George Chorpenning and Absalom Woodward. They entered into a contract with the government to carry the mail between Sacramento and Salt Lake City by way of Carson Valley, erecting crude way stations along the route. It was often spoken of as the "jackass mail" because most of the mail was carried on mules. Mr. Woodward was killed in the process of making one of the mail deliveries, leaving Chorpenning to complete the "Overland Mail" contract alone. A second contract for what came to be known as the Southern Route, which ran between Salt Lake City and southern Utah to San Diego, California, was also awarded to Mr. Chorpenning in April 1854. Unfortunately, Chorpenning's bid was too low to meet the initial expenses, so delivery was often late leading Californians to accuse the government of not wanting to improve mail conditions (Carter 1960; Jackson 1966).

In 1858 a contract was again awarded to George Chorpenning. This mail contract was meant to reestablish the Central Overland route, although this time the endpoints were Placerville, California and Salt Lake City (Nardone 2003). As part of the contract, in order to improve the timeliness of delivery, stages were ordered to replace the mule carriers and Chorpenning also built small stations every 20 to 40 miles. It is said that he also supervised the building of the new Concord coaches and wagons (Hafen 1926). "The cost of equipping the line was $300,000; the subsidy received was to be $180,000 but it was cut to $160,000. The service was then reduced to semi-monthly trips and the pay was only $80,000 per annum"

(Carter 1960:2). In order to try to make up the monetary deficit, Chorpenning ran his stages weekly, but after many months of struggle and financial losses, he was unable to carry on and the contract was annulled in 1860. He later brought suit against the government, arguing successfully that insufficiencies in service were due to contractual changes forced upon him, and not to organizational mismanagement (Moore 1870).

The first US contract to carry the mail west from Independence, Missouri to Salt Lake City was awarded to Samuel H. Woodson. The monthly stage service began July 1, 1850 and continued for four years, with Ephraim K. Hanks, Charles H. Decker, and Feramorz Little assisting in the effort. A two-year contract to carry the mail, along with passengers, in four-horse coaches, was given to William F. McGraw in 1854. Following that contract's expiration, the government mail contract was awarded to Hyrum Kimball in 1856. While Kimball and others were in the process of organizing the service, Johnston's Army began its march to Utah, the Kimball contract was cancelled, and all communication was cut off for a time. Mail service from the east to California through Salt Lake City was resumed late in 1857 based on a weekly service with a 22-day delivery schedule, but fast mail service was not made available until the emergence of the Pony Express (Carter 1960; Hafen 1926)

"The origins, and the reason, for a horse and rider mail delivery system between east and west can be summed up in two words: slow mail. Prior to the Coach and Pony Express delivery, time from the east portion of the United States to the West – by ship down through the Gulf of Mexico, across Panama by mule, then by ship again up to San Francisco – might take eight weeks if the winds were off (at least six weeks with everything working perfectly)" (Bureau of Land Management 1976a). Although mule and coach mail service decreased the delivery time, the minimum 22 days was still considered to be excessive.

An idea to solve this problem came from a businessman of vision, William Russell. Russell owned a stage a freight company based in Leavenworth, Kansas (with partners Alexander Majors and William B. Waddel). While on a promotional trip to Washington to help his ailing freight line, Russell and Senator William Gwin of California discussed the possibilities of an "Express Mail Company" to deliver mail to California by the Central Route along the Oregon and California trail (Bureau of Land Management 1976a).

Russell and Senator Gwin's initial approach to constituting a workable, rapid service consisted of the creation of a stage express comprised of 50 coaches and just under 800 mules. By February, 1860, when the line was extended from Salt Lake City across Utah and Nevada to California, efficiency had improved the mail delivery time to a respectable number of days, but financial losses were staggering. Already struggling, Russell's original freight business was further damaged as no government subsidies for the express deliveries were forthcoming. Something was needed to promote the Central Route – to bring it to the public's eye.

Finally Russell, Majors and Waddel came up with the idea of the Pony Express. Russell, Majors and Waddell formed the 'Central Overland California and Pike's Peak Express Company' to own and operate the service in addition to their two mail and passenger coach contracts already in operation (Hafen 1926; Nardone 2003). The Company was also operating mail and stage coach service from the Missouri River to the new gold fields in Denver, Colorado, as well as carrying passengers over the Central Route between the Missouri River and California. The reason for the 'horse' Pony Express was to show the Post Office that the Central Route could be used year round. (Nardone 2003). Russell was also sure that not only would this method of mail delivery further decrease the time it took for messages to cross the United States, the imagery of exploration and adventure inherent in a Pony Express ride would catch the attention of the nation, and hopefully be financially viable as well. It was decided: light, tough, young men would be selected and hired to ride the best and fastest horses that could be found. "In no case could the combined weight of rider, saddle, clothes, pistol and mail be in excess of 165 pounds" (Salt Lake Tribune 1960:npn).

Four hundred men were hired to run the way stations where the more than 400 horses would be cared for and where the 80 riders would briefly stop – either to exchange a tired horse for a fresh one, or to pass the 25-pound mail pouch on to a new rider. "The men of the Pony Express would travel the route between St. Joseph, Missouri to San Fransciso, California, as fast as man and horse could go, day and night, averaging over ten miles an hour" (BLM Pamphlet 1976a).

The Pony Express was officially inaugurated on April 3, 1860 as riders left both San Francisco and St. Joseph and started riding towards each other. According to Howard Egan's diary, "The first 'Pony Express' from the west arrived at Salt Lake City, April 7th, 1860, having left Sacramento, California on the evening of April 3rd, 1860, and on the 9th it arrived from the east, having left St. Joseph, Mo. On the same evening, April 3rd, 1860" (Egan 1917:198). From the east, the Pony Express trail entered the northeastern portion of Utah "essentially along the same route followed by the Mormon pioneers, other overland immigrants, and the Overland Stage (which today is Interstate 80)" (Jackson and Crausby 1971:1) (Figure 3). Although the route was laid out, and stations awaited the riders, roads were virtually nonexistent and often almost impassable. Each man had to cover between 33 and 50 miles on three to four horses, often through storms, heat, flash flood, and other dangers such as attack by bandit or Indian, before being relieved by a fresh rider. Sometimes the stations had been attacked or burned, forcing the rider to continue on a tired horse to the next stop. Only once though, in the entire existence of the Pony Express service, did the mail fail to come through.

Riders generally typified the frontier spirit. Many were skillful scouts, guides, and couriers, familiar with the dangers of the West. Weight was an important factor and most riders were hired for their small, lithe, wiry physiques. Many were noted for their bravery in times of danger. For all their effort, they received $125 a month salary, two revolvers, one rifle, one bowie knife, and a Bible.

At its inception, the Pony Express mail service was solely a private enterprise and received no assistance from the US Government. Because there was no subsidy, the cost of mailing a message via the Pony Express was almost prohibitive – the initial fee was set at $1.00 per ounce. Despite the high price to mail a letter, the Pony Express was a losing enterprise from its beginning. Its receipts were high (sometimes $1,000) per day, but expenses were even higher (Nardone 2003; Carter 1960). "By August 1, 1860, the Pony Express was losing $60,000 a month" (Salt Lake Tribune 1968:npn). In total, the founders of the company received "receipts totaling $91,404, but had their loss was estimated at more than $500,000" (Salt Lake Tribune 1959:18A).

The Pony Express was officially terminated on October 17, 1861 due to the completion of the transcontinental telegraph system (Salt Lake Tribune 1935). With the completion of the wire service, messages that had taken eight weeks by ship, or eight to ten days by pony rider, took only four hours to reach their destination.

The legacy of the Pony Express has certainly long outlived the pony riders on the trail. The operation of the trail only lasted 18 months – from April 1860 to October 1861, but it is credited with a major role in United States history. The Pony Express is credited with providing vital communication to California and keeping California aligned with the Union during the outbreak of the Civil War. The riders of the Pony Express also proved that the continent could be crossed in all kinds of weather, thus proving to skeptical Eastern politicians that a transcontinental railroad was feasible (Bureau of Land Management 1976b). Although the Pony Express was made obsolete by the completion of the first transcontinental telegraph system, during its time the Pony Express provided the fastest means of communication between St. Joseph, Missouri, and Sacramento, California.

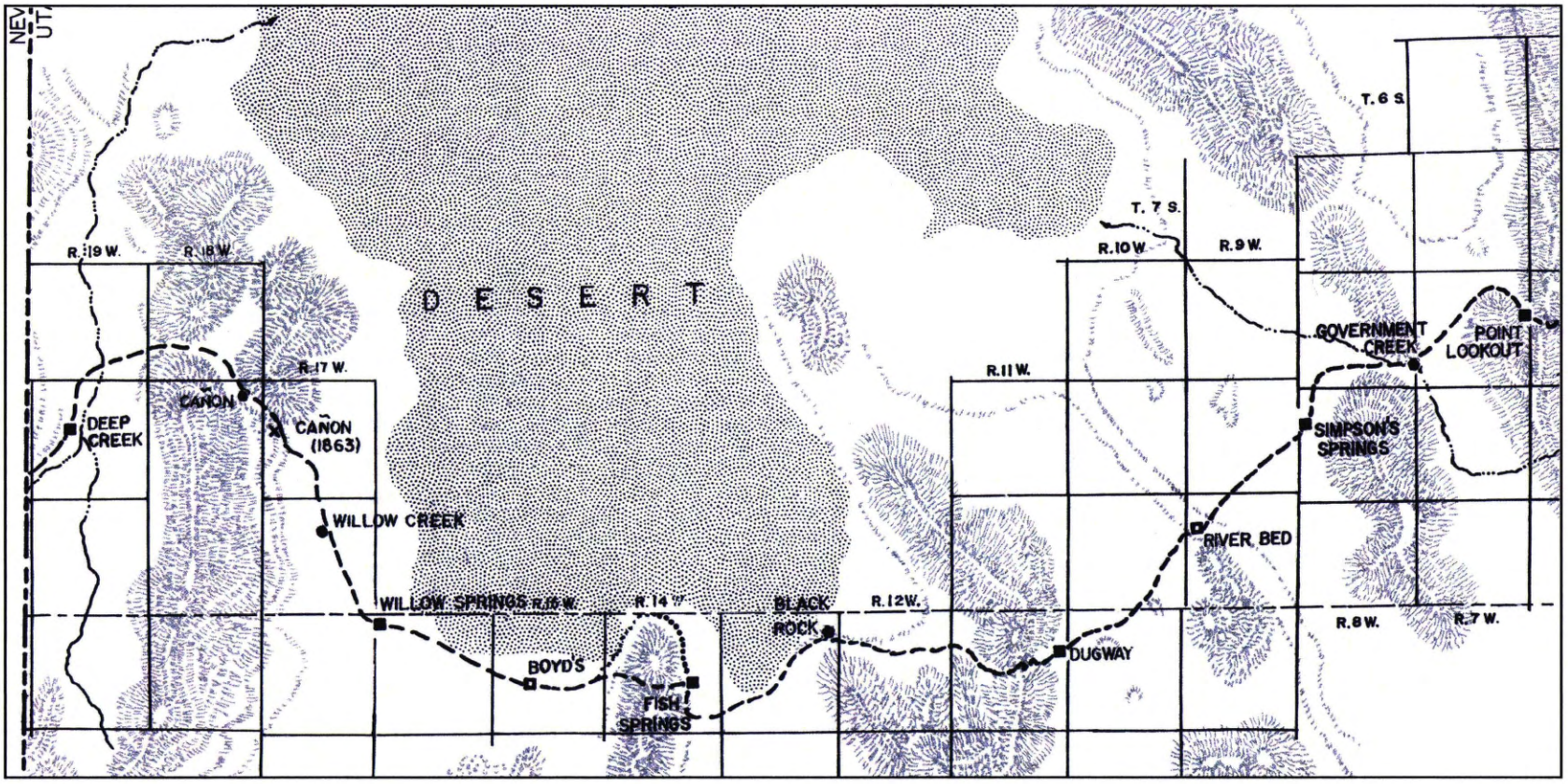

Figure 3. Pony Express Route Through Western Utah and the Gold Hill Project Area.

The Overland Mail and Stage Service

While the Pony Express is the most well known of the early express mail services for the western United States, it did not operate in a vacuum. As previously mentioned, George Chorpennings' mules had provided land-based mail service between California and Salt Lake City long before the Pony Express made its debut. The Overland Mail Company, partially owned and operated by Wells, Fargo & Company, also held contracts to transport mail across the country. While the Pony Express operated as a private enterprise hoping to obtain the official government mail contracts, the United States Post Office had negotiated a semi-weekly stage contract worth $600,000 per year with John Butterfield's Overland Mail Company to transport mail by coach between Tipton/St. Joseph, Missouri and Placerville, California using the Southern Route. This route was 2,635 miles long while the Central Route, used by the Pony Express, was 692 miles shorter. Owners of the Pony Express hoped to show that the Central Route could be used year round and thus put their company in a position to receive the lucrative financial contract (Nardone 2003; Jackson 1966, 1972).

By March 1861 the United States Congress ordered the Post Office to change the Southern Route of the Overland Mail Company to the Central Route. The country was on the brink of the Civil War, Abraham Lincoln was going to be the new President, and the change in routes was important to keep the mails operating to and from California. On March 12, 1861 the Post Office entered into a new contract with the Overland Mail Company. They were to be paid $1,000,000 annually and were told to operate a stagecoach service both ways from the Missouri River to Placerville. The stagecoach would leave from both termini each day, Monday through Saturday. They were also to operate a 'horse' Pony Express twice a week until the completion of the transcontinental telegraph and have everything operating and ready to go by July 1, 1861. On March 16, 1861 the Overland Mail Company met with the Pony Express owners and entered into a subcontract making the Pony Express Company their subcontractor. Under the terms of this contract, the Pony Express Company was to operate the Overland Mail Company's contract from the Missouri River to Salt Lake City while the Overland Mail would operate the western portion of the route from Salt Lake City to Placerville. In return, the Pony Express would receive approximately $470,000 a year and operate 63 percent of the route. The Overland Mail Company would receive all of the Pony Express company's stations, equipment and supplies west of Salt Lake City at no cost. Because of the deep losses incurred over the preceding months, the Pony Express Company needed the money and agreed to this subcontract. Since the contract stipulated near daily coach service in addition to the 'horse' mail service, the Overland Mail Company was also required to construct additional stations because the average 22 miles between the existing stations was too far apart. By the beginning of July, the company owned more than 150 stations, each less than 13 miles apart – including a new station just south of Gold Hill – along the route. Once all the required stipulations were in place, the new postal contract – running from July 1, 1861 to June 30, 1864 – was officially awarded to the Overland Mail Company (Nardone 2003; Jackson 1966).

In July of 1964, new postal contracts were again awarded:

> "*As a result of new mail contracts in 1864, the Overland Mail Company no longer had official responsibility for the entire line west of St. Joseph, Missouri, but only the western section from Salt Lake where it had previously been operating stages. Ben Holladay controlled the eastern portion of the route, having taken it over in 1862 from the Central Overland California and Pike's Peak Express Company (the Pony Express) which had become heavily indebted to him under mortgage of most of the company's stock, equipment, and tangible assets. Then, on November 1, 1866, there was a grand consolidation of the Holladay interests, the Overland Mail Company, Wells Fargo & Co., and other express companies into one giant enterprise controlling all transportation and mail facilities west of the Missouri River*" (Jackson 1966:306).

With the consolidation of all the express companies into one corporation, both mail and passenger coach service slowly improved as more resources were made accessible for improving the routes and stations along the way. In September, 1909, a report in the Salt Lake Mining Review by H.W. McFarren illustrated how the differing modes of transportation were being integrated throughout western Utah. In his essay "(A) Trip Into The Deep Creek Country," McFarren described his journey to Gold Hill and Deep Creek via the Overland Stage to the readers of the Salt Lake Mining Review. Beginning his journey by rail from Salt Lake City, McFarren, traveled first across the west desert to Wendover. Leaving the train there, Mr. McFarren took the Overland Stage to Deep Creek. According to his account:

> *"The stage for the Deep Creek country leaves Wendover on the mornings following the arrival of the train from Salt Lake City. The stage road runs south with the alkali flat of the desert, on the left, and the famous Deep Creek winter-range country, on the right. Twenty-two miles south of Wendover is Salt Springs, where several hundred acres are covered by shallow lakes or lagoona fed by springs of slightly brackish water. ... Sixteen miles farther on and at the mouth of Deep Creek canyon, is Erickson's ranch, the only habitation on the route. ... Another 18 miles ... lands the traveler at Gold Hill, the principal camp for the Deep Creek mining country. The town of Deep Creek with post office, the name of which is Ibapah, lies 15 miles farther on, but is the center of a ranching community only. There is no regular conveyance to it from Gold Hill.*
>
> *This country can also be reached by going to Ajax station on the Salt Lake route, 20 miles south of Tooele, and staging on the old Overland road for a distance of 140 miles past Fish Springs, the Utah mine, and Callao, to a point six miles south of Gold Hill. From this point the stage continues ten miles farther to Deep Creek. This is the mail route of the locality, but as it requires two days and one night of continuous staging, it is preferable to go by way of Wendover. From Deep Creek the Overland road continues through Ely to the coast; it is a favorable route for transcontinental automobilist"* (McFarren 1909:17-18).

Although in 1909 coach service was now available to almost anyplace in western Utah, people's perceptions about transportation were already adjusting. The transcontinental railroad made it possible to travel over extended distances more quickly, conveniently, and less expensively. The private automobile was also gradually gaining favor as the preferred method of travel, particularly as more and more trails and roadways were being safely opened up. The development of the railroads and increasing popularity of the automobile encouraged travel that was efficient, but at the same time, more spontaneous and less structured. In one sense, the nation was becoming smaller as more and more of the country's lands were opened up to the individual.

Railroad Service in Western Tooele County

The influence of the railroads in encouraging both settlement and industry in the new West can hardly be overstated. The Union Pacific, for example, had an influence along the entire line of its road. Before its construction, there were very few, if any, organized settlements, but within a year of its completion, the population was high enough along the railway to permit the region to be made into a territory on July 25, 1868 (Riegel 1926). The Deep Creek Railroad, a local line extended from the Western Pacific Railroad, was very similarly influential in revitalizing population growth and the mining industry in the Deep Creek region of western Utah.

Efficient transportation systems in western Utah were never really promoted when George Chorpenning received the first contract to carry mail between Salt Lake City and California. In the early 1850s, Chorpenning hired Major Howard Egan to find best and shortest route, resulting in the route known as Egan's Trail, later used by both the Pony Express and Overland Mail stages, providing service to the small mining towns. Almost from the time that valuable minerals were discovered in the area, a railway was promoted. Major Egan lobbied particularly aggressively, but ultimately unsuccessfully, for a railroad through the area in 1868, but by then, Congress had already established the 42nd parallel further north as a railroad route (Anderson 1990).

Other voices would soon join the ranks for supporting the development of a Deep Creek railroad. In 1881, the Deseret News suggested that the lights of a railroad would hail the dawn of a new day, while in 1890, the Salt Lake Tribune stated that the editors could not understand the apathy of the people of Salt Lake regarding the subject (Bateman 1984). Unfortunately, nothing came of those efforts, or many other efforts for quite a period of time. However, when the Western Pacific rail line was built from Wendover to Salt Lake City in 1907, fifty miles north of Deep Creek, it renewed hopes that a rail way could be built into the area (Anderson 1990).

"Gold Hill, the mining camp, had a boom period during the last quarter of the 19th century. Considerable amounts of gold and other metals and ores were recovered, but transportation was difficult as there was no railroad and roads were primitive. A slump set in and lasted until about the time World War I started in Europe. With things booming again the time had come for the long awaited railroad" (Anderson 1990:347). Captain Duncan McVichie convinced the President of the Western Pacific that the railroad should be built, and on October 11, 1916, the Deep Creek Railroad Company was incorporated, with Captain McVichie as its president (Anderson 1990). Other investors included Charles Levey (President of the Western Pacific Railroad), and U.S. Senator Reed Smoot; the $450,000 contract to build the railroad was awarded to the Utah Construction Company (Nolan 1935).

Construction of the Deep Creek Railroad

Dr. Joseph Peck was hired in November of 1916 to act as the company physician for the men constructing the new Deep Creek rail line running between Gold Hill and the Wendover station of the Western Pacific. Several years afterwards, he described some of his experiences as the railway was being built.

In November 1916, Dr. Peck was called to Salt Lake City to interview for the position of doctor for the Western Pacific railroad, which was building a branch line southward from Wendover, Utah, to a new copper camp "some place out in the Great Salt Lake Desert" (Peck 1959:1). That night he went to the rail station, there to board the last car on the train to Wendover. The car was already a museum piece. Made of wood and painted a sickly green to match the Pullman's up ahead, it was built high off the trucks. An iron stovepipe that stuck out of the roof was belching black coal smoke at a lively rate. Within a year this relic would become the entire passenger rolling stock of the Deep Creek Railway.

Construction of the railroad "started November 1, 1916 and was completed March 12, 1917" (Anderson 1990:347). Fifty-two lb and 60 lb rail was used to construct the one-track wide line (Thompson 1982). Leaving Wendover, the railway crossed briefly into Nevada for a short distance, then went past Salt Springs to Erickson Siding near the Last Chance Ranch. Workers made good progress with the railroad across the flat desert, even though shortly after one large snowstorm, a flash flood caused 35 washouts of the track within a 15-mile stretch. After leaving the salt flats, the next strip of construction was along the base of Dutch Mountain. The rails had to get some altitude to reach Gold Hill, which was about a thousand feet higher in elevation. "The last place before Gold Hill was the Garrison Monster Mine. A deep cut had to be made through a ridge of rock at the northwest part of the gulch to get trains into Gold Hill. A large fill carried the tracks across the gulch to the depot and freight house on the east side. The tracks continued on to the Alvarado and Gold Hill mines two miles east of town" (Anderson 1990:347).

When he wrote about the final phases of the construction of the Deep Creek Railroad, Dr. Peck stated:

> *"To be near this more hazardous work I moved once more to a tent camp in Gold Hill Canyon. There at last I found a classless society. The hammer men swung the double jacks for a while and then held the drills for the other men to hit while making holes in the rock for dynamite blasting. After the blast they all grabbed shovels and mucked the breakage into dump cars, while well trained mules stood by ready to drag the car to the dump, jump out of the way and let it spill its contents, and drag it back again without benefit of mule skinner.*

These men were mostly old prospectors and miners. They drank less and fought less than the track gangs, and were more interested in what a blast would reveal than in anything else that could be found in the region. This was the last camp. Soon the rails were laid and the canyon awoke to the strange sound of locomotive whistles. The workers began scattering to the ends of the earth, wherever construction jobs were to be found.

The Deep Creek Cannon Ball was truly a limited express. Because of the poor roadbed she could not exceed a speed of 15 miles per hour. The grades held her payload down to three boxcars and the all-purpose passenger car. ... The Cannon Ball was supposed to leave Wendover at three o'clock in the morning, providing the Western Pacific was on time from Salt Lake City, and to arrive at Gold Hill at 9:00 am. Going downhill, she could do a little better. She left Gold Hill at 10:00 am, arriving at Wendover at 1:00 pm, in time to connect with the eastbound passenger train on the main line. The train was robbed only once, with the burglars getting away with the conductor's watch, a mail pouch full of catalogs, a bunch of bananas, and approximately $3.00. (They were caught the same day!") (Peck 1959).

The Deep Creek Railroad line was 46 miles long. Its rolling stock consisted of two locomotives, purchased in 1916 and 1917, one combination passenger car, one box/freight car, and one water tank car. (Anderson 1990). The poor condition of the roadbed and its steep grades made it impossible for the train to pull more than three cars at a time (Bateman 1984). The ICC listed the Deep Creek Railroad as

"a class III common carrier. Two trains a day were operated from March 12, 1917 to late 1925. The main cargo had for several years been arsenic, an insecticide used against the boll weevil in cotton, but arsenic was now being imported at lower cost. Service was reduced to one train a day. Business continued to decline and traffic was reduced (first) to two trains a week, and finally one a week until the last train was run July 31, 1939. The ICC authorized abandonment and in October 1939 the track was torn up and scrapped. The Board of Directors met for the last time on June 1, 1944 and dissolved the railroad" (Anderson 1990:347).

"Modern Transportation" – The Old Lincoln Highway

The first continental crossing of the United States by automobile was made by Dr. H. Nelson Jackson in 1903, when he drove from San Francisco to New York City in a total of sixty-five days. Although the condition of the roads he traveled resulted in Dr. Jackson having to spend more than three weeks of the trip making repairs to his vehicle, his journey fueled the hunger of Americans to more easily roam the furthest reaches of the nation. Ten years later, the idea of a coast-to-coast highway expressed the national desire to bind the country from east to west and to make the country accessible to all. "The Lincoln Highway (now designated variously as Highway 40, 50, or Interstate 80) was the first effort at a coast-to-coast route for motorists" (Peck 1959:139). The concept of this road captured public imagination in much the same way as other significant events, such as the westward migrations along the Oregon and California trails, the adventures of the Pony Express, the technological advances making the transcontinental railroad and telegraph possible, and Dr. Jackson's feat. "Along with the motorcar, the Lincoln Highway allowed ordinary citizens the opportunity to follow Jackson's trail, to make their own journey, (and) to express their own transcontinental aspirations ... and helped teach us a new way to travel – only to fade when newer ideas came along" (Hokanson 1993:xvi).

Genesis of the Lincoln Highway

Entrepreneur and automobile enthusiast Carl G Fisher, known particularly for his publicity stunts and financial adventures, was an auto racer who built the Indianapolis Motor Speedway and inaugurated the Indianapolis 500 in 1911. Recognizing that the automobile was well established in America, but that good, improved, roads were not, Fisher proposed the construction of a coast-to-coast "rock highway" in early September of 1912. At that time, there were some 2 ½ million miles of road in America. However, only 7 percent of these roadways were "improved" through grading or the application of graveled macadam

or brick, and there was no road system at all – most of the roads didn't really go anywhere. Instead, there were tracks which just extended outward from supply and rail centers out into the countryside which led to individual farms or small communities. There was no real effort made to connect one road, or one town, to another. Persons wishing to travel outside of these local networks often had to either forge their own way or take a bewildering route of meandering tracks to progress from one town to another.

Although the newly formed American Automobile Association (AAA) had suggested that a transcontinental highway be built as early as 1902, Carl Fisher "was the first to propose a road with a real improvement plan and the means to finance it" (Hokanson 1998:7). Fisher proposed that a coast-to-coast road should run between New York City on the east and San Francisco on the west. According to Fisher, "a graveled highway could be built from coast-to-coast for about 10 million dollars, a low figure even for 1912. This money would be used to buy only basic road-building materials; the labor and machinery, he said, would be provided by the counties, towns, and cities along the as yet undetermined route, (for) what community could turn down the opportunity of free materials and a place on the map astride America's first transcontinental highway?" (Hokanson 1988:6). Within 30 days of his announcement, Fisher had raised $1 million in pledges and generated even more publicity for the new road -- even though its official route had not yet been determined.

But success for the proposed highway was not assured. In 1912, over 75 percent of the automobiles on the road were Model Ts, and the Ford Motor Company was the largest manufacturer of cars in the country. Because of this dominance, Fisher felt that it was essential that Henry Ford throw his support behind the $10 million road fund – particularly since most of the large American manufacturers were waiting to see what Ford would do before they supported Fisher's road fund. But Mr. Ford did not think that private funding of such a road was a good idea. Instead, he stated that he was

> *"not favorably disposed to the plan, because as long as private interests are willing to build good roads for the general public, the general public will not be very much interested in building good roads for itself. I believe in spending money to educate the public to the necessity of building good roads, and let everybody contribute their share in proper taxes"* (Hokanson 1988:8).

Despite pressure from President Taft, Vice-President Fairbanks, friend Thomas Edison, and other leaders in government and business, Henry Ford never supported the road because of his firm belief that American highways should be built by American taxpayers.

Ford's initial lack of support did not stop the effort to build the road, however. In December, 1912, Henry B. Joy, president of the Packard Motor Car Company, wrote to Fisher suggesting that he should protest Congress spending nearly $2 million on a marble monument to President Abraham Lincoln when the roads in the country were in such disarray. Mr. Joy, who viewed Lincoln as a larger-than-life hero, wanted to see Lincoln memorialized instead for "the good of all the people in good roads. Let the good roads be built in the name of Lincoln" (Hokanson 1998:9). Fisher, who was looking for a more appealing name for his road than the coast-to-coast rock highway, quickly understood the great public and patriotic appeal in naming the road after President Lincoln. Also recognizing that Mr. Joy was highly regarded both in industry as well as in Washington political circles, Fisher enlisted Henry Joy as the spokesman for the new road. Within a few months, Fisher and Joy recruited several prominent businessmen to the project and formed an official organization to promote the funding and building of the transcontinental highway (Vorsten 1974). On July 1, 1913, the Lincoln Highway Association was incorporated, with Henry Joy as President and Carl Fisher as Vice-President, its purpose being "to procure the establishment of a continuous improved highway from the Atlantic to the Pacific, open to lawful traffic of all description without toll charges: such highway to be known, in memory of Abraham Lincoln, as 'The Lincoln Highway.'" (Hokanson 1998:11).

Although the exact route of the road had still not been determined, three important factors were defined which would govern the direction the road would take. These factors were: "first, the directness between New York and San Francisco; second, the proximity of population centers and points of scenic interest; and third, the 'amount and character' of support afforded the association by communities along the way" (Hokanson 1988:12). Fisher, as publicist for the association and recognizing a great opportunity for fueling public interest, suggested that any proposed routing be kept secret; he was delighted by the increasing pledges made by communities who hoped the route would pass their way. Henry Joy, however, was more interested in the route's directness, and how the road could take advantage of easy terrain and natural pathways. Unfortunately these differing approaches to defining the eventual route of the highway led to confusion and misunderstanding, until public support began to waver. As a result, after much deliberation and consultation with experts, the members of the Lincoln Highway Association finally determined an official route for the road. On August 26, 1913, in Colorado Springs, Henry Joy met at a conference of state governors and stated:

> *"The appeals of sections have been heard. The arguments of all interests have been and are being weighed. Shall the Lincoln Way be marked on the map from large city to large city? Shall it be from point of interest to point of interest? Shall it be a highway from New York to San Francisco, as direct as practicable considering the limitations by Nature in the topography of the country?*
>
> *For decision, the hopeless divergence of conflicting interests and opinions must be eliminated, and the practical conditions only must be considered. The decision must be confined to one permanent road across the country to be constructed first, no matter how desirable others may be and actually are. Such has become the basic principle guiding the Lincoln Highway Association. It is seeking to decide wisely a matter which must be decided right in order to eliminate the petty hauling and pulling and opposition which would be fatal to the great patriotic work, and which would thus postpone beyond our vision so laudable a project"* (Hokanson 1998:13).

Mr. Joy then revealed the route selected for the highway (Figure 4). It began at Times Square in New York City, ended in Lincoln Park, San Francisco, and crossed 3,389 miles of territory. The route moved westward across Pennsylvania, Ohio, Indiana, Illinois, and Iowa before turning southwest and crossing Nebraska, Wyoming, then proceeding "through Echo Canyon to Salt Lake City. It followed edge of the Great Salt Lake desert around the south end of the lake, then linked the remote Nevada towns of Ely, Eureka, and Austin" (Hokanson 1998:14) before crossing the Sierra Nevada mountains at Donner Pass and proceeding across California. The route was controversial, mainly because so many communities which had expected to be on the highway were bypassed. Consequently, citizen's committees and other groups banded together to try to change the route, particularly since no actual construction work had actually commenced on the road. "But the highway was drawn as a grand boulevard ... like the Appian Way, having on the map only the most gentle turns ... a smooth, gently curving boulevard spanning the continent" (Hokanson 1998:17). This vision of the Lincoln Highway was to be the defining factor for determining its location across the United States.

Despite the complaints of those left off the route, the concept of the Lincoln Highway had taken hold of the public imagination. As time passed, however, it became obvious that financially, the Lincoln Highway Association could not raise the funds required to physically build the road. Rather than give up the dream, however, Henry Joy turned to Henry Ford's suggestion that the public be educated and convinced that it was up to American taxpayers to fund the construction of "good" roads. The $10 million road fund plan was quietly abandoned – easy to do since none of the pledged funds had actually been collected. Instead, the focus of the Lincoln Highway Association was adjusted, instead seeing private donations for construction but leaving the major funding to states, counties, and communities along the road. In order to generate support for the public funding of the road, the association proposed building concrete "seedling miles" of the road with donated materials in areas where improvement was most needed, hoping that this would both stimulate larger contributions and increase public demand for widespread improvement of a

Figure 4. Route of the Old Lincoln Highway across the Western United States. Dark line indicates the original route as laid out by Jay. Light line defines the final route of the highway. From Hokanson.

national infrastructure. "Seedling miles" were proposed for Illinois, Iowa, Nebraska, Wyoming, Nevada, and Utah. These short pieces of concrete road were strategically placed out in the countryside, where their firm, smooth, durable surfaces contrasted greatly with the muddy, rutted, tracks on either end. Experience with the improved road sections once again ignited the public imagination and support for the road. Reverend Frank G Brainard, of Salt Lake City, expressed this sentiment, stating:

> *"It is a name to conjure with. It calls to the heroic. It enrolls a mighty panorama of fields and woodlands: of humble cabins and triumphant farm homes and cattle on a thousand hills: burrowing mines and smoking factories: winding brooks, commerce-laden rivers and horizon-lost oceans. And because it binds together all these wonders and sweeps forward till it touches the end of the earth and the beginning of the sea, it is to be named the Lincoln Highway"* (Hokanson 1998:14).

The Lincoln Highway in Western Utah

The western Utah section of the 1915 Lincoln Highway covered 287 miles between Salt Lake City and Ely, Nevada. Henry Joy identified three possible routes for crossing the desert west of Salt Lake City. The three options consisted of: one, a northward track, which went north from Salt Lake City to Ogden, looped around the north end of the Salt Lake and then followed the old Central Pacific Railroad line, but was circuitous and devoid of people along the way; second, a central route running directly west of Salt Lake City but straight through the middle of the salt desert; and third, a southern route which turned south from the shore of the Great Salt Lake and followed the edge of the Great Salt Lake Desert (Figure 5). It then climbed and descended through the mountainous Deep Creek terrain, passing first through the old Pony Express station at Fish Springs – made famous by Mark Twain (Peck 1959:138). Twain described his impression of not only the station, but the region, as follows:

> *"Imagine a vast, waveless ocean stricken dead and turned to ashes; imagine this solemn waste tufted with ash-dusted sagebrushes; imagine the lifeless silence and solitude that belong to such a place; imagine a coach, creeping like a bug through the midst of this shoreless level, and sending up tumbled volumes of dust as if it were a bug that went by steam; imagine this aching monotony of toiling and plowing kept up hour after hour, and the shore still as far away as ever, apparently; imagine team, driver, coach and passengers so deeply coated with ashes that they are all one colorless color; imagine ash-drifts roosting above moustaches and eyebrows like snow accumulations on boughs and bushes. This is the reality of it"* (Twain 1872:143).

After Fish Springs, the route traversed through Ibapah (Deep Creek), and Tippett Ranch before emerging in the Steptoe Valley near Ely. This route was initially chosen for the Lincoln Highway because it was an established path that had been the route of the Pony Express, the Overland Stage, and the transcontinental telegraph. "Though the Lincoln Highway didn't follow those routes in their entirety, it ran on the trail of the stages and express riders for most of the distance through the hardest desert, where water could be found at intervals, the route was passable and direct as any route could be, and it avoided the worst of the salt flats" (Hokanson 1998:64). Here, the road was infused with history. The narrow tires of touring vehicles ran in the very ruts made by the overland stages and in the hoof tracks of the Pony Express.

As travelers headed west out of Salt Lake City on the Lincoln Highway, the road took them past the Saltaire resort, skirted the edge of the Salt Lake, and then turned south into Skull Valley, where travelers finally understood the enormity of their task ahead. Hokansen (1998) describes the landscape these travelers faced. The valley was stark, dry and uninhabited. Just beyond the south end of Skull Valley lay the Great Salt Lake Desert, the very pit of the great interior basin of the western United States, which forms an alien landscape of burning salt and sand devoid of potable water, yet with occasional, treacherous mud flats waiting to trap automobiles, dry washes where springs could snap with ease, rough mountain-pass roads with sharp stones to slash tires, thick alkali dust to choke carburetors and throats alike, and most of all, enough heat to boil the most efficient radiator and dehydrate the stranded traveler (Figure 6). Later,

Figure 5. Route of the Old Lincoln Highway in 1915 along the Pony Express and Overland Stage Route. Courtesy of the Utah State Historic Society.

Skull Valley was to become the center of a US Army testing range. According to Peck, "where once there was nothing by coyotes and wild horses, now there are golf clubs, PTA's and other blessings of civilization, all made possible by an underground water supply over which passed hordes of thirsty men for a hundred years before someone thought to bore a well there (1959:138).

After passing through the desert, the road ascended the mountainous terrain of the Deep Creek Range, dropped down into the Deep Creek Valley and passed through the town of Ibapah before crossing the sage desert and entering Nevada (Anonymous 1956).

Although the crossing of the Great Salt Lake Desert was viewed by most travelers as the most difficult portion of the coast-to-coast journey, most overland travelers had surprisingly little trouble, probably because they had been sufficiently warned of the dangers and were well-prepared. "Their fear caused them to travel so cautiously that mistakes were few. . . . Though the salt desert caused the greatest worry to travelers, more were probably delayed by Iowa mud and high water in 1915 than by all the cloudbursts, washouts, and deep salt mire during the twelve years that the Lincoln Highway used this route across the desert southwest of Salt Lake City" (Hokanson 1998:65).

In 1916, the Lincoln Highway had become a household name as more and more people made the journey across the United States. Transportation was becoming so important to the nation that the Congress appropriated $75 million to match state funds used to construct and improve roadways throughout the country. By the time the US entered World War I, most portions of the Lincoln Highway were considered to be in fairly good shape, although states with very low populations in the west could not generate the tax revenues required to improve the road. In order to better evaluate the actual condition of the Lincoln Highway, and to establish its viability as a transcontinental highway, in 1919 the U.S. Army conducted

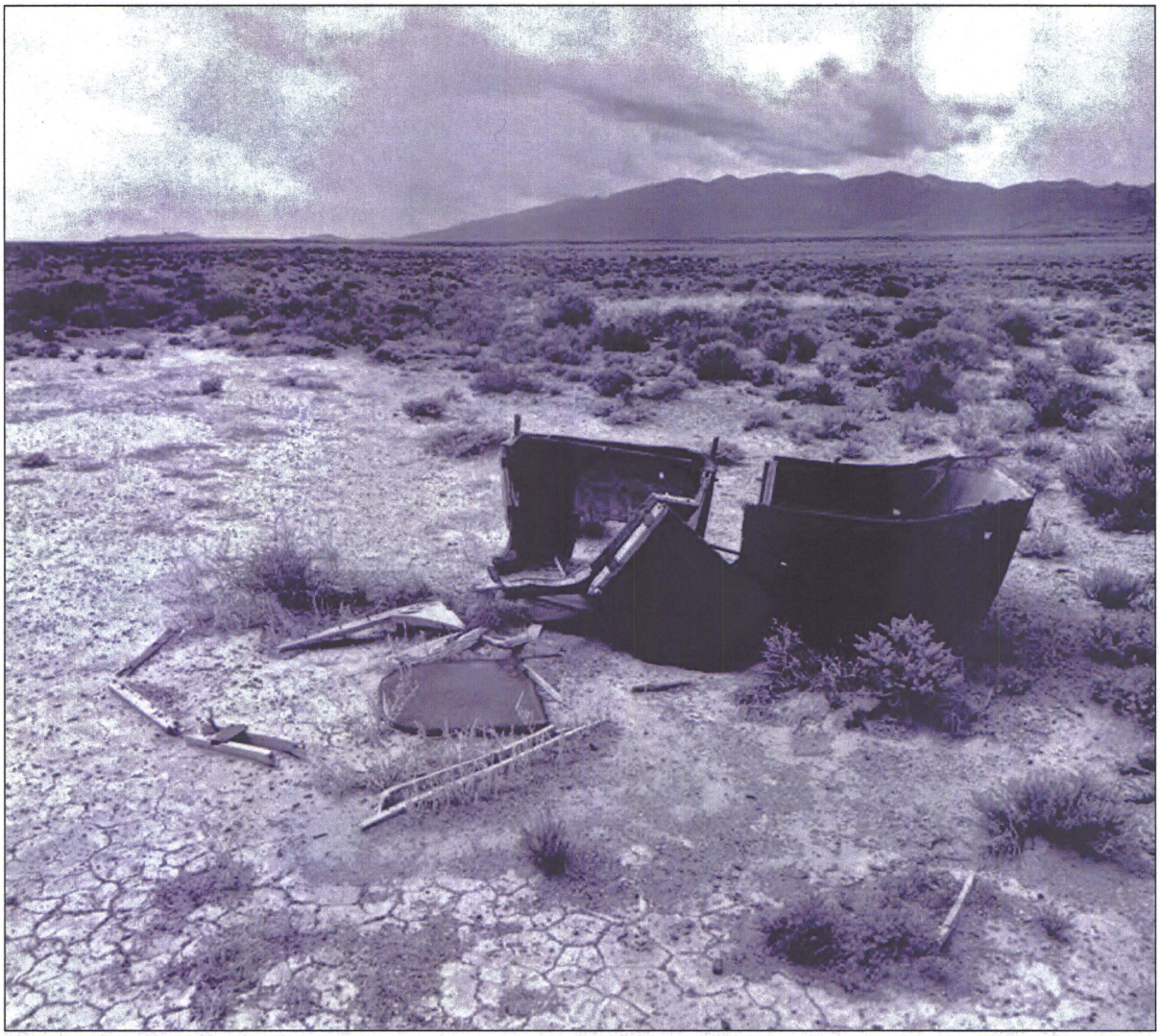

Figure 6. Early automobile remains on the route of the Old Lincoln Highway. Courtesy of the Utah State Historic Society.

a Trans-Continental Motor Truck Trip along the entire highway. The night before the motor train was scheduled to leave Washington D.C., a Lt. Col. D.D. Eisenhower was detailed for duty as an observer (Eisenhower 1953). The transcontinental journey was also to provide and evaluation of the dependability of the vehicles used by the Army at that time. In his notes, the Lt. Colonel stated that many of the trucks were too heavy to use in sand and that "in western Utah, on the Salt Lake Desert, the road becomes almost impassable to heavy vehicles. From Orr's Ranch, Utah to Carson City, Nevada, the road is one succession of dust, ruts, pits, and holes. This stretch was not improved in any way, and consisted only of a track across the desert. At many points on the road, water is twenty miles distant, and parts of the road are ninety miles from the nearest railroad" (Eisenhower 1953:4). In areas of Nevada and Wyoming work performed on the road was often washed away during strong cloudbursts which commonly occurred.

> *"But in western Utah, the problem wasn't a matter of road improvement: west of Salt Lake City, there was hardly any road at all. The road between Salt Lake City and Ely was the least improved and least direct section along the entire highway. Because of the terrain and lack of habitation,*

Henry Joy had been forced to take the existing road – the historic but winding Pony Express and Overland Stage trail. The ink was barely dry on the first association maps when efforts began to straighten the road, and by 1916 the directors had figured out a way to do it. The plan required construction of an 18-mile long embankment straight across a southern lobe of the salt flats between Granite Mountain and a point east of Gold Hill (Figure 7)*, plus six miles of new road in Johnson Pass in the Stansbury Mountains. This work would shorten the Lincoln Highway by a substantial 48 miles and eliminate the most crooked and rough sections through Fish Springs and Callao"* (Hokanson 1998:78).

While the members of the Lincoln Highway Association thought the adjusted routing was a good answer to the problems of the southern route across the desert, Utah's government leaders had other ideas. Lt. Col. Eisenhower noted that many of Utah's citizens were pushing for a more northerly route for the road, and stated: "At least, the Lincoln Highway over this portion of the country is so poor as to warrant a thorough investigation of possible routes for building a road, before any government money should be expended on such a project" (Eisenhower 1953:5). Governor William Spry had no real interest in improving

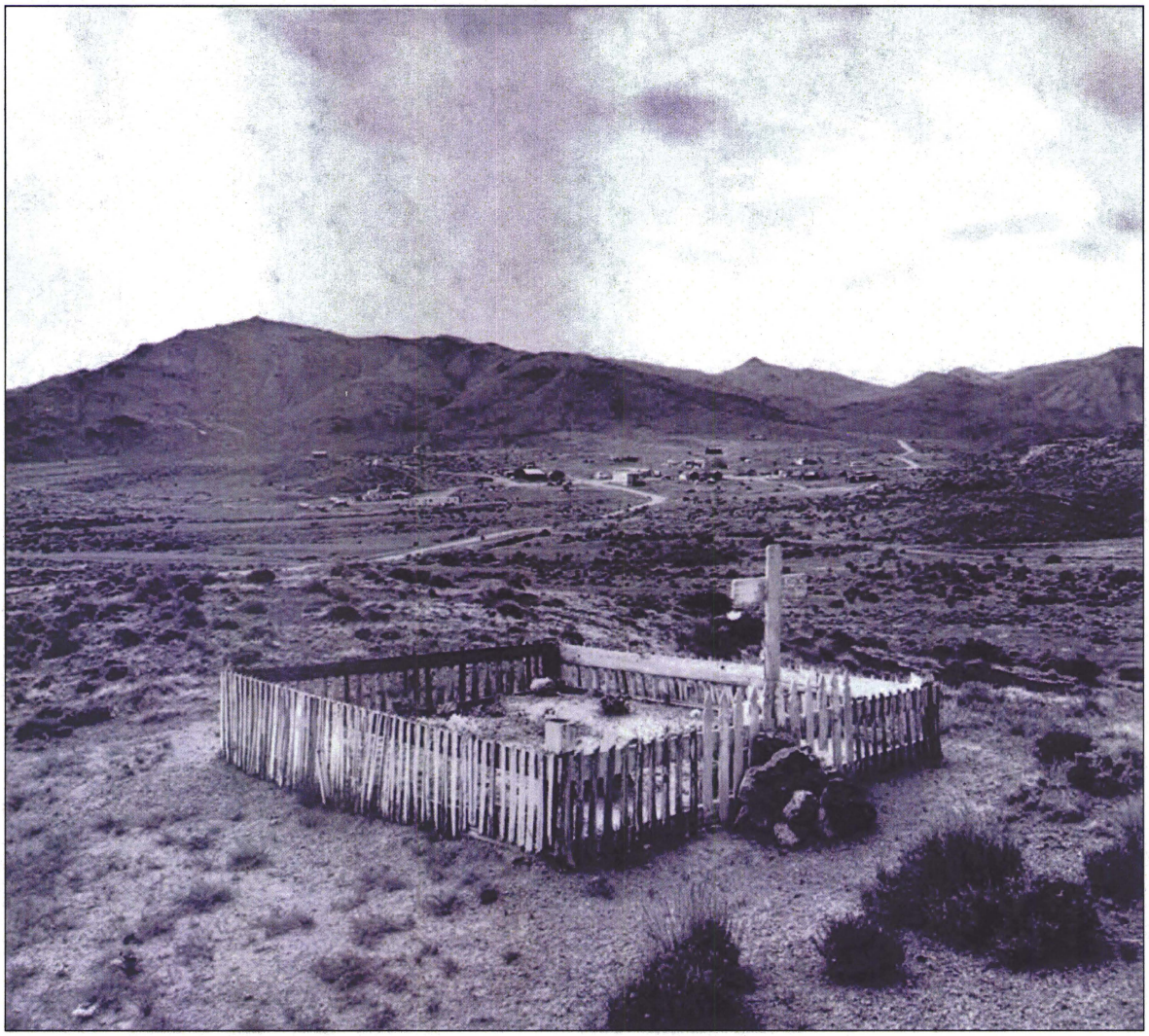

Figure 7. A view of Gold Hill, Utah along the Old Lincoln Highway Route, 1926. Courtesy of the Utah State Historic Society.

the Lincoln Highway, instead pushing for support of a road which angled south-southwest from Salt Lake City towards Los Angeles. This road passed by both the Zion and Bryce Canyon National Parks and also kept tourists within the state for several hundred more miles and several more days than any road running due west. Governor Spry did budget $40,000 to improve a westward-running road which connected up with Wendover, Nevada, but was not very attractive for two reasons. First, the Wendover road crossed even greater expanses of the salt flats than did any of the Association's proposed routes. Second, and most important, because the other road went to Wendover instead of Ely, it would never connect up with the Nevada section of the Lincoln Highway. Transcontinental traffic would instead flow through Wendover and across Nevada on the rival "Victory" Highway, a concept that was unacceptable to the proponents of the Lincoln. Gradually the route for the Lincoln Highway that led to Gold Hill was established.

The Federal Highway Act passed by Congress in 1921, like the bill passed in 1916, appropriated $75 million in federal monies to be matched on an equal basis with state highway funds – with one important difference:

> *"Where the earlier act had allowed states to spend construction funds as they saw fit, this bill stated that federal aid should be concentrated upon such projects as would expedite the completion of an adequate and connected system of highways, interstate in character. This legislation stipulated that each state identify no more than 7 percent of its total mileage as "primary" and that the funds could be used only on these roads. . . . Within two years, the skeleton of a national network of highways began to emerge"* (Hokanson 1998:93).

The emergence of federal support for a national highway system was exactly what the members of the Lincoln Highway Association had been working for, but it resulted in circumstances not foreseen by the association. By 1922, nine highways had been constructed which in some way deserved being recognized as transcontinental, of which the Lincoln was one. Three of these roads, however, were very close to – and occasionally overlapped – the Lincoln Highway. The first, known as the Pike's Peak Ocean to Ocean Highway ran between New York and Los Angeles, sharing the Lincoln's path from New York to Philadelphia. The Midland Trail connected Washington, D.C. with Los Angeles, traveling across Kansas and Colorado (states bypassed by the Lincoln) but also sharing the Salt Lake City to Ely route. Unfortunately, the Midland Trail organization could provide very little assistance to the Lincoln Highway Association in completing this joint section of the route.

The third road, known as the Victory Highway, was the cause of great concern for the directors of the Lincoln Highway. The Victory claimed a coast-to-coast route which ran from New York to San Francisco, but had chosen the rival route of Salt Lake City to Reno through Wendover in direct competition with the Salt Lake to Ely route taken by the Lincoln Highway. Of the two roads, the Lincoln was the more improved, except for the section through the west desert (now known as the Goodyear Cutoff), but public sentiment was turning in favor of the Victory, especially as the State of Utah continued to argue for the Wendover route. Construction of the Cutoff depended upon the allotment of federal funding, so "if the state of Utah designated the Victory as the federal route, the Lincoln Highway across the Goodyear Cutoff would never be built. . . . Despite the efforts of the association, Utah selected the Victory Highway between Salt Lake and Wendover as its federal highway to the western border. . . . On May 14, 1923, the final battle for the Lincoln Highway of western Utah was fought in Washington, D.C." (Hokanson 1998:99). Outside of the Goodyear Cutoff, the Lincoln Highway itself was in much better condition than the Victory, but the main argument against it was five mountain grades all greater than 7,000 feet high at the summit, all with deep valleys between, and long, steep grades – one of which was at 18 percent – between them. Following a summary of the arguments for each route, US Secretary of Agriculture approved Utah's selection of the Victory as the federal route through the state. With this decision, "the Lincoln Highway in western Utah was dead; ... construction of a permanent earthen berm began between Knolls and Wendover in 1924, and the Lincoln remained a natural prairie path. The efforts of the association ... were swallowed by the desert

sand of Utah, the missing link in the transcontinental highway" (Hokanson 1998:102). Shortly after the commencement of the re-routing of the road to join the Victory Highway, a new United States Highway identification system was designated and approved (US Dept. of Agriculture 1927). The focus of the new system was to number the highways, thus reducing confusion and making it easier for motorists to travel without getting lost. While highly practical, the new system removed the "relationship" between the American population and her named roads. The Victory's new designation was Highway 80 while the Lincoln Highway was now to be known as Highway 50.

But the Lincoln Highway in itself was not gone. On June 13, 1930, the Emery County Progress reported that the "West celebrates Lincoln Highway Completion: Gold Trail of '49 Becomes Continental Highway of 1930 – Officials and Citizenry of Four States Meet at Ely, Nevada, in Honor of Forging Final Link of Historic Travel Route" (1930). Even though the decision in 1923 prevented the Lincoln Highway to travel across central Utah into Ely, it was decided to construct a highway segment that connected the original western portion of the road which terminated at Ely to the new route going through Wendover, and the Lincoln-Victory Highway controversy could finally be put to rest (Cottrell 1935). With this action, the first truly conceived transcontinental highway across the United States was completed.

Historic Towns

Gold Hill

"The village of Gold Hill is located in Tooele County, northwestern Utah. It is 55 miles southeast of Wendover over 27 miles of paved road and 28 miles of graveled road; it can also be reached from the east over 94 miles of dirt road from Utah Highway 36 near Faust, via Callao" (El-Shatoury 1970:5). It lies in the east central part of the Great Basin section of the Basin and Range Province, at the north end of the Deep Creek Mountains. The area is composed of a highly dissected group of hills of relatively low relief. The elevation of Gold Hill village is 5,321 feet. The Gold Hill area is bounded on the east by the Great Salt Lake Desert at an altitude of about 4,300 feet, on the north by Dutch mountain with a highest elevation of 7,735 feet, on the west by Clifton Flat, at an approximate elevation of 6,600 feet, and on the south by Montezuma Peak with an elevation of 7,369 feet. The group of relatively low hills at Clifton merges westward into Ochre Mountain, whose highest elevation is 7,541 feet. The area is characterized by an interior drainage system typical of the eastern Utah-western Nevada part of the Great Basin.

Valuable ore was first discovered in the vicinity of Gold Hill by a group of 'gold seekers' on their way to the California gold fields. Although the prospects looked positive, hostility by the native inhabitants convinced the miners that they should continue west. By 1869, however, "the white man had become numerous enough to ... organize a mining district (and) a town of quickly constructed dugouts in the side hills and huts built of cedar posts with willow coverings of sagebrush and dirt was excavated. Canvas tents served as dining and cooking shelters" (Parsons 1961:384).

The town of Gold Hill is referenced in LDS Branch records as early as 1874, when some of the earliest mining claims were first located in the district. The town was variously known at different times as Goald City and Goodwin, but "by the 1890's it was known as Gold Hill" (Bateman 1984:308). As with most mining camps, the camp of Gold Hill experienced a recognizable life cycle, one which was repeated throughout the west. "Gold was discovered, and a teeming, pulsating town soon flashed to life on the spot. Nineteenth-century diarists were very consistent in their descriptions of the conception of a town in their journals. These towns 'sprang magic-like into being,' 'as if by enchantment,' or 'like mushrooms in the night'" (Sagstetter and Sagstetter 1998:157).

Gold Hill's first boom period really began in the 1890s. Colonel James F. Woodman, who had discovered the Emma Mine at Alta, as well as other mines in the Tintic mining district, moved west "to

Gold Hill and was again successful. He constructed an amalgamation mill with expensive machinery imported from France and treated ore from the Alvarado, Cane Springs, and Gold Hill mines (Carr 1972). The operation lasted about 23 months, during a period from 1892 to 1895. The mines produced in excess of $200,000.00 with a net value of $177,906.23 from the Cane Spring mine alone. ... At one time the Woodman Mining Company shipped gold by wagon in large iron balls filled with pure gold. Each ball was about one foot in diameter and weighed approximately two hundred pounds; ten to fifteen thousand dollars' worth of gold could be carried in one ball, and at least one attempted robbery of an iron ball shipment occurred. ... Transportation difficulties and Colonel Woodman's death seem to have ended Gold Hill's first big boom. There were still over 40 miners in the area in 1900 at census time, however" (Bateman 1984:308, 9).

With World War I came the government's demand for Gold Hill's valuable tungsten and arsenic deposits. But a problem arose. Shipping charges by wagon and on the railroad were so high the tungsten couldn't be profitably shipped by rail. Resourceful mine owners came up with a plan that raised havoc with the US Post Office – they packaged the tungsten and sent it to Salt Lake via parcel post (Miller 1980).

Gold Hill continued to suffer from the lack of transportation. Hopes had been high that the Western Pacific would link Gold Hill with other Utah cities, but the railroad bypassed the town. It wasn't until 1917 that a line from Wendover to Gold Hill was constructed. Mines began stockpiling ores, awaiting the boom the rail line promised. Ultimately the railroad carried so much ore from the area that Salt Lake City smelters couldn't keep up with the volume and declared an embargo on shipments from the area (Carr 1972).

For a few years after World War I, Gold Hill's arsenic mines were productive as tungsten prices skyrocketed, but about 1924 the arsenic market collapsed, and Gold Hill began to die (Bateman 1984; Miller 1980).

Dr. Peck, the physician for the Deep Creek Railroad construction crew, stayed in Gold Hill proper while the railroad construction was finishing up. He described the town as follows:

> *"The first time I saw Gold Hill, in 1916, it consisted of two buildings and the ruined head frame of the old Cain (sic) Springs Gold Mine. Two families made up the population of the town proper. Jack Hudson lived in the old Cain Springs boarding house; over on the other side of the flats the Gersters had a little house made of old timbers from the mine heading.*
>
> *The flat was "patented" ground. Jake Gerster had done enough prospecting upon it to warrant the government's giving him title to the whole area. It consisted of about 30 acres of reasonably level earth, bounded on the west and the north by the Gold Hill wash, or stream bed, and completely surrounded by dry, rocky hills whose ugliness was modified only by a few junipers and shad scale bushes. So spotted over was it with mine shafts and dumps that it looked as though some ambitious gophers had been working there. There was a spring of shorts about a mile above the place, but the water had only wetness to recommend it; it contained so much mineral that it was totally unfit for human consumption unless one's alimentary tract were lined with copper and one's kidneys modeled after stone crushers. The burrow liked it, but they could get fat on tin cans and glass bottles, and so were not guarantee of its palatability.*
>
> *Gold Hill was unique in that it went through three periods of boom and bust instead of the usual single flash of greatness and then oblivion. Twenty-five years before the time of which I write (1916), it was a booming gold camp. In my day the golden fleece had turned to copper. Twenty years later the mining of arsenic blew new life and hope into the discouraged breasts of those who had been too poor to leave when the other booms fizzled out. None of these periods of hope and promise lasted more than three years.*

Six weeks after my first visit there were 50 men working in the newly opened copper mines. By the time I had moved there, in the spring of 1917, there were three store buildings, a gasoline pump, the framework for a pool hall, and possibly 20 tent-houses.

Gerster had laid out a townsite. He had named the streets and even gone so far as to reserve plots for a school, a church, and a public library. The last two tracts were never used. The school was completed just as the children's parents decided to try their luck elsewhere.

Sanitation was no problem whatever, and so I was spared the grief and troubles of doctors in such new communities. All those old mine shafts, most of which were from fifty to seventy feet deep, were available for the disposal of refuse. The new inhabitants built outhouses over them and were not bothered a particle by the fact that their sanitary facility might be situated right in the middle of the main street.

Because of my connection with the construction camps, I was more fortunately situated than the rest of the inhabitants in that I could take my water keg down to the camp and fill it with Wendover water from the locomotive tank. The rest had to drive 25 miles westward over the mountains to Ibapah for their supply. In fact, one of the most remarkable things about Gold Hill was its inaccessibility. Forty miles to the east was Callao, a metropolis of twenty people. Ibapah was a collection of half a dozen cattle ranches. Fifteen miles beyond it was an Indian Reservation Populated by 200 Goshutes and three whites. The connecting roads were confined to the beds of the water courses. In time of rain these became raging torrents, but they were dry and sandy most of the year.

South along the stream bed from Gold Hill was Clifton Flats, a mesa-like triangle on top of the Clifton range. This miserable little scrap of ground, covered with shad scale and invested with rattlesnakes, had once been the crossroads of the West. The Overland Trail reached it from the salt desert to the east via the Overland wash, and left it by another dry wash for the Nevada mines and California. If the going got tough on the Humboldt Trail, wagon trains would come south to the Overland, or the Overland traverses could turn north here to the Humboldt.

Gold Hill was little more than a collection of people gathered together because of a common interest but mostly devoted to their own particular problems. The were about as stable as a bunch of tumbleweeds in a windstorm. Always ready to pull up stakes, they would move on at the first rumor of a metal strike anywhere within traveling distance" (Peck 1959).

The outbreak of World War II once again brought life into the town. Nearly completely closed down by the end of the 1930s, in 1943 the United States needed arsenic, and the Gold Hill mines had plenty of it. Gold Hill prospered and came to life once more, with its citizens repairing old buildings, constructing new ones, and entertainment areas, like the pool hall and bowling alley were always busy. But once again, the life of the town was short lived. In 1945, the mines were abruptly ordered to stop production, and almost overnight, the town became almost a ghost town (Bateman 1984). The latest efforts to reopen the mines occurred in 1977, when Atlas Minerals leased over 300 claims were staked on federal (BLM) and state lands. Atlas was looking for uranium, but their exploration efforts were blocked. (Bateman 1984).

Clifton

The town of Clifton was established sometime shortly after 1864, when Utah's first smelter was established at Stockton. Miners had known since the 1850s that deposits of ore, principally lead-silver, were abundant, but as the site was so far from mills and smelters, it was not worthwhile to seriously mine the area. "Desultory mining had been done as the years went on, but nothing of importance until 1864" (Murbarger 1954:npn).

Following the installation of the Stockton smelter, mining boomed in the Deep Creek Mountains and the town of Clifton was born.

"Mines opened like mushrooms sprouting in a meadow. By 1872, a mill and smelter had been constructed locally, thereby obviating the long haul to Stockton, and no town's future ever looked more promising. But Clifton was a little ahead of her time. Her ore was too largely composed of copper, lead, zinc, tungsten, and arsenic – all completely unmarketable at that time – while all the gold and silver which men sought was limited to rich pockets that were too few and too far between" (Murbarger 1954:npn)

Clifton's town history then followed a common pattern. Unable to operate at a profit, the major mines closed, the smelter first shut down and then was moved to Gold Hill, and the town of Clifton disappeared. Over the following years, as the minerals plentiful in the district became more profitable, the town would temporarily revive. Old mines would reopen, but not for long. Developers of both the mines and other property quickly lost interest and moved on to other, "greener" fields.

Very little historic detail is known about the town itself – in fact, in many ways it remains one of the most mysterious of the ghost towns in the state. Its last resident was a man who called himself Ollie Young. Ollie and his brother, Brigham, had come to the town during one of its periodic revivals. They claimed to be nephews of Brigham Young himself, but never provided any details beyond that assertion. Like most of the miners of Clifton, they prospected and dreamed. When the boom collapsed, everyone but Brigham and Ollie left. Brigham died shortly afterward, but Ollie stayed on for 10 more years, before he died as the last inhabitant of Clifton (Murbarger 1954).

Historic Figures

Major Howard Egan

Howard Egan was born June 15, 1815 in Tullamore, Kings County, Ireland. Following his mother's death when he was eight years of age, Egan's family emigrated to Montreal, Canada. Egan became a sailor until he reached the age of 23, when he moved to Salem, Massachusetts and became a rope maker. While in Salem, he became a member of the "Mormon" faith and joined the other members in Nauvoo, Illinois where he helped to build the city. "He became a member of the Nauvoo police and a major in the Nauvoo Legion from which time on he was known as "Major." After the mormons were expelled from Nauvoo, he went to Winter Quarters and then accompanied the first group of pioneers into the Salt Lake Valley in 1847.

In 1848-49, Major Egan returned to Winter Quarters in order to assist another group to cross the plains into the valley. He took the Salt Lake City mail east, then returned in May, bringing both Saints, supplies, and more mail. During 1849, he guided gold-hunters to California using the route through southern Utah, and eventually became the mail agent. He made his headquarters at Deep Creek, a post on the mail route which he had established in 1853, while engaged in driving stock between Utah and California. The trail he mapped, known as Egan's trail or the Overland trail, covered a distance of 658 miles with 56 relay stations for mail and passenger coach service. Soon after he had laid out the Egan Trail, he went into partnership with George Chorpenning, who had the first mail contract from Salt Lake to California (Bateman 1984; Carter 1960).

"With the inception of the Pony Express on April 3, 1860, Howard Egan again made great contributions to frontier life. The Egan Trail became the route traveled by the express for 300 miles. His jurisdiction as an officer included all of the Utah route. He contributed much to the organization through his valuable experience as a pioneer, trail blazer, and stage coach driver. He also rode the ponies when necessity demanded it. He is credited with bringing the first Pony Express mail into Salt Lake City, riding a distance of 75 miles from Rush Valley on April 8, 1860, carrying four pouches on which were written "Overland Pony Express" (Carter 1960:35).

Major Egan remained at Deep Creek as Superintendent of the Overland Mail until May 10, 1869, when the railroad was completed on the Northern Route and leaving Deep Creek almost entirely out of the general line of traffic. He returned to Salt Lake City in 1875, where he died in 1878.

Capt. Duncan McVichie

In 1984, T. P. Billings published a biographical summary Captain Duncan McVichie. The comments below are taken from Billings (1948).

Duncan McVichie was born September 20, 1858, at Lancaster, Glengary County, Canada. His father was a farmer, but at 14 years of age young McVichie left the farm, starting a career in navigation on the Great Lakes and earned the title of Captain. At age 25, he joined a surveying party with the Canadian Pacific Railroad and decided to become an engineer. He supplemented this practical experience with studying and in 1882, graduated as a full-fledged engineer. After graduation, he entered the employ of a mining company operating on the Gogebic Range in Michigan, from where he was advanced to Superintendent of the Bessemer Mine at Hurley, Wisconsin, then the Lake Mine in Michigan, and in 1890 was Superintendent of Iron Belt and Atlantic mines in Wisconsin.

In 1897, Captain DeLamar, who was operating mines at Mercur, called upon Captain McVichie to determine upon a cheap mining method applicable at his Mercur mines. Captain McVichie sent one of his employees and a miner from the north of England, Richard Hyland, to Mercur to investigate the properties of Captain DeLamar's mines. Hyland reported back that the physical conditions were favorable to using the relatively inexpensive caving method of mining. Captain McVichie then decided to come to Utah as Superintendent of the DeLamar mines . He continued in that capacity until 1901.

In 1901, Captain McVichie spent a short time at Gold Hill, Utah, in the development of a gold prospect, which in later years came to be known as the Western Utah property Gold Hill Mine. During this period Utah, and especially the camp of Bingham, was receiving a lot of attention and publicity as a potential producer of copper, and eastern financiers from Boston were eager to expend venture capital. Based on his mining experience from Mercur, Captain McVichie was made Manager of the Bingham Copper and Gold Mining Company, a Boston company which had acquired a commercial group of claims north of and adjoining what was known as the Old Jordan mine. Captain McVichie again introduced the caving system at the workings, with modifications to fit the specific ground conditions at the huge Bingham mine.

Although the overall quantities of ore in the Bingham Mine were extremely large, the majority of the ore grades at Bingham required that smelting costs be reduced substantially in order to boost the economic viability of the mine. Captain McVichie oversaw the construction of a smelter for processing the Bingham copper ores at Bingham Junction, and was also instrumental in ensuring the construction of the Copper Belt Railroad, which extended from the terminus of the Denver and Rio Grande rail line in Lower Bingham to the portal of the lower commercial tunnel of the mine. As Captain McVichie's smelting business prospered, he extended his personal mine holdings. First, near the Bingham area, he acquired a number of small claim groups located on the Lark, Lead Mine and Brooklyn veins. As he improved the mines, Captain McVichie also built another railroad spur, the Lark Branch, which connected with the Bingham Branch of the Denver and Rio Grande. Over the next decade, Captain McVichie continued to manage the Bingham Copper and Gold Mining Company as well as further expand his personal holdings in the Tintic mining district, until he retired from official engineering work in 1908.

In 1914, Captain McVichie returned to active mining activities in Gold Hill, Utah. Copper was in great demand for the requirements of World War I. Captain McVichie, together with Senator Reed Smoot and other financiers in Rhode Island, prepared to re-open the Gold Hill mine.

"After an examination and sampling of the property, it was realized that even at the relatively high price then prevailing for copper, a profitable operation ... would require low costs. The mine was about 60 miles from Wendover, Utah, the closest point on a railroad, so the Captain took up the matter of a branch railroad from Wendover to the mine with Western Pacific Railroad Company officials. (They) were immediately interested by wanted an independent examination of the mining property and adjacent areas before undertaking the construction of the proposed branch. The engineer recommended and hired by the Western Pacific Railroad Company was an unfavorable report and, of course, the railroad officials so advised Captain McVichie. But the Captain was not the kind to be so easily discouraged, and full of confidence, he immediately took a train to San Francisco and met the President of the railroad personally to present his ideas. Within a week, the Captain returned to Salt Lake with the assurance that the branch railroad would be financed and constructed by the Western Pacific Railroad. This mining operation continued throughout and after World War I but folded up during the early 20s, when the demand and price of copper caused the cessation of operations in practically all our copper mines. ... Today, this mine, although about depleted of known copper reserves, has a very substantial reserve of arsenopyrite, which was being seriously considered as a source of arsenic during World War II" (Billings 1948:6-7).

Captain McVichie finished his mining career in Iron County with his promotion and development of the iron ores located there and was influential in bringing the steel industry to the state of Utah. Captain McVichie also served as a Director of the Copper Bank (later known as the First Security Bank) in Salt Lake City for a number of years. He died in 1941 at age 83, still interested and active in Utah mining ventures right up to his death (Billings 1948).

Lieffler (Leffler) Palmer

Lieffler Palmer was somewhat of a local folk hero in western Tooele County. He lived in the town of Gold Hill, and spent several months of each year working his claim, a mine known as the "Rube." It seems that Palmer took out only a single carload of ore each year from his mine, just enough to live on comfortably, or "about $10,000 in gold each year" (Blanthorn 1998:53) 'Gold Hillers' thought the miner crazy for not mining more ore, or forming a corporation to go into large-scale mining operations, but Palmer remained satisfied with his mining method.

The tale of Lieffler Palmer and his mine spread from Gold Hill to Salt Lake City first through articles published in the local newspapers, and eventually to mining journals. Eventually the word about Palmer's rich mine had spread to most mining circles. Despite a number of attractive offers, Palmer consistently refused to sell the Rube. He apparently reasoned that gold stored in Mother Nature's bosom was safer than in a bank, and by removing only as much as he needed each year, he always would be assured a living. Finally, a group of Californians offered enough money to make Palmer weaken and sell. Palmer retired to the West Coast and bought a fine country estate.

Upon acquiring title to the mine, the new owners scurried to do what virtually everyone had said Lieffler Palmer should have done. They began to develop the mine, installing costly mining equipment in preparation for operating on a grand scale in order to reap millions. They would not be satisfied with a little gold dust once a year. About the time the expensive operations began, Palmer 's vein pinched out. Lieffler had somehow known when to get out – one of the few who ever did – and his place in local history was assured. (Miller 1980:107).

Mining in the Deep Creek Region

"Deep Creek is a mining region of unsurpassed mineral wealth. It is situated in the western part of Tooele and Juab counties, Utah, and is about 125 miles distant from Salt Lake City. The most heavily mineralized section of the country is in the Deep Creek mountains, although the mines begin with the Dugway range and continue westward to the Nevada line. ... The mines of this region have been producing (since 1879) and millions of dollars worth of ore has been treated or placed upon the dumps. In the earlier history of the country, several small smelters were operated...lead silver

was the only ore treated during those days. Gold, silver, copper, lead, zinc, and iron have been found to exist in immense quantity, while bismuth, tin, nickel, antimony, tungsten, and molybdenum are all found, particularly in the north end of the range" (Salt Lake City Tribune 1909:21).

The Deep Creek mining country proper extends sixteen miles north of the Overland road, twelve miles west of the western edge of the alkali flats of the Great American Desert to ten miles east of the Nevada line at the Deep Creek valley and is officially known as the Clifton Mining district. No southern boundary to the district has ever been definitively described. The two main camps in the district are Gold Hill and Clifton (McFarren 1909). It is most easily reached by car by driving 28 miles southwest of Wendover on US Highway 50 (the Old Lincoln Highway), then a further 28 miles southeast on a gravel and dirt road. The Gold Hill area has had an interesting mining history, even though total ore production falls short of reaching a 'major' classification. "The value of mineral production from discovery of the district in 1858 to the present (1958) is estimated at approximately $6,800,000. Recorded production lists ores containing gold, silver, copper, lead, zinc, tungsten, arsenic and bismuth. In addition, minor amounts of antimony, vanadium, tin, and molybdenum occur in some of the ores" (Wilson 1958).

Gold Hill-South Clifton Mining District

The Gold Hill and Clifton sites constitute one of the oldest mining areas in all of Utah. The mining district lies about 15 miles northeast of Ibapah, in a group of low, rolling hills, with the Great Salt Lake Desert (salt flats) bounding the district on the east. Dutch Mountain is located to the north and Montezuma Peak lies south. "Clifton arose on the Clifton Flats, a triangular mesa on tope of the Clifton Range about five miles southeast of the mining town of Gold Hill. ... With an area of about 72 square miles, the Clifton Mining District later included the Gold Hill mines" (Blanthorn 1998:43-44).

Bateman (1984) notes that the Gold Hill-Clifton district was first organized in 1868, with Major Howard Egan purchasing materials to be used to build a smelter in 1869, and in Willow Springs, gold was discovered. In 1872, a small lead smelter was constructed at Clifton, and "1500 tons of high-grade lead-silver ore were reduced" (Bateman 1984:305). The smelter was moved to Gold Hill two years later, where it was used to reduce an additional 500 tons of ore, yielding four railcar loads of lead-silver bullion (Nolan 1935). Because of the high ore yields, newspapers such as the Deseret News stated in July, 1881 that "The mines of Deep Creek will yet of necessity be among the foremost of the territory," "The whole country is absolutely mineral," and "Some hills and mountains appear to be solid ore." Expectations continued to rise even up to the turn of the century as the district mines appeared to produce a heavy and regular output of precious metals.

"Deep Creek Mines-Deep Creek's Best Crop" is a pamphlet produced in 1903 by geologist Marcus E. Jones. In this work, Jones identified the names and locations of the most important mines within the district:

"The Lion and Apex silver claims in Dry Canyon (were located) 12 miles south of Clifton. The New York Giant gold mine was 13 miles southwest of Callao near Granite Creek.

In the Clifton area were the Carmen, McVichie, Walcott, Tripp, Gold Bond, and Brigham Young claims. To the south of Clifton lay the Pocahontas, Paymaster, the IOU, Geronimo, Laura, and Troy claims. Three miles south from Clifton was the Climax zinc, lead and silver mine with 'extensive hoisting works and a mine equipped with up-to-date apparatus' and close by was the 'old Success mine' and the Midas gold mine.

In the Gold Hill region, the principal mines were listed as the Bonnemart, Cane Springs, Alvarado and Gold Hill mines, where iron, copper, gold, and arsenic were taken. ... At nearby Dutch Mountain, the Garrison and Monstor groups were drilling veins of iron, lead, or zinc ore (Jones 1903:18-28).

In his 1909 visit to the district, H.W. McFarren further described the geologic context of the district, as well as his expectations for future mining prospects. He stated:

> *"The sedimentary formations are the usual lime and quartzite, the larger part being lime. Through these the granite has raised and exposed itself. Subsequently porphyry dikes intruded both the sedimentary formation and the granite. The porphyry appears to have played the most important part in the mineralizing of the district. The veins are found mainly in the contacts and in the granite. These are of spar or quartz, sometimes of both, but usually of granite. Some of the veins are of porphyry that has been mineralized and replaced metasomatically. They carry gold, copper, and argentiferous lead. Veins of lead predominate; these carry some copper. There are a large number of copper veins, in some of which lead is found. There are also many gold veins in which the gold is free without sulphides and sometimes as coarse as a pea. These gold veins all show copper indications, though not to the extent that would indicate the probability of the vein changing from one of gold ore to one of copper. The copper and lead veins all carry highly important gold values. In many of the veins the gold content is equal to one-third of the total value of the ore. As to whether or not these high gold values are due to the superficial enrichment peculiar to gold veins, and consequently confined to the upper parts of the veins, deep prospecting alone will tell, but in view of the close-lying gold veins, there is good reason for believing that gold values will be found at depth"* (McFarren 1909:18).

Mines and Claims Identified Within the Survey Area

A summary of information specific to individual mines or claims is presented below, beginning with named mines and progressing through identified claims. Specific details of documentation regarding legal ownership and claim consolidations located for these properties are listed in Appendix C.

Mines

Alvarado

The Alvarado gold mine is located about 1 mile east of the town of Gold Hill and half a mile northwest of the Gold Hill Mine. No Notice of Location could be identified on file, but James F. Woodman and the Cane Springs Consolidated Mining Company were listed as owners in 1896. In 1935 the mine was owned by the James Woodman estate. A Patent (Lot #59) for the mine was granted to the Cane Springs Consolidated Mining Company on September 7, 1940. In 1958, Wilson noted that the Woodman Mining Company, controlled by Cecil Woodman of Gold Hill, controlled the property (see Appendix C).

The mine workings consist of an inclined shaft about 250 feet deep and about 1,500 feet of tunnels, in addition to short raises and winzes (Figure 8). A shaft house and a bunk house were built on the property adjacent to the Deep Creek Railroad spur which was built to the mine. The most productive years for the mine were 1892 to 1895, when it was said to have produced between $120,000 and $140,000 in gold. Subsequent to 1895, the mine has remained mostly idle, with only a few lots of ore being shipped out. Leases were occasionally granted for the purpose of further exploration (Nolan 1935. The first recorded lease was granted to Warren Sandberg in the early 1930s. Leases to the Atlas Corporation (1964), Hunt, Ware & Proffett (1984), Nevada, Utah Gold, Inc. (1984), and the Dingle Boy Corporation (1993) were also recorded.

Gold Hill

The Gold Hill mine is located about eight miles south of Dutch Mountain in an eastward draining opening in the Deep Creek Mountain range and consists of several mine openings. Two springs are located in the center of the mining camp boundaries. No Notice of Location could be identified on file in the Tooele County Records Office. The first documentation, dated December 22, 1919, notes the Western Utah

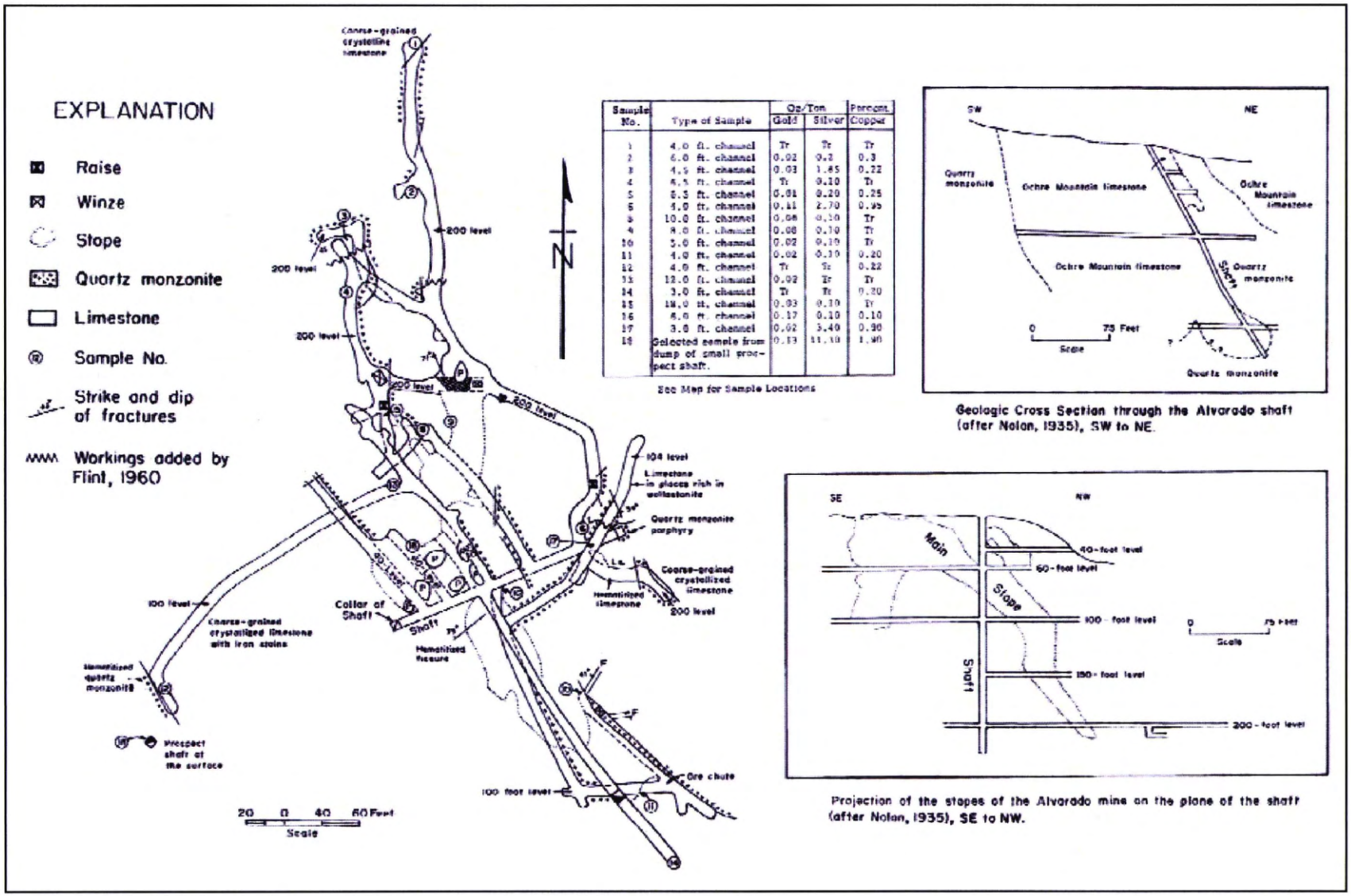

Figure 8. Plan of the Alvarado mine workings, Gold Hill mining district, Tooele County, Utah (after Nolan, 1935, and Flint, 1960).

Copper Company as owner of record. US Patent (MS#4216) for the mine was granted to the Western Utah Copper Company, but the patent is also not on file, so no date of issuance can be reported here. Wilson (1958:6) reports that the "Gold Hill mine is owned by American Smelting and Refining Co. The operating company during the most productive period, 1917-1925, was the Western Utah Copper Company. The claims were taken over by the smelting company in 1932 because of nonpayment of money advanced to the Western Utah Copper Company (see Appendix C).

The mine workings consist of a warren of a vertical shaft about 300 feet deep and more than 1,500 feet of tunnels, raises, and winzes (Figures 9 and 10). A minor amount of gold was mined from the Gold Hill during the period 1892-1895. Significant production began in 1917 after completion of the Deep Creek Railroad branch line from Wendover to Gold Hill. "From 1917 to 1929 a total of 171,637 tons of ore was mined with an average assay value of 4.66 percent arsenic, 2.07 percent lead, 0.725 percent copper, and 4.0 ounces of silver and .0075 ounces of gold per ton. Most of the arsenic ore was mined and shipped during the period 1923 to 1925" (Wilson 1958:6).

Rube

The Rube Mine is located 1 ½ miles northeast of Gold Hill town on the southeast side of Gold Hill Wash. Lieffler Palmer filed Notices of Location for six claims between December 7, 1915 and January 28, 1919. Palmer retained sole ownership in the mining claims for until 1932, when it was sold to the Gold Hill Mines Company. US Patents (MS #6686 and #6733) were granted to Palmer on April 21, 1932. Improvements were made to the Rube by the Gold Hill Mines Company, but results were poor and the claims, with the exception of #2 which was deeded to Edward Schloerb of Ely, Nevada, were Quit Claimed back, to remain in Palmer's possession until his death. In 1964 the Atlas Corporation leased the property. Tooele County mining records show a series of Quit Claim Deeds granted by the heirs of Lieffler Palmer followed by a lease with option to purchase granted to Interstate Resources, Inc. in 1985 (see Appendix C).

Five of the mining claims (numbers 1,3,4,5,and 6) produced gold, with those on the east side of Gold Hill Wash producing "spectacular, coarse gold. A small tonnage of high-grade lead ore (was) mined from an ore body (#2) on the west side of (the) wash. A third type of ore consists of quartz and calcite with pyrite, galena, chalcopyrite, sphalerite, molybdenite, and native gold in a green to black, fine-grained matrix" (Wilson 1958:5). The mine architecture consists of a 150 foot inclined shaft with two levels and as well as a group of shallow workings east of the main shaft (Figure 11). Nolan (1935:136) states that "from April 1921 to July 1927, 22 shipments of gold ore that averaged more than 7 ounces of gold to the ton had been made (by Mr. Palmer). In May 1932 the mine was sold to the Gold Hill Mines Company, and since then it has been actively worked. At the end of 1932 it was reported that 2 cars of ore a week were being shipped, the grade of which ranged from $12 to $30 a ton."

U.S.

Although this mine is not on the official claim list as part of this survey project, the US Mine was also alternatively known as the Gold Hill Mine of the United States Smelting, Refining and Mining Company. "It is located about 3,500 feet south of the Gold Hill Post Office, east of the Lincoln Highway" (Nolan 1935). The original claim was staked in 1922 as the Last Dollar, was owned by J. J. Gerster. In 1923 a small amount of copper ore was taken from the claim. In 1923, 42 foot vertical shaft passed through an ore body containing from 2 to 15 percent arsenic, and the claim was leased to the Grasseli Chemical Company. The Grasseli company leased the claim to US Smelting, who continued development work on the Last Dollar and adjoining claims, mining about 10,000 tons of ore in 1924 which averaged 25.8 percent arsenic, 30 percent insolubles, 20 percent iron, 12 percent sulphur, 0.5 percent lime, 0.4 percent zinc, 0.02 percent copper, and 0.86 percent lead. Occasional gold, silver, and lead were also recovered. Production of arsenic, primarily, continued through 1926 (Nolan 1935). The property remained idle until the period

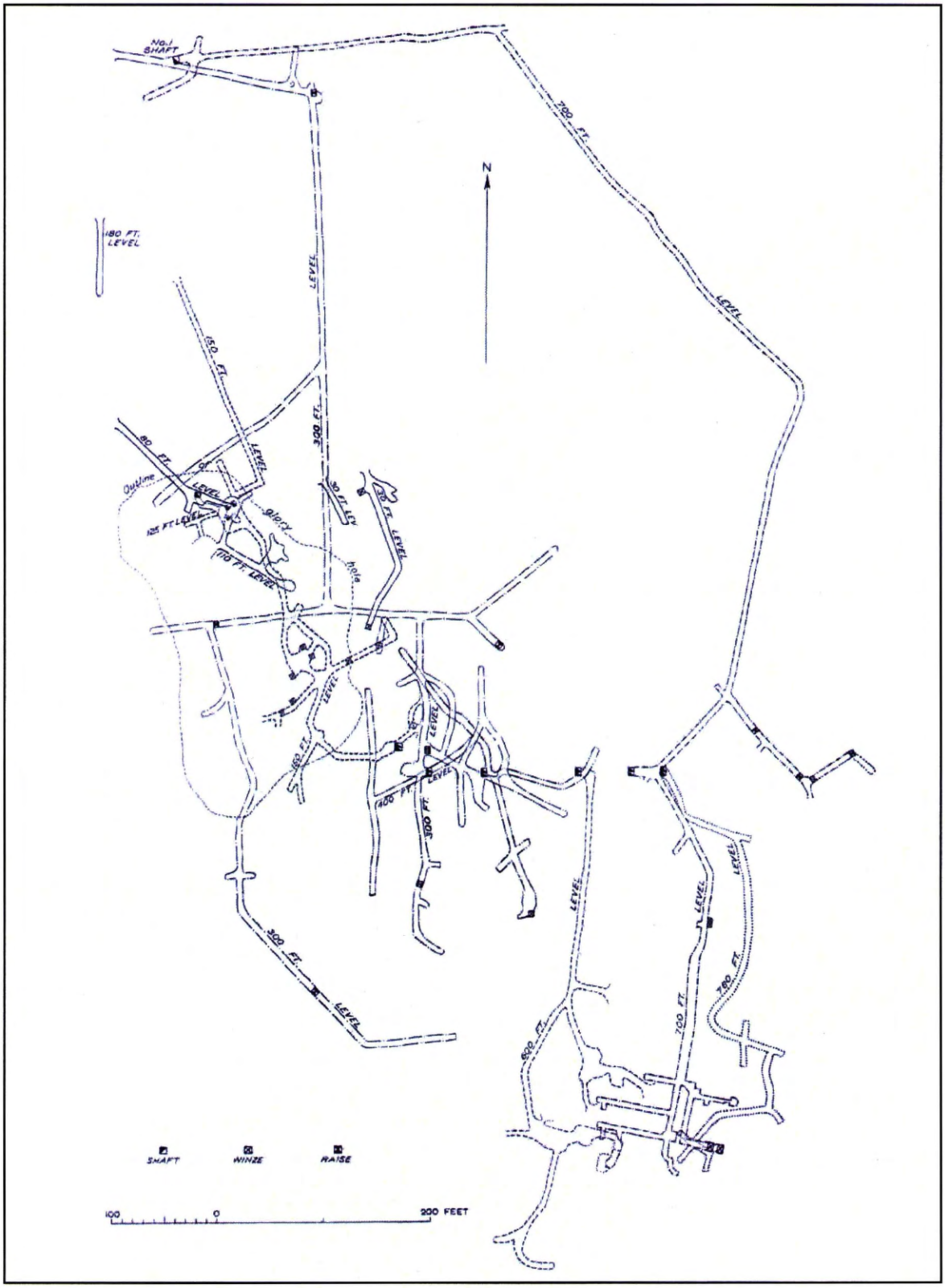

Figure 9. Level map of Gold Hill mine of the Western Utah Copper Company. From Nolan, 1935.

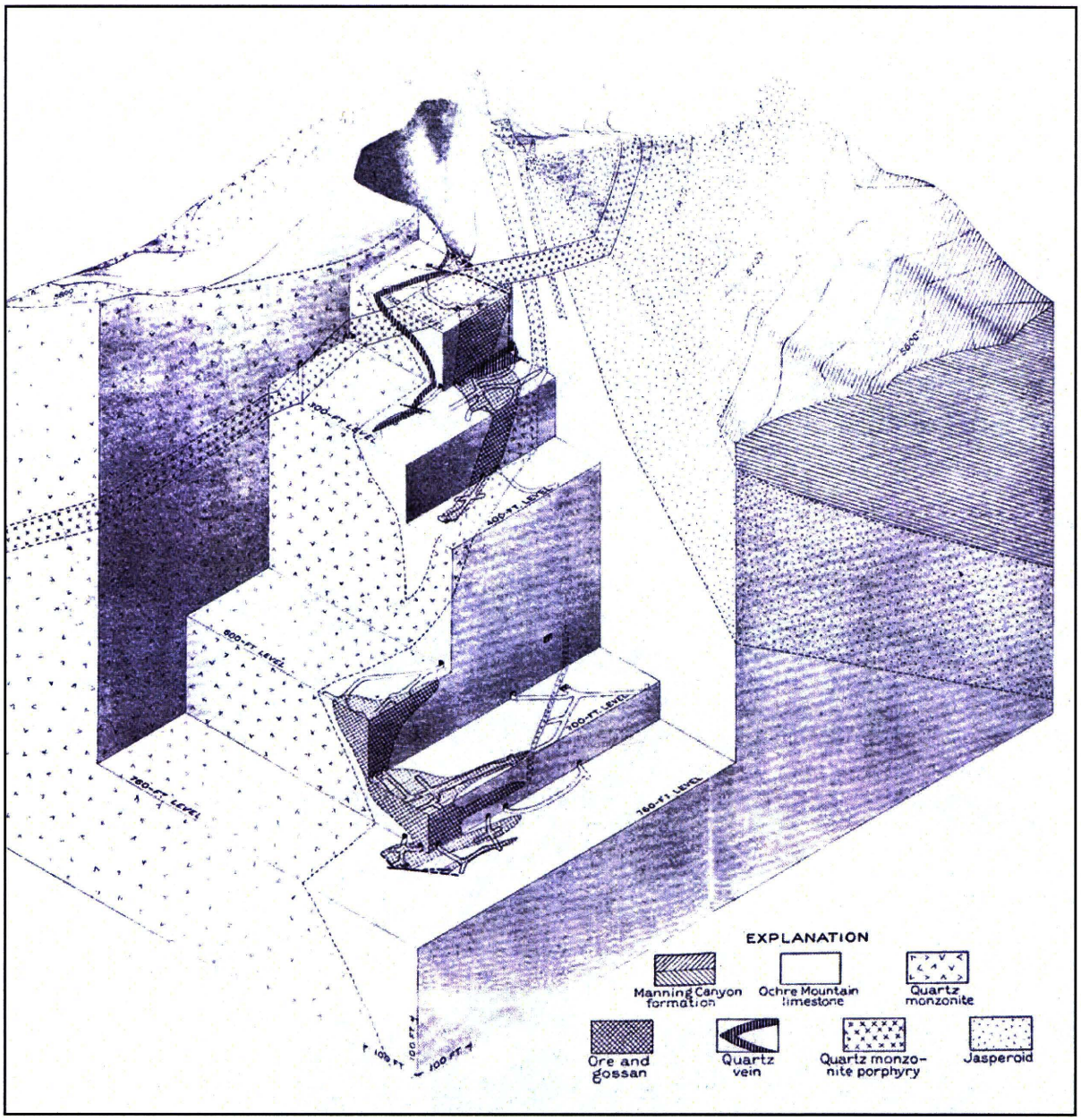

Figure 10. Block diagram of Gold Hill mine of the Western Utah Copper Company. From Nolan, 1935.

September 1943 to January 1945, when 98,784 tons of arsenic ore were mined for the Metals Reserve Company (Wilson 1958).

The mine workings include a crosscut tunnel connecting with about 800 feet of drifts and crosscuts. One working level about 20 feet above the entrance adit has been identified as the working level. A second working level, mostly inaccessible due to stoping, extends from the main working level down to 234 feet (Nolan 1935). No filing information was collected for this mine.

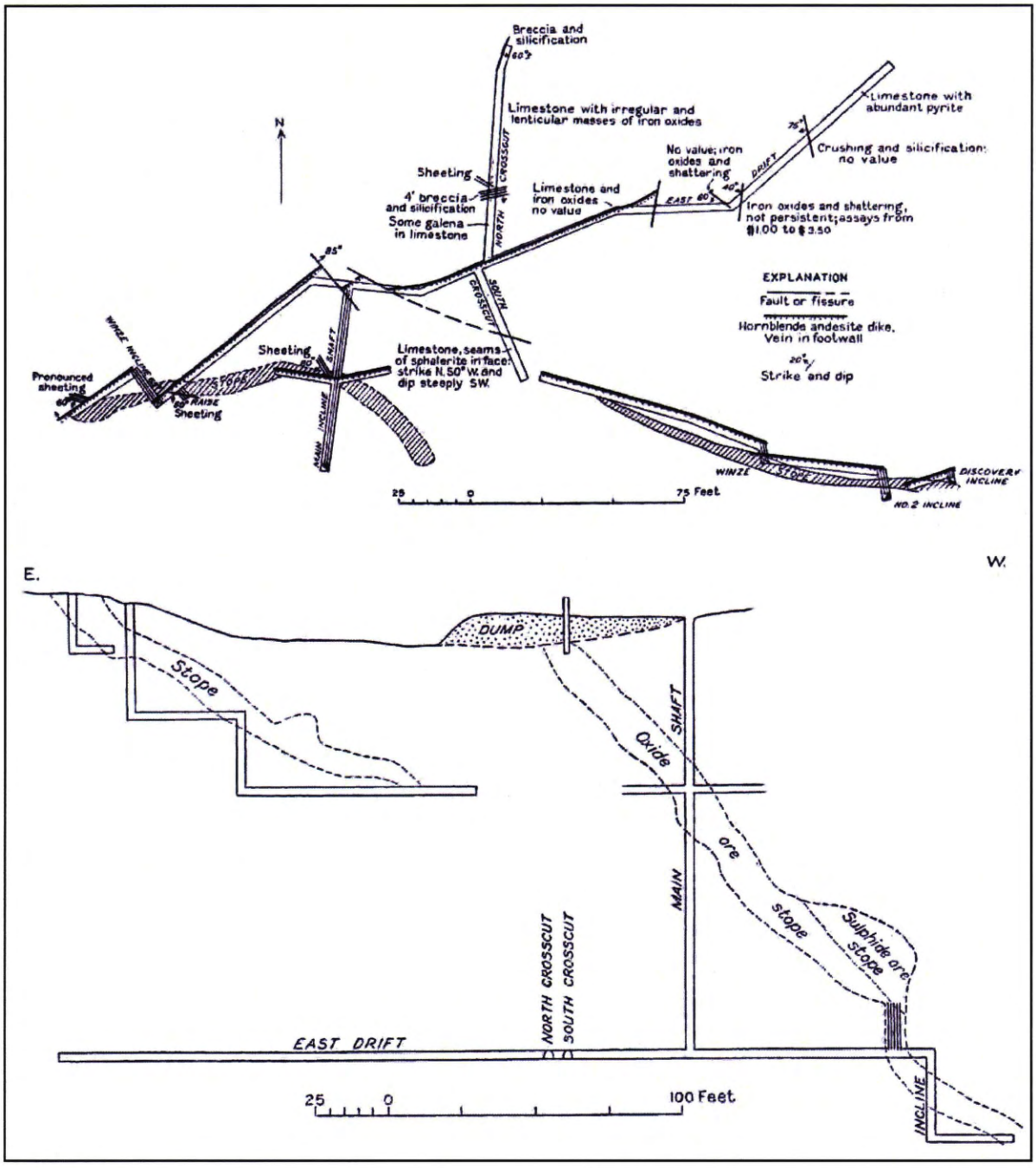

Figure 11. Plans of the Rube mine workings, prepared by Lieffler Palmer. From Nolan, 1935.

Claims

Blackbird #2

A Notice of Location for this claim was filed on June 14, 1900 by J.P. Gardner and Paul Rodenhouse. US Patent MS#5994 was issued to J.P. Gardner on July 27, 1910 (see Appendix C). No other documentation was identified for this claim.

Bonanza King

No Notice of Location is on file for this claim, however the group of Lewis and Elizabeth Martin, James F. Woodman, and Newton A. Dunyon granted a Quit Claim Deed to William W. Chisholm on November 15, 1891. The claim was then deeded back to the Cane Springs Consolidated Mining Company, owned by James F. Woodman, on July 28, 1893. The claim was purchased from Mr. Woodman by Captain Duncan McVichie on May 13, 1905, and became one of the Western Utah Copper Company properties. County records show a series of County Tax Sales and Redemption Certificates were filed between the Sheriff of Tooele County and the Western Utah Copper Company in alternating years between 1913 and 1930. A U.S. Patent (Lot #60) was granted to Cane Springs Consolidated Mining Company on February 28, 1930. In that year, Columbia Trust took possession of the claim via a Sheriff's Deed and sold it to the American Smelting and Refining, Co. (see Appendix C).

Boston

The Boston claim is found south of the Lincoln Highway about 6,000 feet east-southeast of the summit of Gold Hill. According to Nolan (1935:143), the claim is owned by the Boston-Utah Mining Company. No shipments of ore are known to have been made from the property.

Notices of Location for Boston claims 2 and 4 were filed by Paul Rodenhouse (January 1, 1904 and December 21, 1906, respectively). US Patent (MS#5697) was granted to the Boston-Utah Mining Company on September 26, 1911. In 1930, documents for a County Tax Sale and Tax redemption certificate were filed. The claim appears to have been idle until 1962, when the claim became the property of Byron F. Barkley through a Quit Claim Deed. Boston-Utah Mining Company brought suit against Mr. Barkley, but on February 28, 1973, the 3rd District Court rendered a Judgment for the benefit of Byron F. Barkley. A Quit Claim Deed from the Continental Bank and Trust filed on December 31, 1976, granted the claim to Lydia and Byron Barley as Trustees (see Appendix C).

Brooklyn

On January 1, 1899 a Notice of Location for the Brooklyn claim was filed by P.B. Waslett, Dan Gutting, and John Cobbley. In July 1900, the claim was deeded (Quit Claim) to the Christmas Mining Company who received a US Patent (MS#4483) for the claim on September 13, 1902. The Christmas Mining Company retained possession of the claim until June 1963, when the claim was taken by the county for taxes due. The claim was Quit Claim Deeded to Floyd Myers, H. H. Peterburg, and Supermines, Inc. on June 14, 1963. In 1979, the Brooklyn claim was consolidated with several other Clifton district properties, as well as three of the Snowstorm claims located in the Camp Floyd District. After the claim consolidation, the Brooklyn was controlled by the Intermountain Development company, Silver Treasure Inc., and Melville Inc. (see Appendix C).

Cane

No documentation was located for this unpatented claim.

Carrie

No Notice of Location was placed on file for the Carrie claim, however a deed for the benefit of Lewis Martin from S. P. Lassiter and dated January 4, 1887 is found in the records. From that point forward, the Carrie claim was tied to the Bonanza King claim, and legal information abstracted for the claims is identical (see Bonanza King and Appendix C).

Christmas/Xmas

The Christmas group consists of 12 patented claims located a little over 2 miles east-northeast of the Western Utah mine. No Notice of Location for these claims was located on file, but several Quit Claim

Deeds for the benefit of the Christmas Mining Company are dated April 1891. Proof of Labor affidavits were filed almost bi-annually until 1899. Two US Patents were granted to the Christmas Mining Company for these claims. The first, #MS4483 is dated September 13, 1902 and applies to the Christmas claim. The second patent, #MS5021 is dated January 31, 1905 and transfers ownership of the Xmas claim. A Notice of Location for the Christmas #3 claim is dated June 20, 1906 and Amended on December 23 of that same year, and its US Patent (MS#5692) was issued in September 1913 (see Appendix C).

A series of County Tax Sale and Tax Redemption certificates were filed in 1936, 1958, 1959, and 1963 when several claims were deeded by Tooele County to Floyd Myers, HH Peterberg, and Supermines, Inc. However, no mining activity appears to have taken place. The abstract for the mining claims only reveals a series of decrees relating to estate issues during the 1970s and three Quit Claim Deeds for the benefit of Silver Treasure, Inc. and Daniel F. Johnson, Trustee. Of interest is a note in the claim abstract that shows the Christmas group being consolidated with another large group of claims in 1973 (see Appendix).

In 1935, Nolan (151) reported that only one shipment of ore was ever recorded. The lot consisted of an 11-ton shipment of ore containing small percentages of gold, silver, copper, and lead.

Climax

Twelve patented claims, located on the north side of Rodenhouse Wash a short distance west of Gold Hill make up the Climax group (see Appendix). The majority of the workings can be found at 5,675 feet in elevation. W.S. Chastain filed a Notice of Location for the claim on January 1, 1899. In August of that year, he Quit-Claimed the Climax to J.P. Gardner, who still owned it in 1935 through the Climax Mining and Milling Company (Nolan 1935). Proof of Labor affidavits were filed for the years 1899 through 1902. A US Patent (MS#4994) was issued to the Climax Mining and Milling Company on December 24, 1904. Only two shipments of ore, containing 29 ounces of silver and 27 percent lead per ton, are known to have been shipped from the claim (Nolan 1935). The claim remained essentially idle until 1963, when H.J. VanderVeer deeded the property into the ownership of Julian E. Simpson. Mr. Simpson leased the property to the Consolidation and Development Corporation, liquidating the lease in October 1984. Simpson also granted a road easement to the USA in 1992, followed by a Quit Claim Deed for the benefit of JJS Mining, Ltd on May 19, 1993 (see Appendix C).

The mine workings consisted of a vertical mine shaft 150 feet deep from which 250 feet of drifts and crosscuts had been made. The shaft has partially caved in and filled with water.

Copper King

Notice of Location for this claim was filed on January 1, 1905 by John H. Snell, Julia Simons, Cyrus P. Snell, and Elizabeth R. Simons. Claimants filed a general Quit Claim document deeding the claim first to J. H. Snell on December 23, and then to the Copper Queen Mining and Milling Company on December 25, 1905 (see Appendix C). On July 28, 1906, a Notice of Consolidation for the Copper King, Copper King Extension, Copper Queen, Copper Queen Extension, Ruby, and Frenchman claims was filed. Mining was carried out at the claim in 1907 and 1913. In 1921 the claim was deeded to the Red Copper Queen Mining and Milling Company and then the Napoleon Mining Company, who controlled the claims until 1926. A U.S. Patent (MS#6271) was granted on October 7, 1925, to the Napoleon Mining Co. County records exhibit little to no other activity except Tax Sale and Redemption filings until 1941, when J. J. Bradshaw receives title to the claim group via a County Auditor's Deed. On September 19, 1944, J. H. Snell, acting on behalf of the Napoleon Mining Company, again gained control of the claims, then deeded them over to the Blue Ribbon Mining Company in 1944. Again, little actual mining activity appears to have taken place until a Lease Agreement was negotiated with the Atlas Corporation in March of 1964. The properties were controlled by Terracar and Investestate, Inc. from August 1970 until October 30, 1980

when John Nak and the Nak Fabric Company acquired the claim group. The claims were also explored by BeO, Limited, the American Consolidated Mining Company, and Au Associates during 1982 and 1983.

Copper King Extension

Notice of Location for this claim was filed on January 1, 1905 by John H. Snell, Cyrus P. Snell, Edward Simons, and Elizabeth R. Simons. Claimants filed a general Quit Claim document deeding the claim first to J. H. Snell on December 23, and then to the Copper Queen Mining and Milling Company on December 25, 1905. On July 28, 1906, a Notice of Consolidation for the Copper King, Copper King Extension, Copper Queen, Copper Queen Extension, Ruby, and Frenchman claims was filed. Following the consolidation, these claims were all treated as a group and its abstracted information is identical to that of the Copper King claim (see above and Appendix C). The only exception to this is the granting of a U.S. Patent (MS#6670) to the Napoleon Mining Company on October 7, 1925.

Copper Queen

Notice of Location for this claim was filed on January 1, 1905 by John H. Snell, Julia Simons, R. D. Simons and Elizabeth R. Simons. Claimants filed a general Quit Claim document deeding the claim first to J. H. Snell on December 23, and then to the Copper Queen Mining and Milling Company on December 25, 1905. On July 28, 1906, a Notice of Consolidation for the Copper King, Copper King Extension, Copper Queen, Copper Queen Extension, Ruby, and Frenchman claims was filed. Following the consolidation, these claims were all treated as a group and its abstracted information is identical to that of the Copper King claim (see above and Appendix C).

Copper Queen Extension

Notice of Location for this claim was filed on January 1, 1905 by John H. Snell, Cyrus P. Snell, Edward W. Simons, and E. W. Simons. Claimants filed a general Quit Claim document deeding the claim first to J. H. Snell on December 23, and then to the Copper Queen Mining and Milling Company on December 25, 1905. On July 28, 1906, a Notice of Consolidation for the Copper King, Copper King Extension, Copper Queen, Copper Queen Extension, Ruby, and Frenchman claims was filed. Following the consolidation, these claims were all treated as a group and its abstracted information is identical to that of the Copper King claim (see above and Appendix C). The only exception to this is the granting of a U.S. Patent (MS#6670) to the Napoleon Mining Company on October 7, 1925.

DMC 2

No documentation was located for this unpatented claim.

Dottie

Lewis Martin and Newton A. Dunyon filed a Notice of Location on March 14, 1888 for the Dottie claim. Within less than a year, all interest in the claim was deeded to James F. Woodman, and the property became part of the Cane Springs Consolidated Mining Group. Activity for the claim was essentially the same as that noted above for the Bonanza King claim (see above and Appendix C). The only material difference in the legal abstracts between the two claims is the Patent (Certificate #1394) for the Dottie claim granted by the United States to the Western Utah Copper Company.

Emma #2

The Emma #2 claim is also associated with James F. Woodman and the Cane Springs group of mining properties. Newton A. Dunyon filed the Notice of Location for the claim on May 28, 1890, and its US Patent (Lot #59) was granted on September 7, 1940 to the Cane Springs Consolidated Mining Company (see Appendix C). As of May, 1995, all leasing activities on the property ceased, and control was returned to the Woodman Mining Company. Abstracted legal information regarding the claim is detailed in the Appendix.

Gem #1-3

The Gem claims were filed with a Notice of Location by W. P. Richards, et al. on May 30, 1905. In September 1905, the claims passed to the control of John H. McChrystal, et al. and the West Pacific Mining and Development Company through a series of Quit Claim Deeds. Limited mining activity was carried out during the years of 1906 and 1912 (see Appendix). A Sheriff's Tax Sale returned the property to Tooele County in 1922. A U.S. Patent (MS #5417) was granted to the West Pacific Mining and Development Company on July 16, 1956.

During the years 1925 to 1981, the claims were controlled by several individuals and corporate entities. In 1955, the Gem #1-3 claims were consolidated with several other properties, including the Brooklyn claim (see Appendix C).

Gilbertson

The Gilbertson is another of the claims associated with the Cane Springs Consolidated Mining Company. As with many of the other claims, no Notice of Location could be found on file, but the property was deeded to William W. Chisholm in January 1891 and then to James F. Woodman in September 1982. The Patent (Lot #37) for the Gilbertson was issued to the Deep Creek Consolidated Mining Company on November 2, 1916. Most of the other abstracted details for the Gilbertson mine are identical to those of the Bonanza King (see above and Appendix C).

Glenda

No documentation was located for this unpatented claim.

Golden Gem

A Quit Claim Deed dated July 22, 1893 from James F. Woodman to Newton A. Dunyon is the first filing information on record for the Golden Gem claim, another of the Cane Springs Consolidated Mining Company properties. Captain Duncan McVichie and the Western Utah Copper Company assumed ownership of the claim via a Quit Claim Deed issued by John H. Woodman on May 13, 1903. No Affadavits of Labor were ever filed, and no documentation regarding the claim exists after 1916, so it is doubtful that any significant work was ever conducted on the site. A US Patent (MS #4381) for the claim was issued to James F. Woodman on November 29, 1916 (see Appendix C).

Goldstone

A US Patent (MS #6062) was issued to Luciano Manfrini on May 29, 1924 for the Goldstone claim (see Appendix C). No other documentation, except for a Lease Agreement filed March 10, 1943 between US Smelting, Refining, and Mining Company and the Metals Reserve Company, could be located.

Grand Cross

The Notice of Location for the Grand Cross claim was filed by Lewis Martin and Newton A Dunyon on March 14, 1889. Part of the Cane Springs Consolidated Mining group of properties, the abstracted legal history of the Grand Cross claim looks very similar to the Bonanza King – with a few exceptions. The US Patent (Lot #62) for the property was granted on November 2, 1916, to William W. Chisholm. One item of interest is a note deeding a strip of Grand Cross land which enters the Dottie claim to the Deep Creek Rail Road Company in December 1917 (see Appendix C).

Grandee

Paul Rodenhouse and James P. Nelson filed the Notice of Location for the Grandee claim. On September 18, 1899. On July 7, 1907, a ½ interest in the property was deeded by J. P. Nelson to J. P. Gardner. Mining Patent MS #5994 was issued to Paul Rodenhouse on July 27, 1910 (see Appendix C). No other documentation for this claim could be located.

Helmet

Property of the Western Utah Extension Copper Company covers the area from the open cut of the Gold Hill mine to the southeast (Wilson 1958), however, the only claim on which any significant activity occurred is the Helmet (Figure 12). William C. Hudson filed the original Notice of Location on January 1, 1905, and a Proof of Labor Affadavit was file for the claim in February 1907. The claim passed into the hands of the Western Utah Extension Copper Company in 1917 when they filed a Notice of Intention to Hold Claim. A series of County Tax Sales and Redemption Certificates were filed most of the years during the 1920s. In 1939 the Helmet was purchased by H.J. VanderVeer and then deeded to Julian E. Simpson. As with the Climax claim, Mr. Simpson deeded the property to JJS Mining, Ltd. in 1993. A US Patent (MS#5622) was granted for the claim, but was not listed in the abstract or on file in the County Records Office (see Appendix C).

Nearly 200 tons of ore were shipped from the Helmet claim by the Western Utah Extension Copper Company during 1917-1918. The ore had average contents of 0.026 ounces of gold and 5.4 ounces of silver to the ton, and was 4.08 percent copper. No record exists of any mining activity on the claim after 1920 (Wilson 1958). The mine workings consist of a main tunnel and several stoped, higher levels. In total, nearly 1,000 feet of drifting was done on the tunnel level, from which two additional interior shafts were sunk (Nolan 1958).

Homestead

Notice of Location for this claim was filed on October 19, 1915 by H. E. White, who deeded the property to Charles L. Morduff on December 2, 1916. According to the claim abstract, the property was leased to the Gold Hill Lumber Company in 1916, suggesting that mining was not the primary use of the property. A U.S. Patent (MS #6453) was granted to Mr. Morduff on July 1, 1920. No Affadavits of Labor were ever filed for the Homestead claim. In 1973, the property was deeded to Lester A. Bollinder, who had Notices of Location for the Lucky Strike 1-4 claims in April of 1972. The abstracted record combines these two claims from 1973 forward, and shows that at the Lucky Strike claims, at least, regular mining activity was carried out as Proof of Labor affidavits were filed annually from 1972 to 1985 (see Appendix C). In 1992, Earl J. and James E. Fox acquired the property by way of a Warranty Deed.

Ida Lull

Approximately ¾ mile southeast of the Gold Hill mine is where the Ida Lull claim is located. Workings of the mine consist of one adit tunnel approximately 150 feet long, with two small side cuts (Figure 13). The original Notice of Location is not listed, but a contract between P.W. Dunyon, et al. and Brigham H. Young, Jr., dated September 13, 1894, is on file. Affadavits of Labor were filed in 1894 by B. H. Young, Jr. and in 1899 by I.N. Dunyon, et al. AUS Patent (MS#4075) was awarded on January 6, 1941 (see Appendix C). The Ida Lull claim was deeded to J. E. Bamberger in September 1900, then from him to the Copperopolis Mining Company (owned by the Bamberger family) in 1915, which retained control of the property until 1941, when it was sold to the Crown Corporation (Wilson 1958). "Total production from the mine is probably less than 1,000 tons of silver-copper ore" (Wilson 1958:8).

Incomparable

A Notice of Location was filed for the Incomparable claim on April 20, 1905, by W. P. Richards. The property was conveyed to John H. McChrystal on September 7, 1905, thus becoming part of the consolidated claims controlled by the West Pacific Mining and Development Company. Mining Patent MS #5418, covering the Incomparable, Giant, and Western Pacific claims was issued on July 16, 1956 to the West Pacific Mining and Development Company (see Brooklyn, above, and Appendix C).

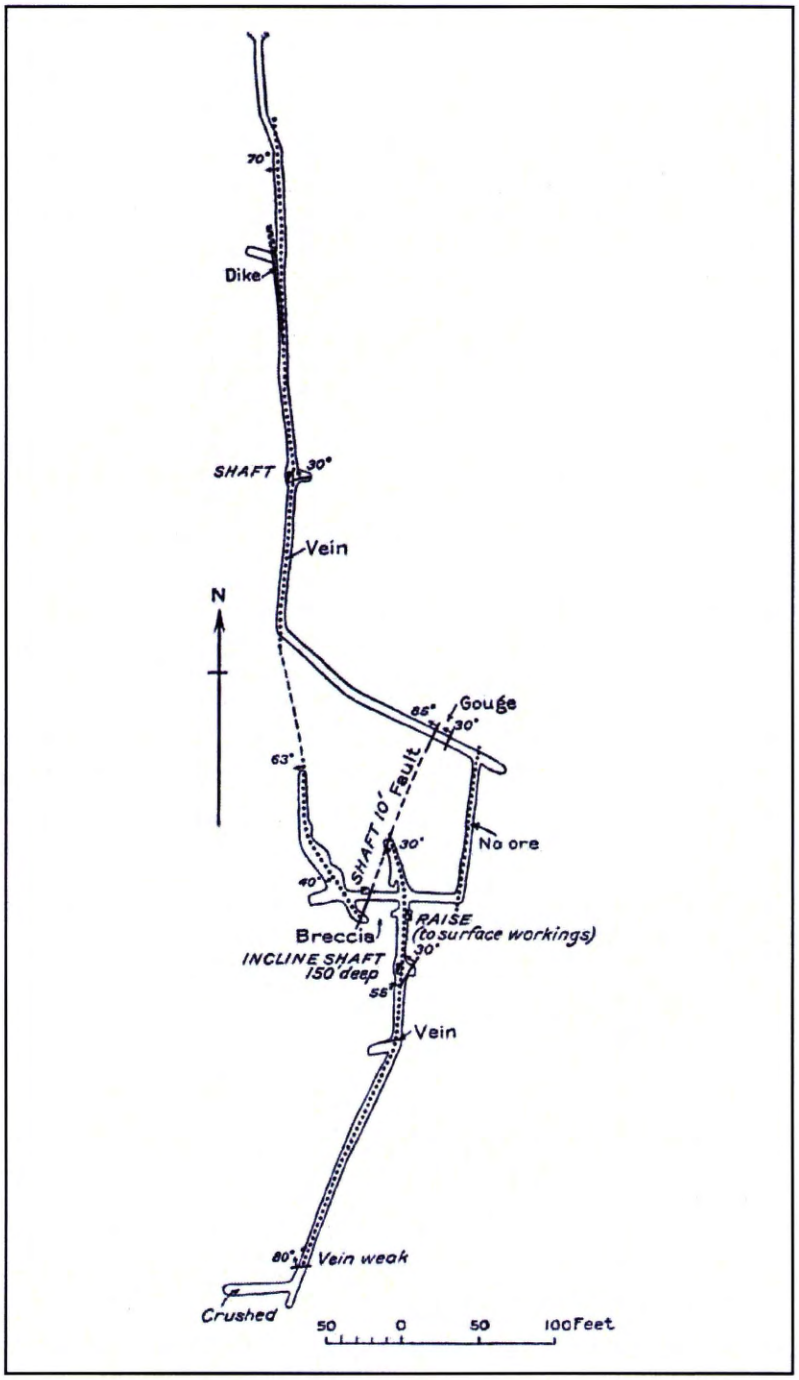

Figure 12. Plan of the tunnel level, Helmet claim. From Nolan 1935,

Lilly

No Notice of Location is on file for the Lilly claim, which is one of four properties initially claimed by P. W. Dunyon, et al. and eventually deeded to J. E. Bamberger and the Copperopolis Mining Company (see Ida Lull and Appendix C). Patent MS #4097 was granted for this property, but its location and details were not on file in the County Records Office.

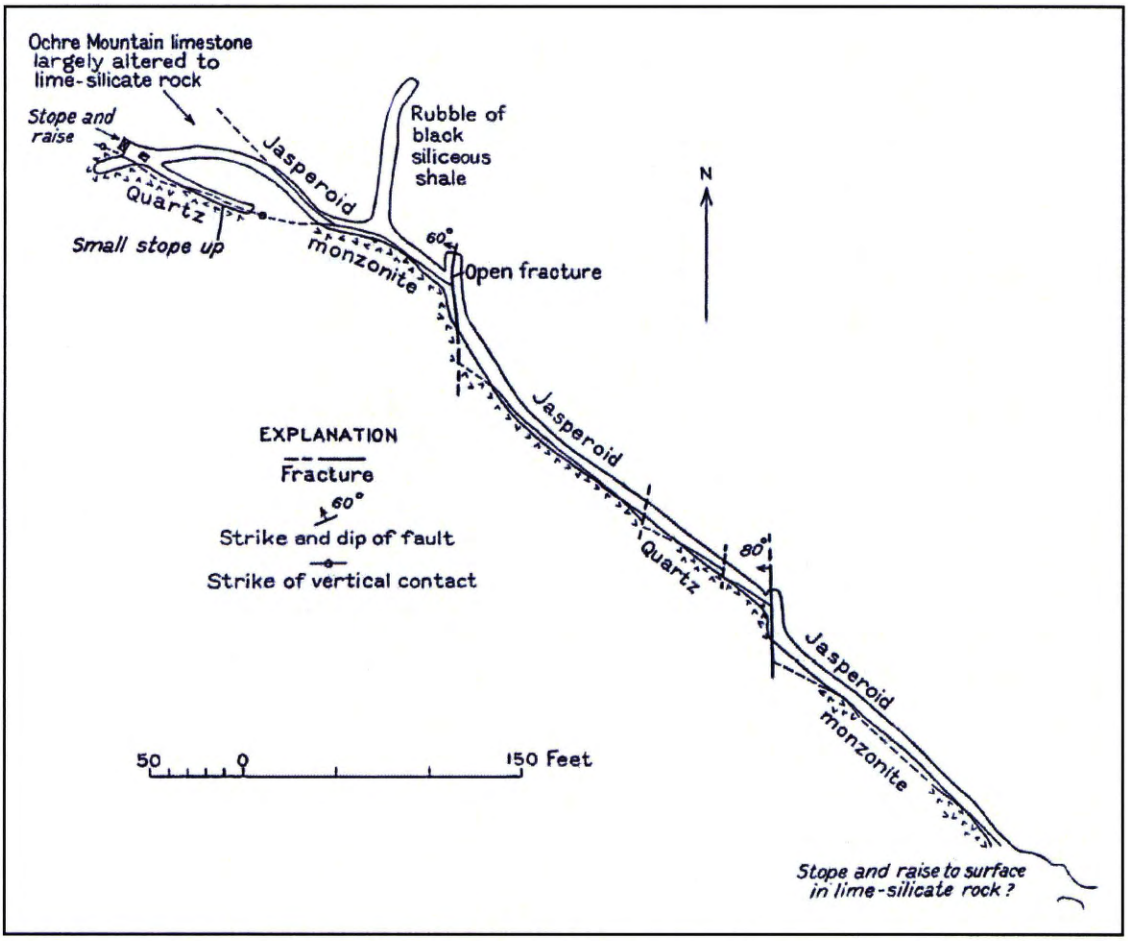

Figure 13. Plan of the adit tunnel, Ida Lull claim. From Nolan, 1935.

Lost Cabin

Another of the Cane Springs mining group claims for which a Notice of Location was not filed, but passed into the hands of James F. Woodman and the Cane Springs Consolidated Mining Company during 1895 and 1896, respectively. The mining patent for this property (Lot #61) was granted on December 6, 1933 to the Cane Springs Consolidated Mining Company. Abstracted details for the claim are very similar to the Bonanza King (see above and Appendix C).

Lucky Boy 1-3

Frank S. Gardner and Paul Rodenhouse filed a Notice of Location for these claims on April 5, 1901. Affadavits of Labor for the claims were filed for the years 1902, 1905, and 1908, but no additional mining activity appears to have taken place for many years. Gardner and Rodenhouse were jointly granted a US Patent (MS #5646) on January 27, 1910. Several Tax Sale notices and Redemption Certificates are on file between the years 1926 and 1953, and the claims changed hands several times. In 1963, Willard J. McNabb transferred the Lucky Boy 1-3, the Electric 1 and 3, and the Electric Amended #2 claims to H. J. VanderVeer by Warranty Deed, and in 1993, the claim became the property of JJS Mining, Ltd. (see Appendix C)

Lucky Jim

Patrick McAfee filed the Notice of Location for the Lucky Jim claim on March 27, 1888. The Lucky Jim, like many of the claims previously mentioned, was one of the claims controlled by the Cane Springs Consolidated Mining Company. The mining patent for this property (Lot #59) was granted on September 7, 1940 to the Cane Springs Consolidated Mining Company. Abstracted details for the claim are, again, very similar to the Bonanza King (see above and Appendix C).

Mogul

The first Notice of Location for the Mogul claim was filed by S.A. Hudson on January 1, 1915, and then amended on December 29, 1916. Hudson deeded the property to C. L. Glass, a trustee for the Western Utah Extension Copper Company in December 1917. The abstracted record for the claim is, therefore, very similar to that of the Helmet claim described above. US Patent MS #6522 was granted for the claim, but was not on file in the Tooele County Records Office. The lack of Affadavits of Labor filings suggests that only limited exploration activity took place at the Mogul claim. The abstracted record shows, instead, a series of Tax Sales, Redemption Receipts, and Auditor's Deeds over the period 1920 to 1941. Similar to the Helmet, the property was sold to H.J. VanderVeer in 1963, eventually ending up as part of the JJS Mining, Ltd. properties (see Appendix C).

National

Abstracted information for the National claim is identical to that of the Mogul (above), excepting that the official Notice of Location for the property was filed by William C. Hudson on January 1, 1905. See the Mogul discussion (above) and Appendix C for details.

New Year

The New Year claim had no Notice of Location on file in the County Records Office. Proofs of Labor were filed by Kale Maddelana in 1898 and 1899 until he deeded ¼ interest in the claim to John S. Garrison. The Garrisons continued working the claim, filing Affadavits of Labor in 1899 to 1905. During this period, the claim was deeded to the Monster Mining Company, the holding company which managed, among other properties, the Garrison Monster mine north of Gold Hill. Patent rights to the claim (Lot #60) were granted to the Monster Mining Company on August 2, 1906.

In 1924, a lease agreement was filed by Garrison Monster allowing Bert Hickman to conduct mining activities on the property. Hickman assigned the agreement to the Utah Silver Lead Mining Company in 1927. In 1936, the claim was put up by Tooele County for taxes due, and the claim passed to the Salt Lake Investment Company and through several other corporations until 1980, when the claim was received by John Nak and the Nak Fabric Company (see Francis, above, and Appendix C).

Pearl

No documentation was located for this unpatented claim.

Quartzite

No Notice of Location is on file for the Quartzite claim. The Mining Patent issued for the claim (MS #4994) was granted to the Climax Mining and Milling Company on December 24, 1904. The Quartzite claim was consolidated with several other properties, including the Climax, as one group – having very similar histories – particularly after the purchase of the claim in 1963 by H.J. VanderVeer. A road easement was granted to the United States Government in 1992, while the rest of the claim was deeded to JJS Mining, Ltd. on May 19, 1993 (see Climax, above, and Appendix C).

Red Devil

Very little information is available regarding this claim. A Notice of Location was filed on January 1, 1916 by George F. Tilson. Tilson deeded a 2/3 interest in the property to Cliff Simons in February 1916, completing the transfer of the rest of the property in November 1920. The abstracted record does not indicate that any mining activity was ever recorded at the Red Devil claim (see Appendix C).

Rose Tousley

No Notice of Location is on file for the Rose Tousley claim, which is one of four properties initially claimed by P. W. Dunyon, et al. and eventually deeded to J. E. Bamberger and the Copperopolis Mining Company (see Ida Lull and Appendix). Patent MS #4097 was granted for this property, but its location and details were not on file in the County Records Office (see Appendix C).

Savannah

Abstracted information for the Savannah claim is identical to that of the National claim (above). See the discussions regarding the National and Mogul properties (above) and Appendix C for details.

Silver Tip

Abstracted information for the Silver Tip claim is similar to that located for the Helmet, National and Savannah claims. Specifically, no Notice of Location could be found on file in the County Records Office, but outside of that element, see the discussions regarding the National and Mogul properties (above) and Appendix C for details.

State of Utah

No documentation was located for this unpatented claim.

Success

The Success claim is found about 2 miles southeast of the Gold Hill mine and 6,000 feet due west of bench mark 506 on the Lincoln Highway (Nolan 1935). No Notice of Location was on file for the Success claim, but a Quit Claim document deeded the property from J. Wilson to Henry T. Goldsmith on January 2, 1885. The claim was worked during the period 1891-1902 (see Appendix C) by Goldsmith, J. S. Garrison, and Paul Rodenhouse. On January 1, 1904, J.P. Gardner and H. T. Goldsmith filed a Notice of Location for the Success #2 claim. J. P. Gardner was granted a US Patent for the Success claim (MS#4811, dated December 1, 1906) with the Patent for the Success #2 (MS#5642, dated May 16, 1908) being issued jointly to J. P. Gardner and H. T. Goldsmith. During the period 1916-1920, a series of Quit Claim Deeds, Warranty Deeds, and Court Probate proceedings transferred the Success claim into the holdings of the Peters Brothers Rubber Company. The property was worked under lessees D.C. Scott in 1926 and Sevy & Wilkins in 1927 (Nolan 1935). The Peters Brothers Rubber Company held the property until 1946, when it was deeded to Raymond C. Wilson through a County Auditor's deed and later sold to the Success Investment Company in April 1960.

Very little is known about the plan of the mine workings, since by 1927 they were mostly inaccessible. During the height of activity at the claim, several shipments of lead-silver ore were made. Ninety-four tons of ore shipped during 1920 contained traces of gold, 32.3 ounces of silver, 1.55 percent copper and 8.96 percent lead per ton. "Smaller shipments of ore were also made in 1926 and 1927, but their grade is not known" (Nolan 1935:145).

Sunshine

G.D. Shell, John Knapp, and A.L. Williams filed the official Notice of Location for the Sunshine claim on November 2, 1890. Over the next two year period, the original locators granted small interest

Quit Claim Deeds to individuals such as Joseph T. Kingsbury, William M. Stewart, D.G. Blackhurst and Henry M. Dinwoody, to name a few. In 1892, all interests in the claim had been deeded to Henry M. Dinwoody, who then transferred the property to the Calendar Mining Company in December of that year. After 1902, no Affadavits of Labor were filed which would indicate that the claim was being worked; it appears that the property was completely idle from 1902 until 1967. A Mining Patent (MS #4994) granting property rights to the Climax Mining and Milling, was granted on December 24, 1904.

Interest in the Sunshine claim was renewed in 1967, with several companies obtaining partial interest in the property for the purpose of mining silver or gold ores once again. The latest document on record is dated October 18, 1995, granting additional mortgage monies from the American Consolidated Mining Company to the Clifton Mining Company (see Appendix C).

Texas

JH Snell and Edward Simons filed a Notice of Location for this claim on January 1, 1909, then quickly deeded it over to the Red Copper Queen Mining and Milling Company. A series of Quit Claim Deeds transferred the property between the Red Copper Company, RD Simons, and JH Snell until 1915, when Mr. Snell deeded the claim to the Napoleon Mining Company. The Texas claim was consolidated with the Copper King Extension and Copper Queen Extension claims discussed above. The Patent associated with this claim is MS #6670, granted on October 7, 1925, to the Napoleon Mining Company. Details are found in Appendix C.

Trapezoid

WP Richards, et al. filed the Notice of Location for the Trapezoid claim on May 19, 1905 for the benefit of John H. McChrystal and the West Pacific Mining and Development Company. Several Tax Sale notices and Auditor's Deeds on file during the period 1917 to 1963 indicate that the claim was not highly productive. A U.S. Patent (MS #5416) was issued to the West Pacific Mining and Development Company on July 16, 1956. In 1963, the Trapezoid was deeded to HJ VanderVeer, bringing the Trapezoid property into the JJS Mining, Ltd. group of properties (see Climax discussion, above, and Appendix C).

Survey Results

Site Designations

The specific mine openings examined during the project were selected in advance by the Division of Oil, Gas and Mining as potential sites of mine closure and/or reclamation activity. Each was examined per the methodology described previously, and recorded accordingly. Some of the openings had already been recorded, and we re-examined those and in some cases adjusted site boundaries. We also recorded some non-mine sites that were related to the mining activity, primarily old roads leading to the openings.

A total of 67 archaeological sites are impacted by the project area (Table 2, Figures 14-18). These include 196 open mines identified by DOGM for examination that have been separated into 53 sites and 33 isolated finds. It also includes 14 non-mine sites, all of which relate in some way to the mines, either as old roads that may be used for access to the mines for closure, as trash dumps or other related features. Five of these sites were previously recorded, while the remaining 62 are newly recorded sites. The sites are summarized in Appendix A and B with a summary correlation of site numbers to DOGM tag numbers, NRHP recommendations, and proposed mitigation procedures for NRHP-eligible sites. Site sketch maps are presented in Appendix D. In addition two well known linear sites pass through the project area, but will not be impacted by the project except for their use as travel routes, for which they already function at