

AMERICAN FLAT MILL, CYANIDE PLANT
(Comstock Merger Mine Mills, Cyanide Plant)
Gold Hill vicinity
Storey County
Nevada

HAER NV-48-D
HAER NV-48-D

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
PACIFIC WEST REGIONAL OFFICE
National Park Service
U.S. Department of the Interior
333 Bush Street
San Francisco, CA 94104

HISTORIC AMERICAN ENGINEERING RECORD
AMERICAN FLAT MILL, CYANIDE PLANT
(Comstock Merger Mine Mills)

HAER No. NV-48-D

Location:

One mile northwest of Silver City, Storey County, Nevada. The American Flat Mill Cyanide Plant is located at latitude: 39.27007, longitude: -119.66230. The coordinate represents the center point of the American Flat Mill Cyanide Plant. This coordinate was obtained on December 6, 2014, by plotting its location with Geoplaner V2.7 (www.geoplaner.com). The accuracy of the coordinate is +/- 1 meter. The coordinate's datum is WGS 84 (World Geodetic System 1984). There is no restriction on releasing the location to the public.

**Present Owner/
Occupant:**

United States Department of Interior, Bureau of Land Management (BLM).

Present Use:

Vacant.

Significance:

The American Flat Mill Cyanide Plant is a contributing resource of the American Flat Mill District, an eight building silver ore processing mill complex. The American Flat Mill is significant under National Register Criterion A for its historical importance as the last remaining remnant of what was once the United Comstock and the Comstock Merger mining operations. The mill and its associated mining activities represented the last large scale underground mining efforts on the Comstock. Other early twentieth century mining activities on the Comstock were either much smaller in scale, or reflected the use of alternate technologies such as open pit mining or dredging. The American Flat Mill is also a contributing element to the Virginia City National Register District under Criterion A.

The American Flat Mill is eligible for listing on the National Register under

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Criterion B at the local level due to the early and active participation of Royce Hardy and Alex Wise. These two local men were mining engineers who were involved in the formation of the United Comstock Mines Company and worked with the company until its demise in 1923. Wise began developing the "middle mines" which became a key part of the Comstock Merger operation. The American Flat Mill is the largest remaining physical reflection of their actions on the Comstock.

The American Flat Mill is eligible for the National Register under Criterion C at the national level as an early representative of the International Style of architecture, which stressed the metaphor of form following function, rejection of ornament, and use of modern building materials, including reinforced concrete, structural steel, and large window panels. All of these characteristics are strongly expressed throughout the American Flat Mill.

Historian:

Written historical and descriptive data and large-format photographs were prepared by David C. Berg, historian for The Ottery Group in August through December of 2014.

Project Information:

HAER documentation of American Flat Mill is part of the measures to mitigate the adverse effect that will result from demolition of all buildings at the site. The BLM has proposed the demolition of the mill for public safety reasons.

PART I. HISTORICAL INFORMATION

A. Physical History

1. **Date of Erection:** 1921-22.
2. **Engineer:** Walter L. Reid, consulting milling engineer; A. J. Weinig, metallurgist; Lee L. Fillius, superintendent of construction; B. P. Little, chief draftsman in charge of engineering office; and Robert McFarland Doble, in charge of power and electrical engineering.
3. **Original and Subsequent Owners, Occupants, Uses:** United Comstock Mines Company, 1922-24; Comstock Merger Mines, Inc. (subsidiary of Gold Fields America Development Company/New Consolidated Gold Fields, Ltd., of London), 1924-26.
4. **General Contractor:** United Comstock Mines Company.
5. **Original Plans and Construction:** Although original plans of the mill are no longer extant, a basic flow chart of the ore leaching and thickening within the Cyanide Plant is shown in the *Engineering and Mining Journal*, along with photographs of the redwood tanks, filters and overhead crane.¹
6. **Alterations and Additions:** None known.

PART II. STRUCTURAL/DESIGN/EQUIPMENT INFORMATION

A. General Description

1. **Character:** The cyanide and thickening division of the mill was contained in a massive, nearly rectangular building covering two and a quarter acres, most of which had concrete floors, retaining walls, tunnels, equipment mountings, and cast sleepers for supporting an array of

¹ George Young. "New Treatment Plant of United Comstock Mines Co.," *Engineering and Mining Journal* 114 (1922): 848.

40 redwood tanks leeching and thickening tanks. It originally had corrugated metal siding and roof. Presently, only the reinforced concrete floors and walls remain, the corrugated metal on both exterior walls and roof having been stripped in 1926. The unadorned, functional nature of the building with long rows of horizontally oriented windows and siding classify the building as a very early example of the International Style.

- 2. Condition of Fabric:** The Cyanide Plant is presently in ruins. Time and vandalism have played their part. However, as part of salvage efforts soon after the mill's close in 1926, all machinery, metal and tanks were removed from site.

B. Description of Exterior

- 1. Overall Dimensions:** Approximately 325' long and 297' wide. At its highest point, the interior stood 75' tall.
- 2. Foundations:** Reinforced concrete.
- 3. Walls:** Presently, walls consist of reinforced concrete. Prior to salvage efforts in 1926, upper level walls were clad with two layers of galvanized steel sheets, corrugated on the exterior and plain steel sheet on the interior, separated by a layer of tar paper insulation, all attached to a steel framework.
- 4. Structural System, Framing:** Reinforced concrete frame on lower level, steel frame on upper level walls.
- 5. Openings:** Original openings consisted of continuous bands of Fenestra steel sash windows supported by reinforced concrete frame.
- 6. Roof:** The roof is no longer extant. It was originally sheathed with 1-3/4" tongue-and-groove Oregon pine attached to steel purlins and covered with 20-gauge galvanized corrugated steel.

C. Description of Interior

1. Floor Plan: Thickening tanks were on raised concrete columns and cast lintels on successively lower terraces and appear as Greek or Roman ruins today. Other tanks were set on floor level sills. At the northwest corner of the rectangle running down the southwest side of the building are the remains of a rectangular array of 16 concrete tanks, each 27' long, 9' wide and 11' deep which served as the filter unit. Each tank is divided into three hoppers. The aisles beneath the tanks resemble corbelled vaults. These tanks were just inside the southwest wall of the building.

The lowest level of the building is now under water and has several concrete posts protruding from it. This was the location of the pumps used to move material back up through the facility as needed and other pumps needed to produce vacuum for the filters.

2. Flooring: Reinforced concrete.

3. Wall and Ceiling Finish: None.

4. Openings: Since the steel walls and windows have been removed, the remaining concrete building walls have no openings other than the openings on the floor for pumps and tunnel openings for the conveying of ore concentrate.

5. Machinery: All machinery has been removed. Original equipment included two 60' x 16' redwood thickeners, nine Dorr 30' x 24' agitators, and six 60' x 16' redwood leaching tanks. Concentrates were treated in three 30' x 6' Dorr thickeners served by a series of six agitators and a sump tank. The filter hoppers had 12 filter baskets, each with 62 6' x 8' leaves for a total filter area of 74,400 square feet. Two 40-ton traveling cranes were used to shift the filter baskets from tank to tank. The lower level contained sump and vacuum pumps.²

² Walter L. Reid "Design and Construction of United Comstock Mills," *Mining and Metallurgy* 191 (1922): 44-47.

D. Site Layout

The Cyanide Plant is set into a hill and the processing tanks generally got lower in elevation as the concentrates worked their way through the process. The northeast side of the building was separated from the Fine Grinding and Concentration Plant by a narrow yard that was accessed by the V&T railroad spur.

Part III. OPERATIONS AND PROCESS

Solutions were transferred from the Fine Grinding and Concentration Plant through tunnels between that building and the Cyanide Plant. Primary and secondary slimes went to thickening tanks and then to the filter tanks. Sand was transferred to the leaching tanks and the resulting solution sent to the concentrate thickeners before moving to the filters. The resulting pregnant solutions were deoxidized with Crowe vacuum receivers and zinc dust was added. The solution was then pumped onward to the precipitation refinery building.³

PART IV. SOURCES OF INFORMATION

A. Architectural Drawings

Selected drawings depicting process flow charts, plans and sections of buildings at the mill may be found in: George Young, "New Treatment Plant of United Comstock Mines," *Engineering and Mining Journal* Vol. 114, No. 20, (1922): 846-853.

B. Early Views

Early views of the American Flat Mill are available from the Nevada Historical Society, Special Collections and University Archives Photographs at the University of Nevada, Reno. The views during operation range in date from approximately 1922 to 1926, with some later views dating from the 1940s and 1950s, representing a total

3 A. J. Weinig, "A General Study of United Comstock Metallurgy," *Papers Related to the Geology, Mining, Metallurgy and Milling of the Comstock Orebodies of the United Comstock Mines Company*, (San Francisco: American Institute of Mining and Metallurgical Engineers, 1922): n.p.

of 86 views. An additional private collection owned by Mr. Joseph Curtis of Virginia City represents approximately 50 views of the mill during its operating years. Some unique views of the building and its machinery may be found in George Young, "New Treatment Plant of United Comstock Mines," *Engineering and Mining Journal* 114 (1922): 846-853. One aerial view of the mill ruins from 1947 is available from the University of California, Davis, in the Eastman's Originals Collection, Department of Special Collections, General Library.

C. Interviews

Glass, M. *Royce Aller Hardy: Reminiscence and a Short Autobiography*. Oral History Program, University of Nevada, Reno, 1965.

D. Selected Sources

Bray, John L. *The Principles of Metallurgy*. Boston: Ginn and Company, The Athenaeum Press, 1929.

Gavazzi, I., and R. Kendall. *American Flat: Stepchild of the Comstock*, Virginia City, Nevada: Mark Twain Bookstore, 2001.

Goin, P., and E. Raymond. *Changing Mines in America*. Santa Fe, New Mexico: The Center for American Places, 2004.

Hamilton, E. M. *Manual of Cyanidation*. New York: McGraw-Hill Book Company Inc., 1920.

Hardesty, D. *National Register Evaluation of the East Yellow Jacket Mine and the American Flat Mill Sites, Storey County, Nevada*. Report prepared by University of Nevada, Reno. Submitted to Bureau of Land Management, Carson City Field Office, 1998.

Kendall, Robert E. "American Flat: Stepchild of the Comstock Lode - Part II," *Nevada Historical Society Quarterly* 41(2): 1998.

Lincoln, Francis Church. *Mining Districts and Mineral Resources of Nevada*. Reno: Nevada Newsletter Publishing Company, 1923.

Morse Brothers Machinery and Supply Company. "Mining and Milling Machinery of The Comstock Merger Mines and Mills at Virginia City, Nevada" Catalog by the Morse Brothers Machinery and

Supply Company, Denver, Virginia City, Reno, ca. 1927. Located in the Special Collections and University Archives, University of Nevada, Reno.

Reid, Walter L. "Design and Construction of United Comstock Mills," *Mining and Metallurgy* 191 (1922): 44-47.

Weinig, A. J. "A General Study of United Comstock Metallurgy," in *Papers Related to the Geology, Mining, Metallurgy and Milling of the Comstock Orebodies of the United Comstock Mines Company*, San Francisco: American Institute of Mining and Metallurgical Engineers, 1922.

Young, George. "New Treatment Plant of United Comstock Mines Company," in *Engineering and Mining Journal* 114 (1922): 846-853.

Zeier, Charles, Michael Drews and Ron Reno. "An Architectural and Archaeological Inventory of the American Flat Mill, Storey County, Nevada." Clinton, Tennessee: Zeier and Associates, 2009.

E. Likely Sources Not Yet Investigated

Newspaper clippings on file at the Nevada Historical Society, Subject Card Index: "American Flat".