Railroad Waterworks at Argenta, Nevada

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Abstract

During the course of a cultural resource survey conducted in the vicinity of Argenta, Eureka County, Nevada, for Gold Fields Mining Corporation, an old water works system was recorded in Water Canyon. The system is alluded to in a 1903 survey as supplying the Southern Pacific Railroad which came through the area in November of 1868. The gravity-feed system consists of a water source at a spring in the canyon, a sedimentation box, and associated iron pipe. Archaeological investigation of railroad resources can help us "understand the construction methods and maintenance requirements of railroads operating in Nevada's hostile environment" (Adkins 1991: 8-49). The system represents water works engineering principles adapted to a local situation, and may be the only recorded example of its type from this period of early railroading in Nevada.

Introduction

The discovery of gold in California in 1848 and subsequently of gold and silver in Nevada in the 1860s, coupled with the westward migration of easterners, created the need for a transcontinental railroad. Five likely routes were surveyed between 1853 and 1856 resulting in a comprehensive study of 13 volumes. By 1861, the need became urgent with the advent of the Civil War. The Central Pacific Railroad Company of California was incorporated in June of 1861 and, in November of 1862, only four months after President Lincoln signed the Pacific Railroad Act, a contract was signed between the United States Government and the Central Pacific for the construction of a railroad line over the Sierra Nevada and across the Great Basin (Earl 1991, Myrick 1962).

Railroad service was established between Reno and Sacramento on July 6, 1968. In 1868, stations were established at Winnemucca in October, and at Reese River Station (Battle Mountain), Argenta, and Carlin between November and December. In December of 1868, the Central Pacific established an eating station at Argenta.

Silver was discovered in the vicinity of Argenta about 1867, but a limited amount of mining activities were carried out at the north end of the Shoshone Range where the Argenta mining district is located. With the completion of the Central Pacific to this point, a post office was established at Argenta. A town began to develop at the site (Stager 1977), and the Central Pacific began a overland freight line to Austin (Paher 1984). However, the Reese River siding, located about 5 miles west of Argenta station, proved to be more advantageously located to serve the mining districts of the Reese River Valley and particularly the operations at Austin. In 1870, the entire town of Argenta, buildings and all, were moved to the vicinity of the Reese River siding, to be known thereafter as Battle Mountain. Nevertheless, Argenta remained as a siding on the Southern Pacific Railroad, serving as a loading point for barite ore (Stager 1977).

During the course of a cultural resource survey for the Gold Fields Mining Corporation, the remains of a water works that supplied water to the siding at Argenta was identified and recorded. In the field notes of Henry Turtell's 1903 Survey 229, he commented that the "mountain range is drained by a deep canyon in the western part and a small creek utilized by the S.P. Railroad Company to pipe water to its tank in Section 5" (1903:138).

Site Description and Discussion

The site (CRNV-12-10848 [BLM]) is situated in and along the lower reaches of the main drainage in Water Canyon (Figure 1), and consists of the historic water works, as well as a prospect with associated trash, and a sparse to medium lithic scatter composed of basalt, chert and obsidian debitage, tools, groundstone, and two rock alignment features whose historic or

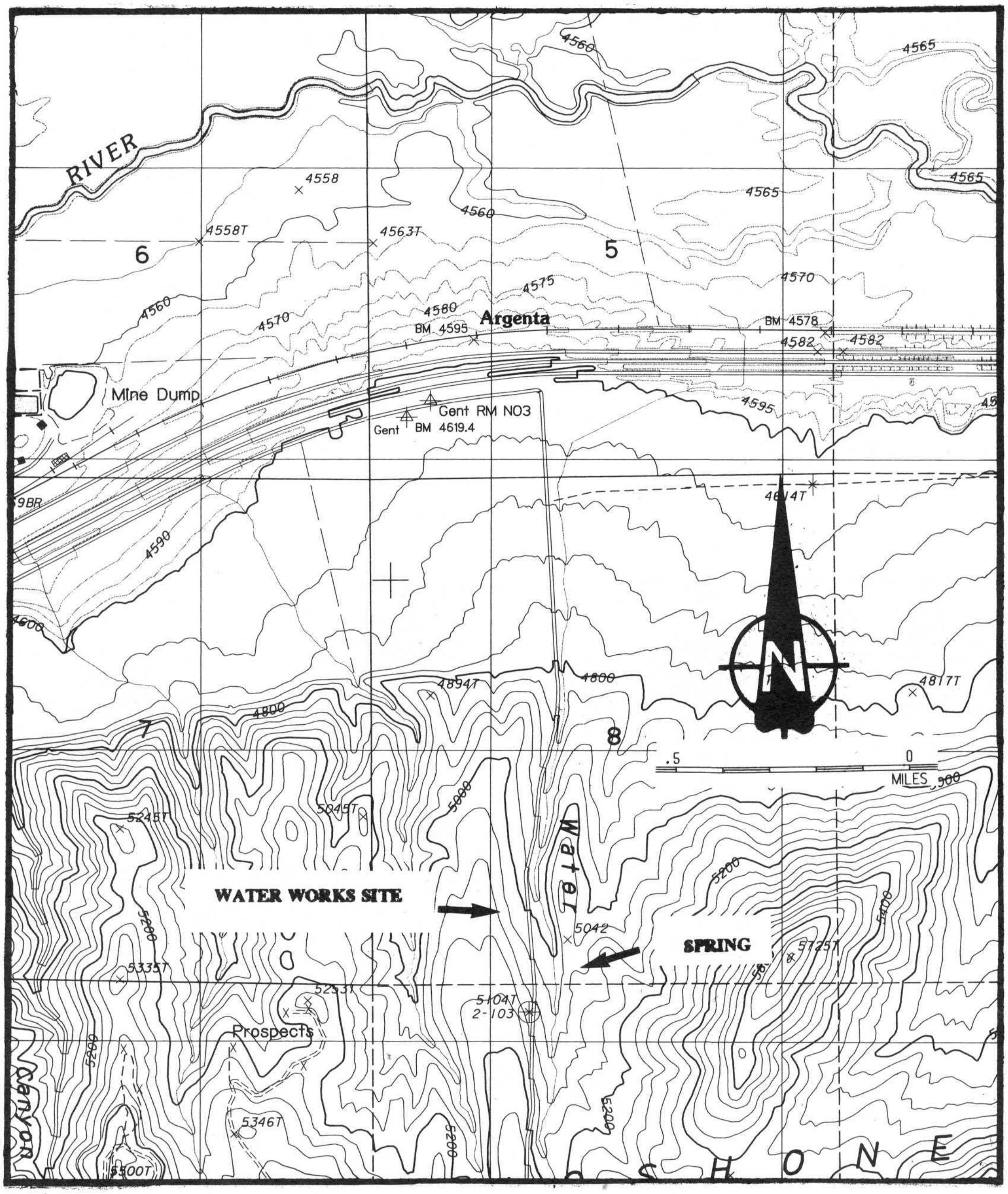

Figure 1. Topographic location of water works site and Argenta Station. Argenta NV., USGS 7.5', 1985.

prehistoric affiliation is uncertain.

The prospect is located at the lower (north) end of the site and consists of the sampling of a rock outcrop and trash that includes seven tin cans, six fragments of glass, milled lumber fragments, a smashed, gray enamel-ware basin, and bailing or electrical/telegraph wire. One intact condensed milk can be dated to 1915-1930, and a clear glass jar bottom contains the trademark for the American Bottle Co. at Streator, Ill., which used this particular trademark between 1905 and 1916.

At the upper (south) end of the site is Feature 3, a mound constructed of earth and rock (Figures 2 & 3). It is situated on the east side of the stream. There is a 3" diameter iron pipe (Pipe "B") protruding from the mound and pointing downstream. In front of and below the pipe is a horizontal iron grate that measures 21" x 60" and is perforated with 0.5" diameter holes. Beneath the grate is a silted-in "cistern," of unknown depth. A 3" diameter section of pipe (Pipe "A"), which may be connected to the cistern, can be seen rising vertically from the creek about three feet downstream. Pipe "B" rests on a section of 3" diameter pipe (Pipe "C"). Another section of pipe (Pipe "D") lies atop these.

It's placement and the placement of rocks around it suggests that this configuration is intentional. Pipe "C" appears to be part of this configuration serving as a support for Pipe "B". However, Pipe "D" appears not to be *in situ*. Still another pipe, located on the upper part (eastern side) of the mound, has been placed in the ground vertically and is thought to be associated with another feature, Feature 2.

Feature 2 is a fence constructed of used sections of 2.13", 3", and 3.75" diameter pipe strung with barbed wire. Consisting of two parallel rows of pipe, it runs on both sides of the stream. The distance between the two rows is only 6 to 9 feet. It begins just above (south of) Feature 3, and continues downstream for about 65 meters. Twenty-one pipe segments are still *in situ*. At the lower end of this feature the

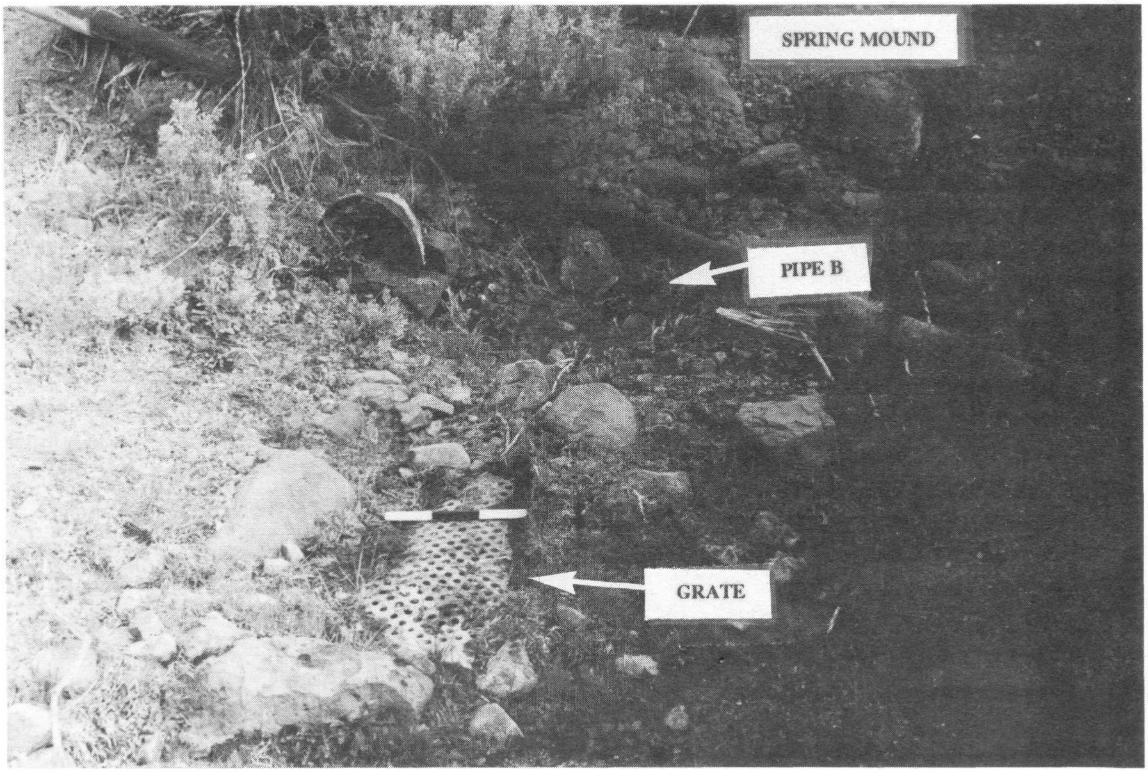

Figure 2. Feature 3, view south showing modified spring with outlet pipe (B) and grate that covers "cistern." Scale: 30 cm.

A trowel probe immediately in back (south) of where Pipe "B" exits the mound revealed that Pipe "B" extends into the mound at least 30".

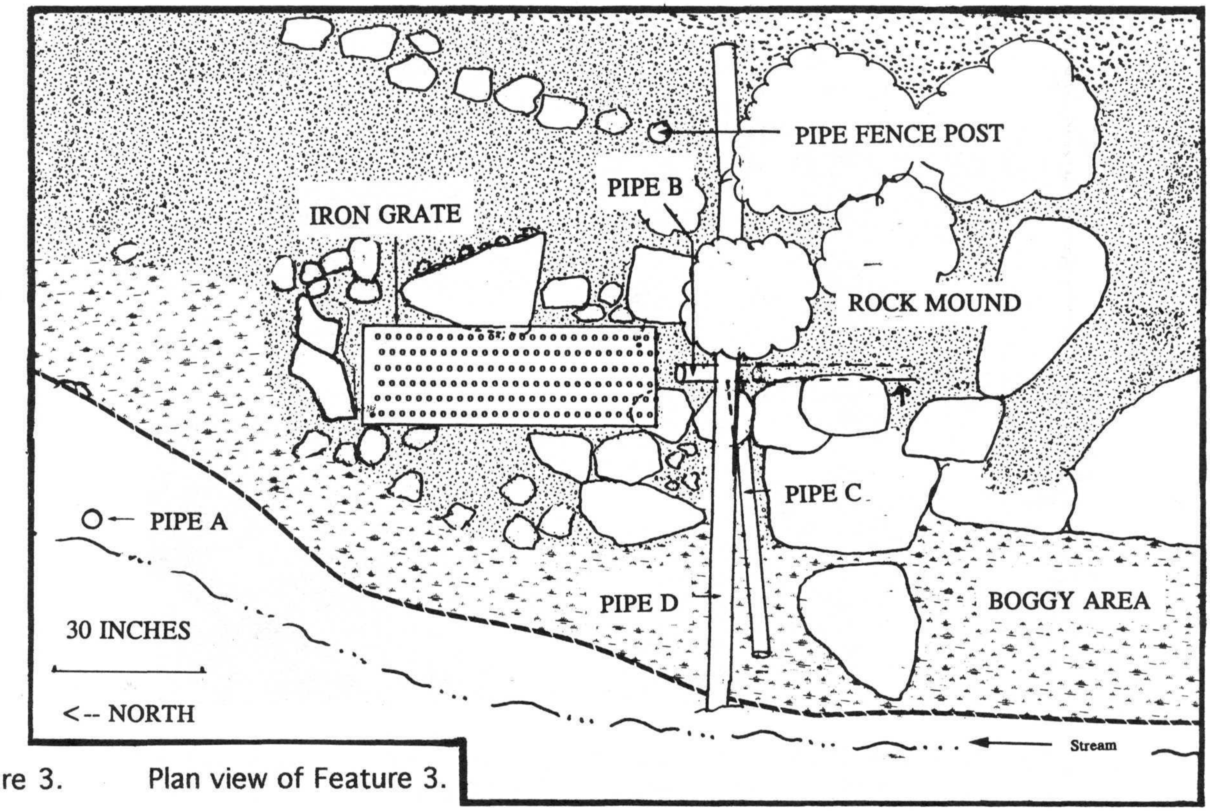

Figure 3. Plan view of Feature 3.

direction of the steam bends slightly to the east, and several such lengths of pipe are scattered along the drainage for another 40 meters. Some of this pipe is 3.75" diameter riveted iron pipe fabricated from 24" segments and coupled with a sleeve, while the majority is threaded iron pipe, using threaded couplings and having a visible longitudinal seam.

Feature 1 is a large wooden box, sections of iron pipe and associated trash located on the west side of the drainage at the point where the stream bends to the east before resuming its north-trending flow. Trash associated with this feature consists of a sieve or filter made from a flattened tin can and measuring 8" x 14" with holes made with a knife; a tar container made from a 10" diameter can with a makeshift bailing wire handle; a modified single lap seam 603x700 (#10) tin can with 0.13" wire handle used for a bucket; milled wood fragments; and sections of iron pipe including one wrapped with rubber and wire. Tar was noted on some of the pipe joints.

The box is built into the cutbank and is constructed from 2" planks having widths of 12", 8.5", and 6.5" (Figures 4 & 5). The planks have been cut with either a longsaw or, more likely, a reciprocating millsaw. The covered box measures 66" x 65" x 24" deep and has an earthen bottom. On the south face, facing up stream towards Feature 3, is a notch cut to accommodate up to a 5" diameter pipe. The base of this pipe would be 10" from the top of the box. A trowel probe revealed a section of iron pipe, probably 3" in diameter, running from the bottom of the interior of the box to somewhere downstream (north) of the box. All nails appear to be 3.38" or 4.5" wire nails. Set around the box is a structure of boulders leading downslope to the level of the stream bed. Included among these boulders is a boulder metate.

Features 1 and 3 are apparently components of an old water works system that is alluded to in the 1903 Turtell survey and which served a water tank at the foot of Water Canyon and the

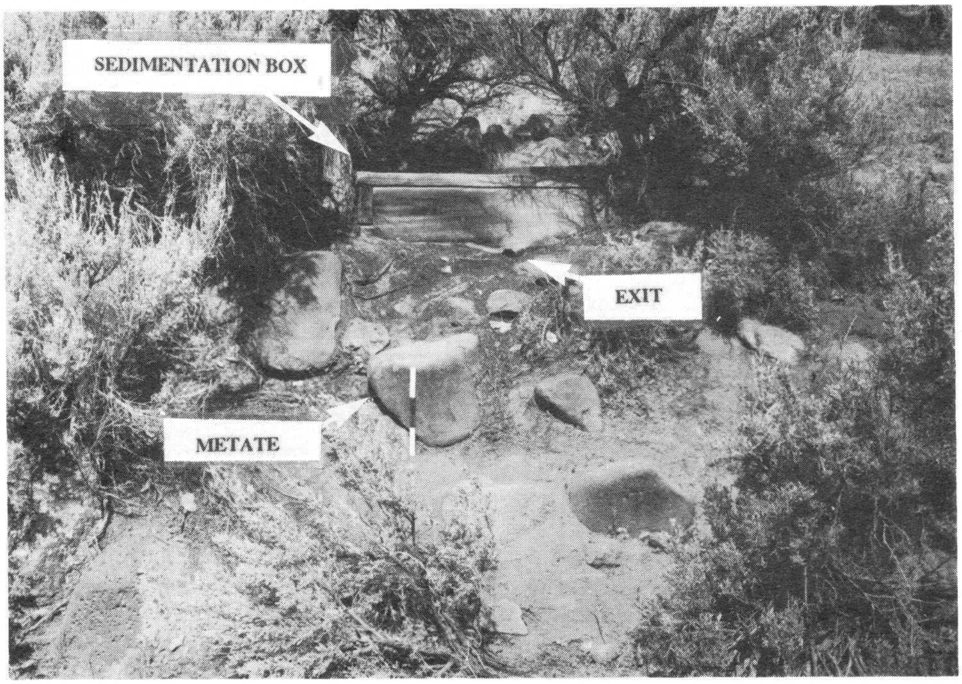

Figure 4. Feature 1, view west showing sedimentation box, exit hole, and stone lined embankment including boulder metate. Scale: 30 cm.

Argenta siding. A map of A.J. Hatch and J.H. Eaton's 1869 Survey 23 & 30 shows a spring in the canyon at the south end of Section 8. The 1903 Turtell survey notes also refer to this spring. The current USGS 7.5' map, which shows several springs in Water Canyon, does not show a spring at this location (refer to Figure 1). However, the location of the spring mapped by Hatch and Eaton and referred to by Turtell is identical with the location of Feature 3. The mound of rock and earth with Pipe "B" protruding from it strongly suggests that the spring referred to in old surveys was tapped and covered over. This would account for it not being seen on more recent maps.

Pipe "B" would be the outlet of the spring, dropping its contents through the iron grate into some kind of cistern. The grate would prevent objects over 0.5" from getting into the cistern. As the grate is no doubt submerged when there is a greater flow in the stream, the stream would be an additional source of water, probably the primary source, with the spring a secondary source. Turtell did say that it was the creek that supplied the water tank. A pipe, perhaps Pipe "A", would carry water collected here to Feature 1, which is a sedimentation tank.

While Feature 3 is situated in the bottom of the drainage, the box at Feature 1 is situated some 80" above the stream bed (Figure 6). The set-up is similar to a water-powered mill whose water supply is delivered by a flume or head race from a source located upstream. Indeed, it was my experience with early water-powered mills that immediately suggested a relationship between the two features (D'Angelo 1982). As the stream bed falls, the "headrace" remains level. The greater the height (the "fall") above the "tailrace" at the mill end of the raceway, the greater the water power delivered to the water wheel (whose diameter, and thus horsepower, is a function of that height) or turbine (whose horsepower is a function of the

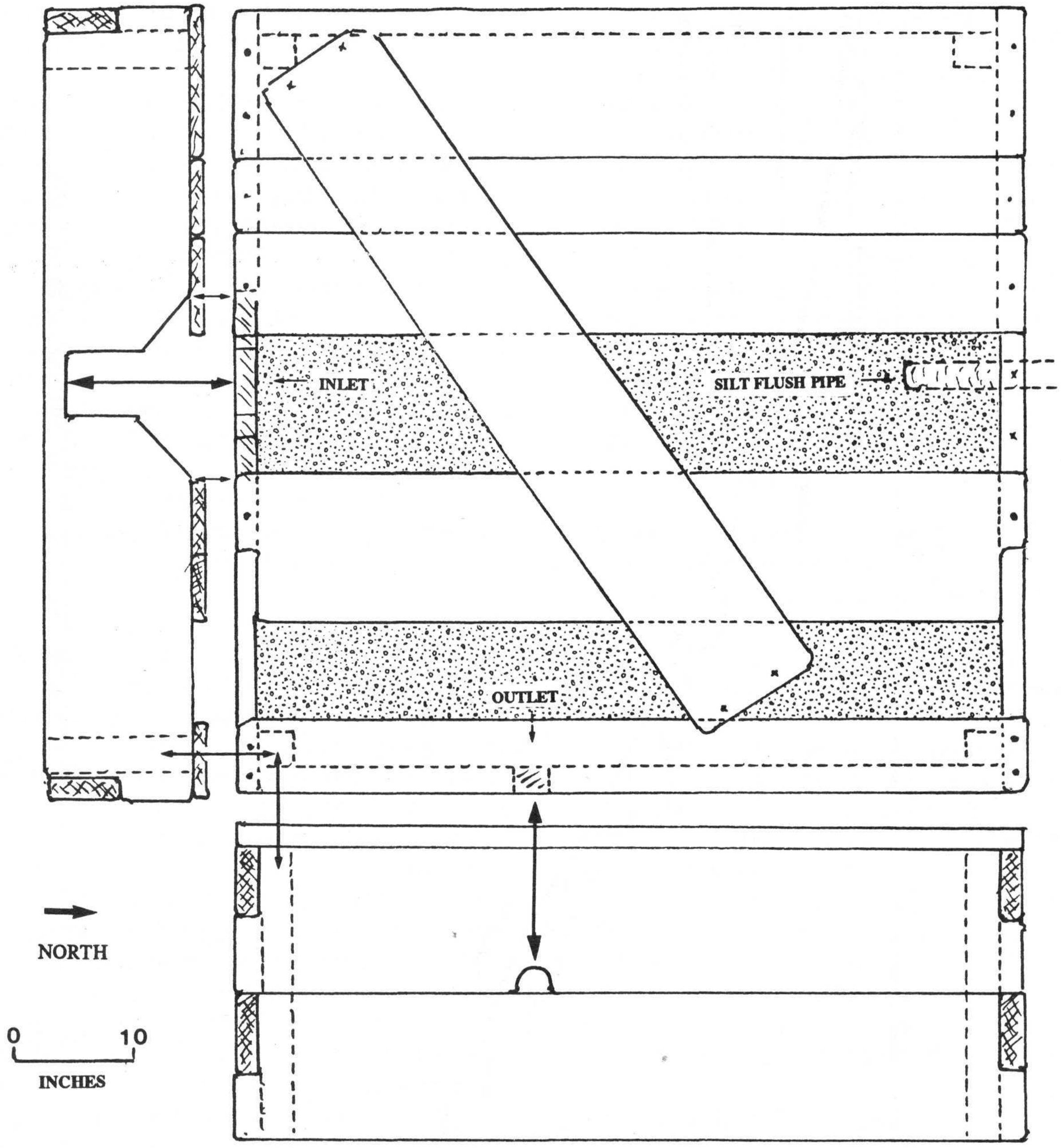

Figure 5. Feature 1, plan view of sedimentation box depicting south (inlet) and east (outlet) facing sides.

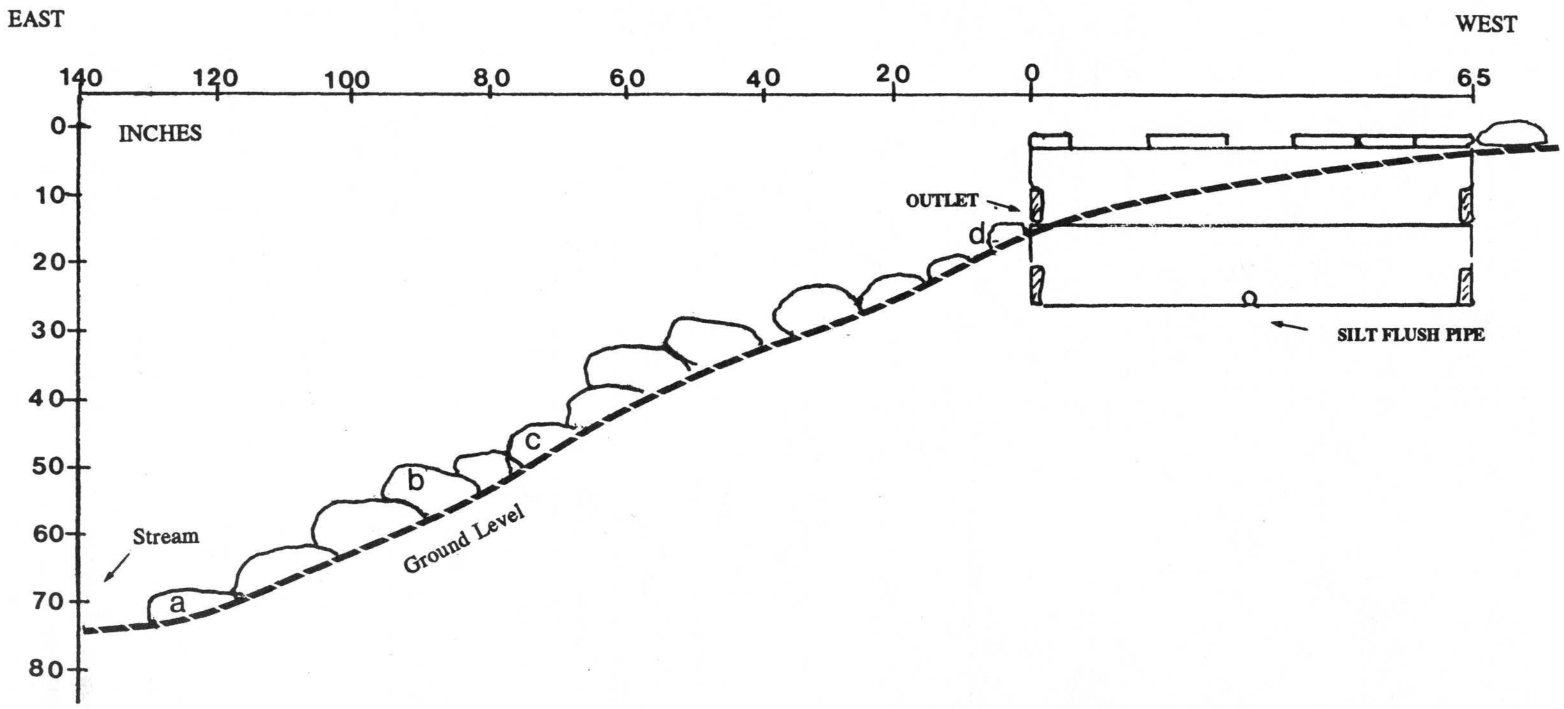

Figure 6. Feature 1, elevation of sedimentation box depicting outlet, flush pipe, and stone-lined embankment.

force of water falling from a given height). However, based on an informal calculation using a contractor's transit and tape measure, the sediment box is 18.04 feet below Feature 3.

The flow of water in a head race is controlled at the mill end with a gate. When the gate is closed there is no appreciable flow because the raceway has a zero-degree grade. When the gate is opened, the water flows at a rate dictated by how much water is allowed to flow through the gate. The gate at the end of a raceway is a hand operated "valve." The water works supplying the Southern Pacific Railroad water tank appears to have been designed to operate continuously, unmanned, except for occasional maintenance. Thus, a grade to the supply pipe of more than zero degrees was necessary in order to ensure continuous flow, but it could not have a pitch equal to the actual fall of the river between those two points, which is about 23 feet.

In order for the box at Feature 1 to function as a sediment settling tank, water flowing into it had to replace water flowing out of it without churning up the sediments which were settling to the bottom. The inlet pipe on the south side of the box would be two inches higher than the outlet pipe coming out of the east side of the box (refer to Figure 5). Apparently it was also significantly larger in diameter. This configuration would guarantee that the water level in the box would be just above the outlet pipe. In fact it would seem, given the 18 foot fall and relatively large diameter of the inlet pipe, that too much water would enter the box. But, since the outlet pipe ran from the box down to the railroad's water tank, a fall of about four hundred feet over approximately 1.3 miles, a siphon effect might have balanced the system. In addition, the pipe located at the bottom of the box on its north face also drew off some water.

Apparently this lower pipe is similar to the arrangement on many mill pond dams which not only have a gate at the top of the dam to supply a flume or head race, but one at the very bottom through which sediments collecting at the bottom of the mill pond can be "blown" out. Again, such a purge gate on a mill dam is operated manually and only occasionally. The lower pipe on the inside of the box had no valve but was just open. Though it passed out of the downstream (north) side of the box underground, it appeared to be more or less level. Such a configuration would guarantee the relatively slow but continuous purging of sediments from the bottom of the box. The exit end of this pipe was not located but would have to be far enough downstream from the box that it would not undermine the embankment near the box or, if near the box, would have to spill down a rock-lined embankment for the same reason. Thus, the whole sediment purging operation would also be automatic.

Streams are notorious for eroding their banks. Most water-powered mills constructed along the banks of streams or rivers make use of rock bulwarks to retard such erosion. The rock structures associated with the sediment box is such a bulwark. Zero-grade earthen head races also have an overflow spillway, similar in principle to the design of bathroom sinks, to ensure that water in the raceway does not overflow and erode its sides. Water from the "silt flush pipe" may have been channeled back to the creek through rocks a-c illustrated in Figure 6. Indeed, the rocks and earth mound at Feature 3 was probably built to protect the spring and pipe against the rampages of the Water Canyon drainage.

The presence of riveted and continuous seam iron pipe point to the likelihood that pipe was replaced during the period this site was in operation. Riveted pipe is common to 19th century sites, while welded, continuous seam, threaded pipe is later. The fence built of discarded pipe sections is curious. The fact that it surrounds and then continues downstream from Feature 3 suggests that it was built to protect the water source, perhaps from the destructive roaming of cattle. It was obviously built later than the original water works, but it is not clear whether it was built to protect the water works while it was in service, or for some other reason.

Except for erosion due to the periodic rampages of the Water Canyon creek, the water works components are surprisingly intact. Only the pipeline, sections of which are strewn all the way down the drainage to the valley floor, has been destroyed. What does remain is two of the three main components of the system, the pipeline being the third. They represent the adaptation of unchanging engineering principles to the ever-changing demands of the local situation. As with mill sites, in terms of these principles, such sites are all the same. But the differences in topography, distances to be covered, available building materials, types of water sources, and so on, no two are the same.

Summary

Adkins (1991:8-49) states that archaeological investigations of railroad resources can help us "understand the construction methods and maintenance requirements of railroads operating in Nevada's hostile environment." As a fairly well preserved example of early water works engineering and construction associated with the Southern Pacific, if not the original Central Pacific Railroad, this site embodies distinctive characteristics of a type, period and method of construction associated with an important moment in Nevada and American history, and can yield information important to an understanding of early water-technology, especially in the context of a hostile environment.

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