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David E. Creighton, Jr.

ARCHAEOLOGICAL INVESTIGATIONS AT AZ U:6:2 (ASU)  
AN HISTORIC CAMP ON THE BANKS OF THE SALT RIVER  
MARICOPA COUNTY, ARIZONA

by

Patricia Eyring Brown

Submitted by:

Glen E. Rice  
Principal Investigator  
Office of Cultural Resource  
Management  
Department of Anthropology  
Arizona State University  
Tempe, Arizona

Prepared for:

Bureau of Reclamation  
U.S. Department of the Interior  
Phoenix, Arizona  
Purchase Order 7 01 32 04160 .

OCRM-32

March, 1978

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## ABSTRACT

Archaeological investigations were conducted at an historic work camp which was first occupied between 1906 and 1908 during the construction of Granite Reef Dam, a diversion structure on the Salt River in south-central Arizona. The site was investigated through the use of archaeological field data; written records, documents, maps and photographs related to the site; and interviews with Gertrude Hill Muir who was born at Granite Reef Dam in 1909.

TABLE OF CONTENTS

	Page
ABSTRACT . . . . .	2
INTRODUCTION . . . . .	6
ENVIRONMENTAL SETTING . . . . .	6
HISTORICAL BACKGROUND . . . . .	8
RESEARCH OBJECTIVES AND METHODS . . . . .	13
ARTIFACT ANALYSIS . . . . .	15
ARCHAEOLOGICAL REMAINS . . . . .	16
Surface Features . . . . .	16
Test Excavation . . . . .	28
DOCUMENTARY EVIDENCE . . . . .	36
ORAL HISTORY . . . . .	47
On Buildings . . . . .	47
On Supplies . . . . .	48
On Water . . . . .	48
On Power . . . . .	48
On the Railroad and Quarry . . . . .	48
On Trash . . . . .	48
On Workers . . . . .	49
On Services and Recreation . . . . .	49
On the World War I Occupation . . . . .	49
On External Connections . . . . .	49
SUMMARY AND CONCLUSION . . . . .	51
EVALUATION . . . . .	55
REFERENCES CITED . . . . .	56

LIST OF FIGURES

Figure 1. Map of AZ U:6:2 (ASU) . . . . .	14
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## LIST OF TABLES

	Page
1. Summary of features found at AZ U:6:2 (ASU) . . . . .	18
2. Artifact clusters on the surface adjacent to Feature 8 . . . . .	30
3. Surface and subsurface artifacts from excavated test units around Feature 8 . . . . .	31
4. Artifacts recovered from the excavation of Feature 5 . . . . .	33

## LIST OF PLATES

Plate 1: Panoramic view of the Granite Reef work camp circa 1907. Looking north toward Mt. McDowell. Photo- graph obtained from Salt River Project . . . . .	7
Plate 2: Granite Reef work camp under construction circa 1906. Photograph obtained from Salt River Project . . . . .	9
Plate 3: Granite Reef Dam. Photograph obtained from Bureau of Reclamation . . . . .	11
Plate 4: General view of AZ U:6:2 (ASU) looking north toward Mt. McDowell. "Y"-shaped slab (Feature 27) in center and cistern (Feature 36) in lower left . . . . .	17
Plate 5: Feature 44. Concrete slab for "cement house." View north . . . . .	17
Plate 6: Feature 46. Cobble and concrete tank at SW corner of stable area. View northeast . . . . .	27
Plate 7: Feature 25. Concrete slab for a small tent structure. View south-southwest. Note impressions of corrugated metal in slab profile . . . . .	27
Plate 8: Feature 36. Closeup of cistern. View southwest . . . . .	27
Plate 9: Feature 30. Trash pile. View northeast . . . . .	27

	Page
Plate 10: Tent structure and workers. Photograph obtained from the Arizona Historical Foundation . . . . .	41
Plate 11: Small tent structure. Cistern in right center. Photograph obtained from Salt River Project . . . . .	42
Plate 12: Interior of tent structure. Photograph obtained from Salt River Project . . . . .	43
Plate 13: Interior of commissary building. Photograph obtained from Salt River Project . . . . .	44
Plate 14: Exterior of "cement house." Photograph obtained from Salt River Project . . . . .	45
Plate 15: Interior of "cement house." Photograph obtained from Salt River Project . . . . .	46

## INTRODUCTION

This report documents the investigation of AZ U:6:2 (ASU), an historic site located adjacent to Granite Reef Dam on the south side of the Salt River. The site was first used as a work camp for the construction of Granite Reef Dam in 1906-1908. It was later reoccupied during World War I and for brief periods in 1916 and 1920, when repairs were made on the dam. The investigation was conducted by a research team from the Office of Cultural Resource Management, Department of Anthropology, Arizona State University, under a contract with the Bureau of Reclamation. A portion of the site was contained within the construction right-of-way of the Salt River Siphon, a feature of the Central Arizona Project which connects the Granite Reef and Salt-Gila Aqueducts. The Salt River Siphon project also included the study of a prehistoric site on the north side of the river directly opposite AZ U:6:2 (ASU). The results of that study are presented in a separate report (Brown, in prep.).

Principal investigators for this project were Donald E. Weaver, Jr., Charles F. Merbs, and Glen E. Rice. The field work was directed by Patricia Eyring Brown with substantial assistance from Gene Rogge, Project Archaeologist for the Bureau of Reclamation. Bill Gibson and Ron Yablon were the field archaeologists for the project. The field work was completed in 25 worker days between 15 and 23 November 1976. The laboratory analysis and report preparation required an additional 12 worker days, bringing the total number of worker days expended for this project to 37. Supplies and facilities were provided by the Department of Anthropology, Arizona State University. Transportation was supplied by the Bureau of Reclamation.

## ENVIRONMENTAL SETTING

AZ U:6:2 (ASU) is located approximately 32 km (20 mi) east of Phoenix and about 5.5 km (3.5 mi) below the confluence of the Salt and Verde Rivers. The work camp occupied a low terrace on the south side of the Salt River adjacent to Granite Reef Dam (Plate 1). The foothills of the Utery Mountains rise to the south and east of the site.

The site is situated near the eastern edge of the Salt River Valley in the Basin and Range Physiographic Province (Wilson 1962). The oldest geologic units which are evident in the area are Precambrian granites and schist and are exposed in the McDowell Mountains to the north and the Utery Mountains (Kokalis 1971:6; Wilson *et al.* 1957). A granite dike outcrops in the Salt River Bed at the Granite Reef Dam site.

The climate in the project area is hot and dry. The mean values for temperature and rainfall were recorded at a weather station at

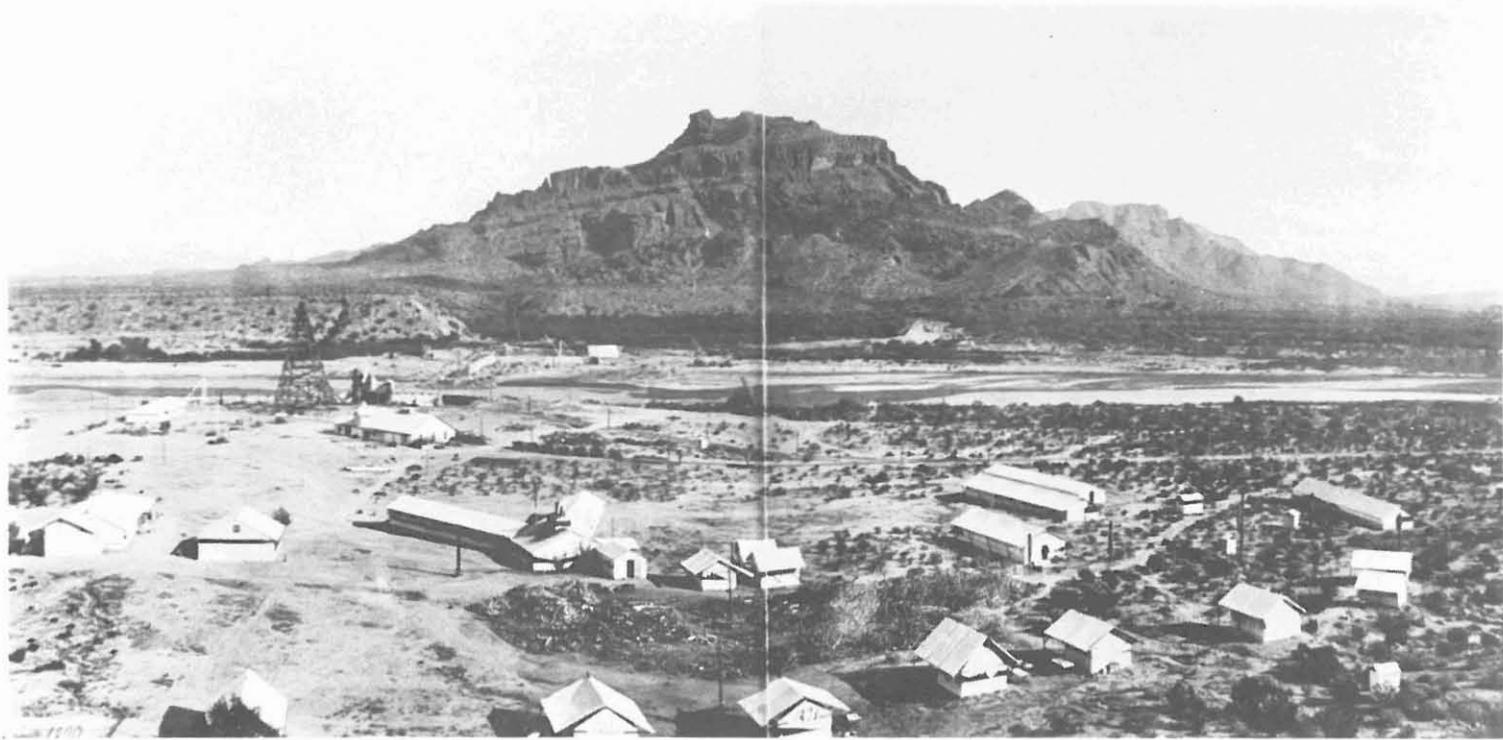


Plate 1. Panoramic view of the Granite Reef work camp circa 1907. Looking north toward Mt. McDowell. Photograph obtained from Salt River Project.

Granite Reef Dam for the period from 1893 to 1957. The mean daily maximum temperatures recorded for the months of July and January were 40.5°C (104.9°F) and 18.8°C (65.9°F), respectively. The mean daily minimum temperatures for those same 2 months were 23.6°C (74.5°F) and 3.8°C (38.9°F). The annual mean rainfall at Granite Reef Dam was 23.4 cm (9.2 in) (Green and Sellers 1964). The rainfall pattern in this area of the Southwest has a bimodal distribution, peaking in July and August and again in December and January. The summer rains are more intense and of shorter duration than the winter rains and cause localized heavy flooding.

The site is situated within the Arizona Upland Subdivision of the Sonoran Desert Scrub (Brown 1973; Lowe and Brown 1973). The site area presently supports large numbers of creosote bushes, some paloverde and saguaro. Early photographs of the site indicate that the area was cleared of vegetation prior to the construction of the camp (Plate 2). The natural flow of the river was interrupted by the construction of Granite Reef Dam. Prior to that time the riparian habitat consisted primarily of mesquite, cottonwood and willow. The river continued to flow at a reduced level after Granite Reef was completed until the construction of additional dams upstream on the Salt in the late 1920s (Gertrude Hill Muir, personal communication).

Two principal environmental factors determined the location of the Granite Reef Diversion Dam. The first was the presence of outcrops of granite bedrock on each side and across approximately one-third of the river bed at this point. The second was the situation of the dam site on the eastern edge of the Salt River Valley near the point where the river emerges from its constricting canyon and fans out over a broad floodplain.

#### HISTORICAL BACKGROUND

The following summary of the historical development in the Salt River Valley was derived from 3 general sources on the history of Arizona (Farish 1915-1918; McClintock 1916; Peplow 1958). The earliest recorded history for the area that is now Arizona came from the accounts of Spanish explorers. The period of early Anglo settlement was documented primarily by personal journals and accounts with a minimum of public records. The late territorial and early statehood periods were more fully and systematically recorded through government documents and other public statements. It was during this latter time that the first comprehensive histories of the state were being compiled and written.

The first Europeans to enter the Southwest were Spanish explorers and priests in the 16th and 17th centuries. In the vicinity of the Gila-Salt Valley, they found Pima and Maricopa Indians farming the bottomland and floodplain areas and Yavapai groups occupying the mountain ranges adjacent to the valley. The Spanish built missions in the southern part of the state and introduced such concepts as plow



Plate 2. Granite Reef work camp under construction circa 1906. Photograph obtained from Salt River Project.

cultivation and animal husbandry (Hamilton 1928:22). In 1751 the Pima rose up against their Spanish mentors and effectively diminished the sway of the Spanish missions in Arizona. This portion of the Southwest was under Mexican sovereignty from 1821 until 1848, when, by the Treaty of Guadalupe Hidalgo, the territory north of the Gila was ceded to the United States. The remainder of Arizona became part of the United States in 1854 as a result of the Gadsden Purchase.

After the acquisition of southern Arizona, several expeditions were sent out by the War Department to explore the area (Hamilton 1928:25), and in 1863 Arizona became a territory of the United States. The earliest settlers in the new territory were attracted primarily by the mining potential of the mountainous areas. Prescott, located in a rich mining district, was established as the first territorial capital. Military posts, such as the one at Fort McDowell about 16 km (10 mi) northeast of Granite Reef, were set up to keep order and to protect the growing settlements from marauding Apaches and Yavapais.

The earliest American settlers in the Salt River Valley were attracted by the agricultural potential of the land. Their observations were reinforced by the presence of the elaborate network of canals and fields left by prehistoric Hohokam groups. In 1867, Jack Swilling formed the Swilling Canal Company, which excavated the first historic canal on the Salt River. Subsequently, there was a proliferation of canal construction with a concomitant increase in population. The town of Phoenix and the adjacent community of Tempe were founded in the early 1870s. The settlement of Mesa occurred somewhat later, in 1878, and was accomplished by a group of Mormons from Idaho and Utah (Johnson, Perkins and LeBaron 1965).

It is obvious that an irrigation technology was a prerequisite for permanent settlement in the Salt River Valley. The first efforts in historic times involved the excavation of large "ditches" which would serve a small number of individuals located adjacent to them. Brush diversion dams were employed at the heads of the canals to channel water from the river. However, this system was subject to the vagaries of flooding and low water periods. There was no regulatory control over the natural flow of the river. Therefore, a program of water regulation and control was conceived by the citizens of the Salt River Valley.

"The genesis of the Salt River irrigation project was a resolution of the Phoenix Chamber of Commerce, passed in the early summer of 1889" (McClintock 1916:431) to search for potential dam and reservoir sites along the Salt and Verde Rivers. The project did not become a reality until after the passage of the Reclamation Act by Congress in 1902. The United States Reclamation Service was established, and money was appropriated for the construction of a dam on the Salt River below its junction with Tonto Creek. In 1906, construction was begun on Roosevelt Dam under the direction of Louis C. Hill, a chief engineer for the USRS. Concurrently, Granite Reef Diversion Dam was built approximately 45 km (28 mi) downstream from Roosevelt, near the point where the river emerges from the mountains at the eastern edge of the Salt River Valley (Plate 3). A granite dike, outcropping in the

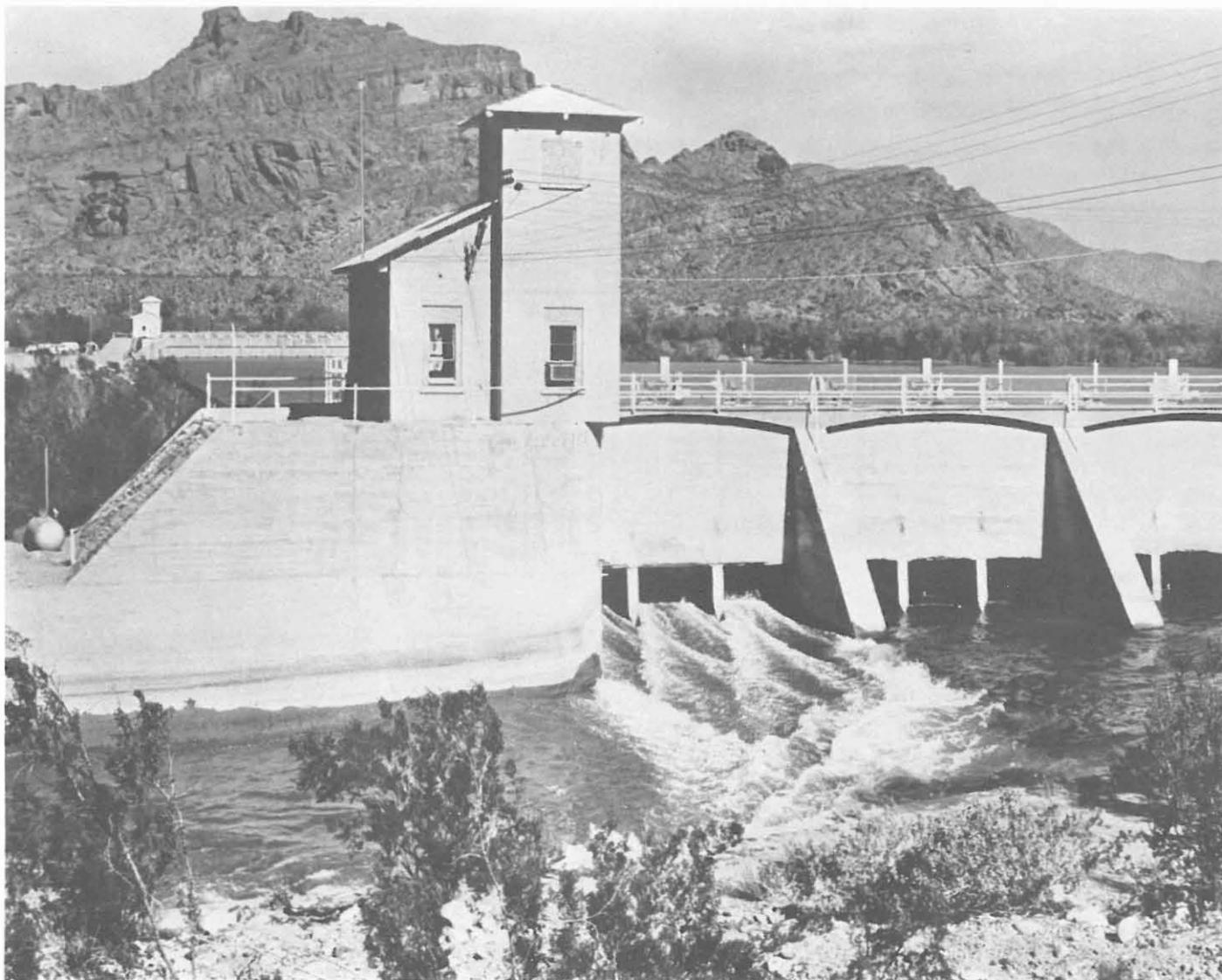


Plate 3. Granite Reef Dam. Photograph obtained from Bureau of Reclamation.

river bed at the base of the dam, gave Granite Reef its name. These 2 dams were the foundation of the Salt River Project system. They were administered by the USRS until 1917, when they were turned over to the water users themselves, subject to payment of the unpaid balance of the construction cost (Salt River Valley Water Users' Association pamphlet printed in Horton 1941). Since that time the project has grown rapidly with the construction of 5 other large storage dams on the Salt and Verde Rivers and hundreds of miles of canals.

The establishment of structures on the Salt River to store and regulate the flow of water to the valley below marks a significant change in the pattern of settlement in the region. The control of water insured a constant, year-round supply to users in the valley which allowed the growth of a stable agricultural resource base to support an increasingly large number of immigrants. In February, 1912, Arizona became a state with Phoenix its capital. The early 20th century was a period of extremely rapid change toward modernization and industrialization in Arizona. Improved communication by railroad, telegraph and radio connected the state with the rest of the nation.

The Salt River Valley has continued its rapid rate of growth and development. Present population numbers nearly 1,300,000 in the metropolitan Phoenix area. Population is beginning to outgrow the available water sources, and programs such as the Central Arizona Project have been instituted to bring Colorado River water into the central river valleys to supplement the existing water supply. There is a growing realization that the water supply in this desert environment is not infinite and that stringent conservation measures may be required to support the projected level of population in the future.

## RESEARCH OBJECTIVES AND METHODS

The principal objective of this project was the thorough documentation of site AZ U:6:2 (ASU) through field examination and archival research. A plane table map (scale = 1:1200) was made of what remains of the site and 50 features were defined (Fig. 1). These features included structural remains, trash areas, various types of pits, hearths, and a cistern. Limited test excavations and surface collections were made at 3 of the features; however, the primary source of information about the site came from historic records and photographs.

An unsuccessful attempt was made to locate any individuals who might have been employed at the camp when it was first occupied; however, it was possible to conduct several interviews with Gertrude Hill Muir, the daughter of the original southside gatetender at Granite Reef. Mrs. Muir was born at the dam in 1909 and lived there with her family until 1917 when they were transferred to El Paso, Texas. While Mrs. Muir's knowledge of the camp was primarily second-hand, she was a keen observer with a deep sense of history, and her reminiscences were very informative.

A second objective was the recovery of artifactual data which might corroborate or elaborate the documented chronology and function of the site and perhaps distinguish between the separate occupations. In the field, observations were made about the artifactual debris that was associated with each feature, and any unusual or distinctive characteristics were recorded. Artifacts recovered from the 3 features which were tested were returned to the laboratory for more thorough examination.

A third objective was the placement of the site in an historical perspective. This perspective involved a somewhat impressionistic evaluation of the development of the Salt River Valley in the early 20th century and of the diverse elements which influenced the operation of the Granite Reef work camp. For this purpose, several accounts of the history of Arizona were consulted (Farish 1918:V. 6; McClintock 1916:V. 2; Peplow 1958:V. 2). The format of these texts, particularly Farish and McClintock, is largely anecdotal, combining several levels of information from specific events to broad generalizations to characterize various time periods and developmental trends. This approach results in an uneven representation of historical events which has few unifying elements. Because of these difficulties, an effort was made to extract from these sources only the flavor or impression of the time and to use it as a background for the interpretation of the site.

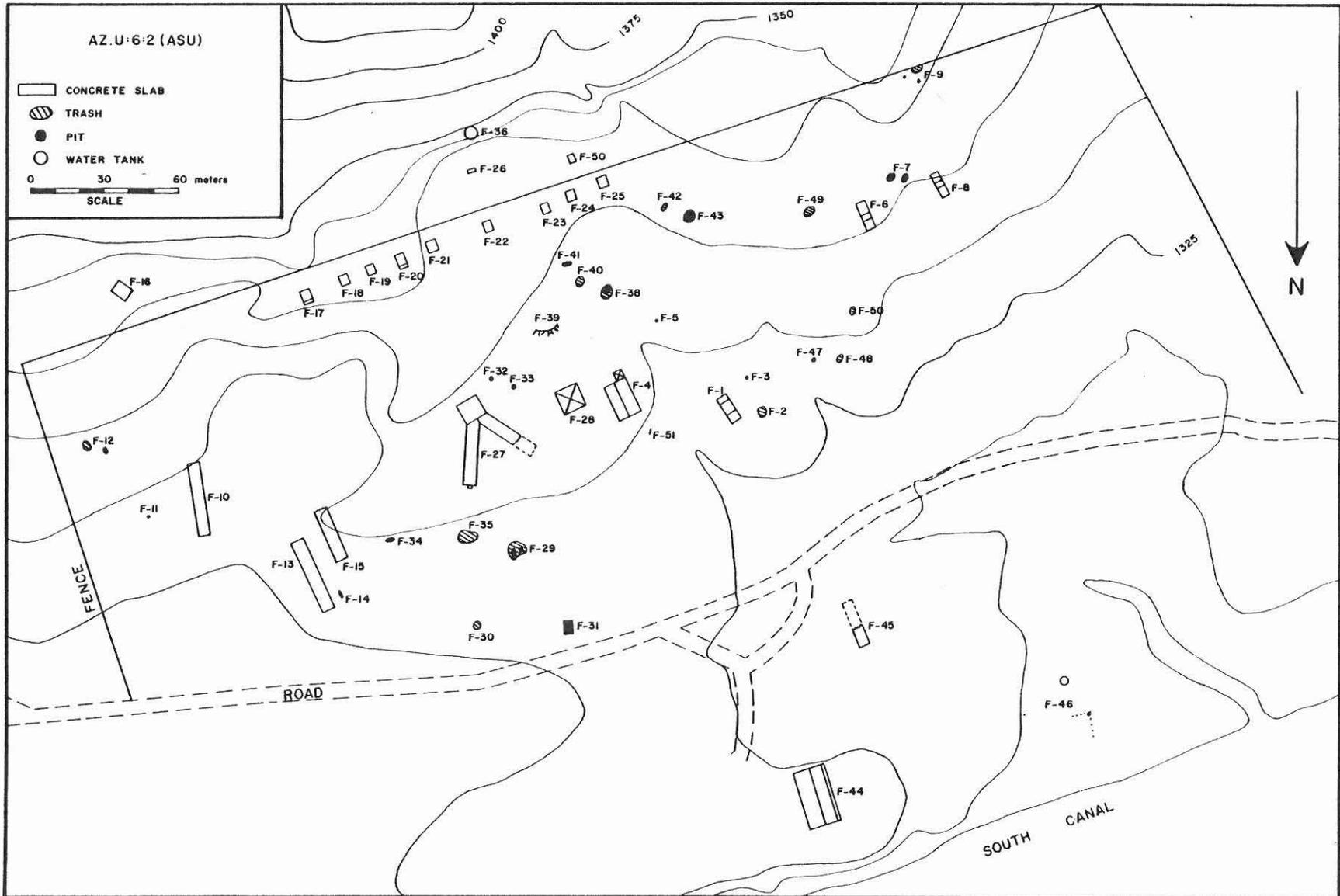


Figure 1. Map of AZ.U:6:2 (ASU).

## ARTIFACT ANALYSIS

The artifact analysis was principally concerned with the discernment of chronological indicators and gross functional classes (such as domestic or non-domestic). The artifacts were placed in intuitive types based on the author's familiarity with the objects.

The chronological distinctions in metal cans and glass bottles for the post-1900 time period has been reviewed by Hunt (1959). World War I is conveniently used as a dividing line between early and modern types. In the last half of the 19th century and the first 2 decades of the 20th, metal cans were generally made by folding the seams and sealing them with solder. These cans were then filled and processed under high heat to sterilize the contents. Frequently a small hole was left in the top of the can to allow for the escape of gases during processing. This hole was then plugged with a drop of solder. This type of "hole-in-top" can (Fontana and Greenleaf 1962) was a common constituent of the trash at U:6:2. After WWI, improvements in the methods of making tin cans led to the virtual replacement of soldered cans by ones with crimped seams and edges. These types were also present, but in relatively small quantities, at the work camp site.

Changes also took place in the method of manufacture of glass bottles around the time of WWI. The most diagnostic was the change from hand-finished to machine-finished bottle necks. In the former type, the mold seam ends at the base of the neck. In the latter, the seam extends all the way to the lip of the bottle (Hunt 1959:9).

A color change is also characteristic of much of the earlier period glass which has been exposed to sunlight. A photochemical reaction between the sunlight and the manganese oxide impurities present in the glass cause it to turn purple in color. Greater standardization in the constituents of glass following WWI resulted in a decrease in this phenomenon. The relative ratio of clear to purple glass has been used to date mining camps (Hunt 1959:10).

The surface finish on glass can also be indicative of age. Surface corrosion is frequently present as a result of the high alkali content in glass manufactured prior to WWI. This corrosion often occurs as an iridescent coating which can be flaked off (Hunt 1959:10). Both purple and iridescent glass were present in abundance at U:6:2.

The above characteristics were the primary chronological indicators for the artifacts from the work camp site. In addition, a small number of artifacts had absolute dates printed on them; for example, a 1919 penny and a fragment of ceramic pipe stamped June 1908. Besides these there were few markings on bottles or cans which could be traced to a specific date.

## ARCHAEOLOGICAL REMAINS

The site, as it presently exists, consists of structural and non-structural features and localized areas of artifactual debris in an area approximately 500 m E-W by 300 m N-S (Plate 4). The southern and eastern ends of the site were enclosed by a fence with metal rod reinforced concrete posts which may have been the original fence surrounding the work camp. A large borrow pit obscured a portion of the eastern end of the site. A more recent fence separated the main portion of the site from a runoff and evaporation experimental station which had been constructed across the western portion of the work camp. The old fence continued along the southern boundary of the station and along its western margin, indicating the original extent of the camp. A dirt road divided the site on an east-west axis. Approximately one-third of the site area lay between the road and the river to the north. The gatetender's house still stands in a fenced enclosure which controls access to the dam. A small number of features still exist between the road and the river. However, an extensive area of bulldozed rubble north of the experimental station indicated that several other features had been destroyed in that area. Isolated concentrations of trash were noted outside the fenced enclosure to the east and west, but these were not systematically recorded.

### Surface Features

Table 1 lists each defined feature, its size, orientation (if any) and pertinent observed associations. Fig. 1 shows the distribution of these features within the site area. Many of the structural features consisted of concrete slabs of varying size and configuration which functioned as foundations for the buildings which comprised the work camp. These features can be tentatively divided into specialized public buildings and generalized domestic units based on the frequency of occurrence of each form. This distinction is considered tentative primarily because of the lack of evidence in the areas of the site where features have been destroyed.

The central portion of the site south of the road contained 4 features which were unique in size and conformation. The most distinctive of these was a large "Y"-shaped concrete slab (Feature 27) which was divided into 3 wings or "rooms." To the west was a 9.6 m square slab with 4 triangular segments sloping toward a central drain (Feature 28). This could have been a bathhouse or ice house or some similar feature requiring drainage. Further west was a large rectangular slab (Feature 4) with a smaller slab (Feature 4B) appended to the SW corner. This smaller slab was identical in form to Feature 28 but was smaller in size. A series of 5 bolts were embedded in the concrete in the NW corner of the main slab. It is possible that these might have secured some valuable object such as a safe. Another rectangular slab (Feature 1), the length of which was divided into 3 unequal segments, was located just west of Feature 4. It was associated primarily with non-domestic trash.



Plate 4. General view of AZ U:6:2 (ASU) looking north toward Mt. McDowell. "Y"-shaped slab (Feature 27) in center and cistern (Feature 26) in lower left.



Plate 5. Feature 44. Concrete slab for "cement house." View north.

Table 1. Summary of features found at AZ U:6:2 (ASU).

Feature #	Type	SIZE (m)		Orientation	Remarks
		N-S	E-W		
1	Concrete Slab	11.9	4.5	N 34° W	Length divided into 3 unequal sections ("rooms"). NW corner of slab worn down--associated with metal footscraper and a possible concrete step. A few scattered sherds. Adjacent to Feature 2.
2	Trash Pit	5.5	2.15		Basically non-domestic trash: paint cans, corrugated metal, light bulbs, etc. Adjacent to Feature 1.
3	<u>In situ</u> Pipe Fixtures	.9	.6	N 26° W	Concrete "box" with metal pipes buried in ground. Function unknown.
4	Concrete Slab	15.1	9.2	N 24° W	Seam divided slab in half lengthwise. Three pipe stubs along East wall of slab. Five bolts imbedded in NW corner of slab. Feature 4-B at SW corner.
4B	Concrete Slab	3.8	3.8	N 24° W	Slab made of 4 triangular segments sloping toward the center drain. At SW corner of Feature 4. Large pile of ceramic tile to E (drain pipe?).
5	Pit	1.3	1.1		Possible latrine. Little trash. 40-50 cm deep.

Table 1 (Continued)

Feature #	Type	SIZE (m)		Orientation	Remarks
		N-S	E-W		
6	Concrete Slab	11.8	3.9	N 24° W	Length divided into 3 segments. The 2 outer ones approximately 4.5 m and central one approximately 2.5 m. Cobble concentrations to N and E. Little associated trash.
7	2 Adjacent Pits	6.1	13.1		Pits 60 and 85 cm deep. Fill mounded W, N and E. Little trash. Latrines?
8	Concrete Slab	10.6	3.3	N 27° W	Length divided into 3 segments. Same pattern as Feature 6. Large areas of tar overlay S portion. Adjacent cobble concentrations. Drainage to the west with tar and trash.
9	Trash Pile w/ Associated Pits	6.1	6.1		Just N of S site boundary fence. Pits may be possible latrines.
10	Concrete Slab	30.3	5.2	N 9° W	Single slab adjacent to borrow area. Cobble pile to N. Little trash.
11	Hearth	.8	.7		Small cobble concentration. Associated sticks of wood.
12	Trash Pile and Pit	4.0	4.0		Pit 70 cm deep. No associated trash. Trash pile - cobbles & ash, glass, nails, no tin cans.
13	Concrete Slab	30.3	5.2	N 24° W	Single slab adjacent to borrow area. Cobble pile to N. Little trash. Adjacent to Features 14 & 15.

Table 1 (Continued)

Feature #	Type	SIZE (m)		Orientation	Remarks
		N-S	E-W		
14	Pit	3.4	1.4		3 m W of Feature 13. 20 cm deep with large boulders inside.
15	Concrete Slab	22.0	5.2	N 24° W	Single slab. S end removed by borrow activities. Cobble area to N. 7 m W of Feature 13. Probably was originally the same length as Features 13 & 10.
16	Concrete Slab	7.3	5.3	N 55° W	S of S fence. Cobble piles to N. Little trash. Hand-molded bottle necks.
17	Concrete Slab	5.9	4.0	N 20° W	Two sections--1 square (S); 1 rectangular (N). Adjacent to S fence & borrow area. Little trash.
18	Concrete Slab	4.0	3.4	N 22° W	Adjacent to borrow area & fence. N segment crumbled. Little trash.
19	Concrete Slab	3.9	3.4	N 23° W	Single slab. Trails N & E. No trash.
20	Concrete Slab	5.8	3.4	N 22° W	Two sections like Feature 17. Cobble pile to N. Wooden box remnants (beehive?). No trash.
21	Concrete Slab	4.6	3.9	N 21° W	Single slab. Wooden box remnants NW & E.

Table 1 (Continued)

Feature #	Type	SIZE (m)		Orientation	Remarks
		N-S	E-W		
22	Concrete Slab	3.9	3.4	N 22° W	Single slab. Resurfaced. Lumber scrap off NW corner. Little trash--cans & glass.
23	Concrete Slab	4.0	3.4	N 23° W	Single Slab. Glass fragments.
24	Concrete Slab	4.5	3.9	N 20° W	Single slab. A few concrete fragments from smaller N slab. Pile of cobbles to N. Little trash.
25	Concrete Slab	4.6	4.0	N 22° W	Single intact slab. Remnants of N slab. Some recent glass.
26	Concrete Slab	1.6	3.5	N 19° W	Slab made of 3 triangular sections sloping toward the N. Just below cistern (Feature 36). Pumphouse?
27A	Concrete Slab	8.9	8.8	N 32° W	Part of a "Y"-shaped slab. Contiguous with B & C. Forms the base of the Y. Adjacent to borrow area.
27B	Concrete Slab	24.7	4.6	N 3° E	Eastern arm of "Y". Small step at N end (1.8 x 1.6 m).
27C	Concrete Slab	16.1	4.6	N 56.5° W	West arm of Y. Approximately 8 m of N end of slab missing. Very little trash associated. Slabs placed on mounded earth. Elevated above surrounding area.

Table 1 (Continued)

Feature #	Type	SIZE (m)		Orientation	Remarks
		N-S	E-W		
28	Concrete Slab	9.6	9.6	N 24° W	Slab divided into 4 triangles sloping toward the center. Drain hole in center. Wire fencing on E side. Some metal & glass trash. Bulldozer disturbance on NW side.
29	Trash Pit	11.0	3.5		Trash included soldered cans, machine finished bottle necks, dry cells, paint cans, pop top tab, coffee cans, beer cans, car parts, tobacco cans.
30	Trash Pile	3.7	3.2		Trash includes soldered cans, screw top bottles.
31	Ramp?	11.0	6.0		Mounded area to the S. Cut vertically about halfway along its length. Mound supported by wooden beams exposed in cut.
32	Trash Pit	2.1	2.0		Pit about 40 cm deep. Fill mounded on E side. Glass & metal trash.
33	Pit	2.7	2.5		No trash. 45 cm deep.
34	Pit	2.4	4.0		No trash. 70 cm deep. Earth mounded on 3 sides.
35	Trash Pile	9.0	9.5		Trash mostly tin cans, wire, glass fragments (some melted), tobacco cans, pipe. Cobble cluster on E side.

Table 1 (Continued)

Feature #	Type	SIZE (m)		Orientation	Remarks
		N-S	E-W		
36	Cistern	5.0	5.0		Circular structure with cobble wall about 1 m thick. Wire reinforced, concrete lined interior. Interior plastered. Portion of cobble wall missing. Inside diameter 3.0 m. 3.2 m depth. In-flow pipe 21 cm below top. Corrugated metal roof remnants scattered to NW.
37	Not Assigned				
38	Trash Pit	4.2	3.8		Trash includes ceramic pipes, tobacco cans, crockery, dry cell, iridescent & purple glass, hand-molded jar neck, metal fragments.
39	Fence	1.0	1.3	S 81° E	Collapsed fence made of wooden posts & chickenwire.
40	Trash Pile	4.1	3.6		Trash included sardine cans, brake shoe, roof tacks, some glass & crockery.
41	Pit	2.5	4.5		No trash.
42	Trash Pile	3.0	1.5		Located in shallow drainage. Mostly soldered milk cans.
43	Trash Pit	5.6	5.3		Trash included metal gallon cans, soldered milk cans, metal frames, little glass or crockery.

Table 1 (Continued)

Feature #	Type	SIZE (m)		Orientation	Remarks
		N-S	E-W		
44	Concrete Slab	24.0	13.5	N 17° W	Slab in poor condition. Surface irregular. Adjacent to fenced enclosure providing access to Granite Reef Dam. Two joints in slab run its length. Portions of wooden plank still present in joints. Rectangular holes for upright posts spaced along joints. Little trash. Soldered cans, 1919 penny, round nails.
45	Concrete Slab	19.0	4.7	N 23° W	Slab partially disintegrated. N end relatively intact. Remainder mostly concrete rubble. May have been deliberately broken up. Trash includes: large quantities of round nails, horseshoe, metal strips, wire, some glass. Blacksmith's shop?
46	Structure	32.0	25.0	N 10° W	Series of concrete post supports with embedded cobbles on lower terrace near river. Small circular tank in SW corner made of cement w/embedded cobbles. Larger, smoothly finished concrete tank to SE. Area intentionally cleared of surface cobbles.
47	Pit	4.0	4.8		Maximum depth 35 cm. Little trash. Fill mounded on W, N & E sides.

Table 1 (Concluded)

Feature #	Type	SIZE (m)		Orientation	Remarks
		N-S	E-W		
48	Trash Area	3.0	1.9		Trash includes soldered cans, glass, machine-finished bottle neck. Located in a drainage.
49	Trash Area	1.1	.8		Trash includes tin cans, some w/soldered tops. Located in a drainage. Area of tar upstream.
50	Concrete Slab	3.4	2.8	N 20° W	Located S of fenced enclosure. Concrete fragments to N. Granite boulders along S edge. Wire scraps off NE corner. On slight elevation at base of Schlecht's Butte.
51	Wooden Beam				Embedded in drainage NW of Feature 4. Metal spike embedded in wood.

To the north of the road there were 3 distinctive features. The easternmost was the largest concrete slab still extant at the site (Feature 44). It was located directly west of the fenced enclosure which now surrounds the gatetender's house (Plate 5). Unlike most of the features examined, it displayed evidence of internal structure. The slab was divided lengthwise into 3 sections. The joints between each section were wide enough to accommodate a 5 cm wide wooden beam. Rectangular holes for upright beams were spaced along the length of the joints. To the southwest there was a smaller, narrower rectangular slab (Feature 45) which had been largely demolished. The association of large quantities of nails and the presence of horseshoes suggested that the structure had once been a blacksmith's shop. Further west over the edge of the terrace was found a regular pattern of concrete post supports and 2 circular concrete tanks (Feature 46). This feature might have been a portion of the corral where livestock were kept (Plate 6).

In addition to these specialized features, there were some forms which occurred more than once. Near the eastern end of the site, north and east of the borrow area, were 3 long (30 m) and narrow (5 m) slabs (Features 10, 13 and 15). A portion of Feature 15 had been destroyed by the borrowing activities, but the part that remained suggested that it conformed to this class. Each feature had a small cobble concentration at the north end of the slab, and there was very little associated trash. These features could have served as communal living quarters for the workers. A series of 9 small rectangular slabs were located just inside the south fence (Features 17-25). Each consisted of an almost square section, forming the main portion of the feature and some had a smaller, rectangular section on the north side (Plate 7). There were 2 sizes, one with the square section about 0.5 m wider and longer than the other. In only 2 cases was the rectangular slab intact. On the others, it was either absent or badly crumbled. Some of the features had small concentrations of river cobbles located to the north. There was very little associated trash. These features were assumed to be the foundations for small tent structures to house the workers. Near the western edge of the site there were 2 more rectangular slabs (Features 6 and 8). These were divided into 3 sections. The north and south sections were approximately the same size. The central section was considerably narrower. These features were associated with domestic trash, indicating that they may have been used as habitations also.

The remaining structural features were south of the fenced enclosure. They consisted of 2 rectangular slabs (Features 16 and 50) located on elevated areas at the base of Schlecht's Butte, a cistern or water tank (Feature 36) also elevated above the level of the camp (Plate 8), and a small slab (Feature 26) just below the cistern with a sloping floor which may have been the foundation for a small pump house.

The non-structural features included trash pits, trash piles (Plate 9), trash piles with pits and pits without trash. Five individual non-structural features were noted which did not fit into

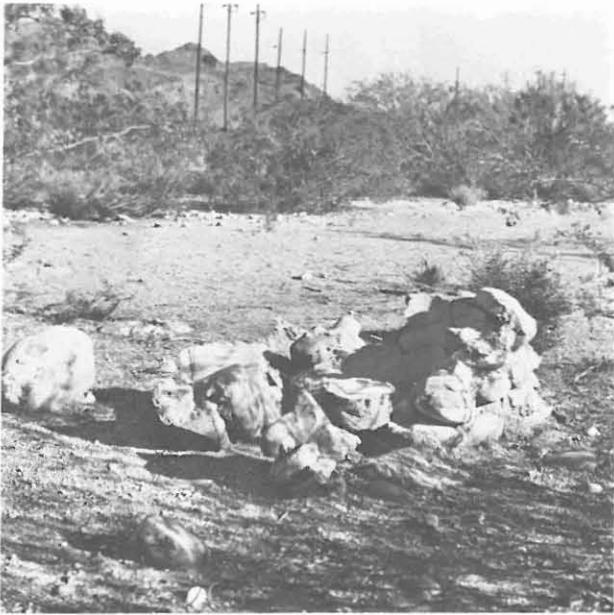


Plate 6. Feature 46. Cobble and concrete tank at SW corner of stable area. View northeast.



Plate 7. Feature 25. Concrete slab for a small tent structure. View south-southwest. Note impressions of corrugated metal in slab profile.



Plate 8. Feature 36. Closeup of cistern. View southwest.



Plate 9. Feature 30. Trash pile. View northeast.

the above categories. Feature 3 was a concrete slab-lined box about 1 m long and 60 cm wide with 4 metal pipes embedded in the ground. Its function is unknown. Feature 11 was a small cobble concentration with sticks of wood which was assumed to be a hearth. Feature 31 was a mounded area supported by a substructure of wooden beams. It had the appearance of a loading ramp. Feature 39 was a collapsed fence made from wooden posts and chicken wire. Its relatively recent appearance suggested that it post-dated the original occupation of the camp. Feature 51 was a wooden beam embedded across a small drainage near Feature 4. A metal spike had been driven into the top of the beam and had penetrated about two-thirds of the way through it.

There was a definite pattern to the distribution of features at the site. The central portion of the camp south of the road was the location of the specialized buildings related to camp administration and communal services, such as offices, bathhouses and dining facilities. The central portion of the site north of the road appeared to contain the special purpose features related to the construction and maintenance of the dam itself, such as the blacksmith's shop and corral. Housing for the workers was located around the periphery of the camp. Trash areas were scattered relatively uniformly throughout the enclosure.

Once the features had been defined and a site map made, the primary field aspects of the site documentation had been accomplished. Further investigations of the surface debris was considered unprofitable. The trash deposits appeared to be largely superficial and mixed. Even where trash occurred in pits, it formed only a thin layer on the pit surface. There was little debris in direct association with any of the features which might have yielded contextual information.

### Test Excavation

Because of the surficial nature of the site, only limited test excavations were conducted. Three features were selected for study. The first was one of the concrete slabs (Feature 8) at the western end of the site associated with a relatively large amount of domestic trash. The second was a possible latrine (Feature 5), one of the few areas where stratified deposits might be found. The third was Feature 51, the beam embedded across a drainage. The selection of this last feature was prompted more by curiosity than by the expectation of information relevant to the interpretation of the site as a whole.

Feature 8. This feature was a concrete slab near the southwestern corner of the site. The slab was made up of 3 segments spaced 10 cm apart. The north and south segments were approximately 4.0 m long and 3.3 m wide. The central portion was 2.4 m long and 3.3 m wide. The total length of the feature measured 10.55 m. A thin (1.5 cm) surface layer of tar covered much of the area in the vicinity of the feature, including part of the south end of the slab. Many of the artifacts were embedded in the tar. The slab appeared to have been resurfaced

at one time. Trash was concentrated to the west of the feature, along a small drainage. A small pile of river cobbles was located to the east.

A surface collection was made of the artifacts located in the vicinity of the feature. Four clusters were isolated along the above-mentioned drainage. The contents of these clusters are summarized in Table 2. A 1 m wide trench was defined around the periphery of the slab and was excavated to a depth of 15 cm below the present ground surface at the southeast corner. The slab itself was approximately 4 cm thick. Only minimal amounts of artifacts were recovered. These are summarized in Table 3.

Feature 8 appears to have been a multi-roomed structure. The trash deposits around the slab suggested an emphasis on culinary activities. If the structure and the trash were associated, then some inferences may be made about the function of the feature. This feature, and by analogy Feature 6, may have been the living quarters for workers with families. These groups would have formed more self-contained living units, performing a wide range of domestic activities for themselves. Some of the other habitation units, such as those along the south fence which had minimal amounts of associated domestic trash, may have housed groups of single workers who would have been more dependent on the domestic services, such as cooking and dining facilities, offered by the government.

It is possible that the occupation of the structure and the deposition of the trash were not contemporaneous events. It is known from early photographs that Feature 8 was part of the original camp construction. It is not known whether the structure was reoccupied during subsequent occupations of the camp site. Most of the artifactual debris was not datable. The principal chronological indicator was the relative proportion of soldered and crimped cans. These comprised, respectively, 54% and 29% of the total tin can count at Feature 8. This indicates that at least some of the trash post-dates the initial occupation of the feature.

The thin layer of tar, spread over much of the area surrounding Feature 8, extended across a portion of the south end of the slab, indicating that it had been deposited after the walls of the structure had been removed. Several of the artifacts were found embedded in the tar, suggesting that some of the trash was deposited after the tar was in place. Because the presence of the tar was unexplained, it was not clear how it affected the relationship between the structure and the artifactual debris.

Feature 5. This feature was a small pit identified as a possible latrine from an early photograph of the site. It was located about 35 m southwest of Feature 4. The pit was 1.2 m in diameter. Fill dirt was mounded around the pit to the east. Rodent disturbance was evident at the base of the pit. A 3 m N-S by 1 m E-W test trench over the eastern half of the feature was excavated to the base of the existing pit (Level 1). Most of the artifacts recovered at this level were associated with the rodent disturbance. The next 20 cm of fill (Level

Table 2. Artifact clusters on the surface adjacent to Feature 8.

Cluster	F.S. #	Material
1	1	29 sherds of a yellow- & white-glazed ceramic from 1 vessel, a constricted bowl form with a slightly recurved rim. 11 sherds of thin, white-glazed ceramic from at least 2 vessels: 1 small globular bowl with at least 1 handle ('sugarbowl') 1 tiny saucer 3 fragments of bottle glass tinged slightly purple.
2	1	106 tin cans representing 9 different types: 48 solder-sealed cans, small (condensed milk?) 7 solder-sealed cans, large 19 cans w/crimped seam, small 13 cans w/crimped seam, large 6 baking powder cans, 3 bodies, 3 lids 3 bacon tins, 1 top, 2 bottoms 2 lard buckets 6 tobacco cans, 2 tops, 4 bottoms 2 Karo syrup lids 3 m of metal strapping 3 round nails
2	2	14 pieces of glass: 1 purple-tinged bottle base (small, rectangular x-section) 1 clear bottle base, PATENT stamped on bottom F 82937 6 fragments of a clear, faceted bottle (catsup?) 2 clear fragments 4 purple-tinged fragments
2	3	2 pieces of calcined, non-human bone.
3	1	4 tin cans: 2 solder-sealed cans, small 1 tobacco can 1 unknown type
4	1	121 aboriginal pot sherds 63 sand-tempered plainware. Some gold mica. 58 sand-tempered plainware, smudged. Sherds appear to come from at least 1 large olla.

Table 2 (Concluded)

Cluster	F.S. #	Material
4	2	13 tin cans: 9 solder-sealed cans, small 4 cans w/crimped seam, large 8 m narrow, metal wire
4	3	13 pieces of glass: 1 thick milk bottle fragment 3 clear bottle fragments 9 iridescent bottle fragments
4	4	1 non-human bone fragment

Table 3. Surface and subsurface artifacts from excavated test units around Feature 8.

Trench	F.S. #	Material
North	1	1 round nail (75 mm)
South	1	8 round nails (65-101 mm) 1 screw 1 metal pin 2 tin can lids 2 fragments of a hardened rubber band 1 roofing disk 1 piece white, glazed crockery 1 metal buckle 2 pieces of thin, metal wire 1 pearl button (4 hole) 2 fragments of calcined bone 1 piece of metal strap
East	1	10 pieces of glass, tinged slightly purple
East	2	1 small piece of wood
East	3	15 round nails (25-105 mm) 1 finishing nail (51 mm) 1 roofing disk
West	1	18 round nails (35-140 mm) 2 coils of thin metal wire

2) had large concentrations of charcoal and ash in localized areas of rodent disturbance. There was an intrusive pit at this level containing several bones, a glass bottle and a piece of corrugated metal (Pit A). At this point it became evident that the pit that had been observed on the surface bore little relation to the actual latrine pit which was rectangular in shape. The latrine pit was 1.2 m N-S and 1.6 m E-W. It had an orientation of N 25° W. The charred organic fill from the pit was removed as a unit (Level 3). Below the charred fill, there was a layer of sterile, brown soil. In the SE corner of the pit, a concentration of a white, lime-like material indicated another, lower level of latrine fill. This second layer of fill (Level 4) was approximately 70 cm deep. It was removed as a unit. A good floor for the pit was reached at 190 cm below the ground surface. Table 4 gives a summary of the artifacts found at each level.

The excavation of Feature 5 confirmed the supposition that the feature was a latrine. There was a well-defined, straight-sided pit in which 2 major periods of deposition were represented. Preservation was excellent in the lower level, as indicated by the presence of seeds, bone and newspaper. The first deposit was apparently covered over by a layer of sterile soil before the second level was deposited. This could have been done without any appreciable time lapse between levels. The thoroughly charred appearance of the fill of the upper level indicates that the entire structure may have burned. There was a relatively high percentage of structural remains in this level, such as nails, roofing disks, corrugated metal, etc., suggesting that portions of the structure may have collapsed into the pit. The pit visible on the surface and intrusive Pit A appear to have been excavated subsequent to the destruction of the latrine superstructure. This is supported by the contrast between the 2 whole bottles found at the feature. The first, from Pit A, had a machine-made neck, and the second, from the upper level latrine fill, had a hand-finished neck. Hunt (1959) states that hand-made necks generally date earlier than World War I while machine-made ones date later. Except for these 2 bottles, there were few chronologically distinct artifacts found throughout the fill.

Feature 51. This enigmatic feature consisted of approximately 0.5 m of exposed wooden beam in the bed of a small drainage. The top of the beam was flush with the drainage bed on the downstream side. Upstream the bed rose sharply to a height of about 15 cm above the top of the beam. It was not clear whether the beam had once been entirely buried and since exposed by headward entrenchment of the drainage, or whether it had originally been situated as it is now. The purpose of the metal spikes driven into the top of the beam is unknown.

An area of 9 m<sup>2</sup> was excavated around the beam. When entirely exposed, the beam measured 3.5 m long and 25 cm square in cross-section. Its south end was approximately 10 cm higher than its north end. Two post holes were found on the upstream side of the beam, dividing its length into thirds. These were about 25 cm deep and extended to the base of the beam. Apparently, the beam had been set into a narrow trench and then had earth filled in around it. The profile of the streambed upslope from the beam showed a

Table 4. Artifacts recovered from the excavation of Feature 5.

Level	Material
Surface	<ul style="list-style-type: none"> <li>1 rubber &amp; fabric shoe sole</li> <li>2 tin cans: 1 tobacco can, 1 small can w/oval cross-section.</li> <li>1 large nut</li> <li>1 fragment of iridescent glass</li> <li>1 clear glass bottle base</li> <li>1 roofing disk w/nail</li> <li>1 round nail (98 mm)</li> <li>2 pieces of graphite</li> <li>2 pieces hardened rubber</li> <li>4 unidentified metal scraps</li> </ul>
Level 1	<ul style="list-style-type: none"> <li>11 round nails (40-116 mm)</li> <li>1 nail tip</li> <li>1 round-headed screw</li> <li>1 round-headed tack</li> <li>17 pieces of bottle glass (13 iridescent, 3 clear, 1 brown)</li> <li>5 pieces of cement</li> <li>14 pieces of hardened rubber</li> <li>19 unidentified metal fragments</li> <li>1 roofing disk</li> <li>4 pearl buttons (2-hole)</li> <li>31 pieces of non-human bone, unburned (rodent or rabbit)</li> <li>7 pieces of non-human bone, burned</li> <li>1 rubber shoe sole</li> <li>1 wooden pencil end</li> <li>1 tobacco can &amp; lid</li> <li>1 used-up tube of toothpaste. Colgate and Company *New York*</li> <li>1 metal can lid</li> <li>1 piece of metal w/rivet</li> <li>1 spent bullet - solid jacket, approx. 30 caliber</li> <li>1 white, metal eyelet (from shoe?)</li> <li>metal wire</li> </ul>
Level 2	<ul style="list-style-type: none"> <li>30+ round nails</li> <li>3 nail tips</li> <li>1 piece of metal strap</li> <li>8 pieces of non-human bone, unburned</li> <li>1 piece of non-human bone, burned</li> <li>5 fragments of glass (2 brown, 3 iridescent)</li> <li>1 tin can base (10 cm diameter)</li> <li>1 small caliber shell</li> <li>1 piece of charred wood</li> <li>1 large nut</li> </ul>

Table 4 (Continued)

Level	Material
Level 2 (Cont.)	<ul style="list-style-type: none"> <li>1 roofing disk</li> <li>1 screw</li> <li>1 rivet</li> <li>50+ unidentified metal fragments</li> <li>4 buttons, 2-hole (3 pearl, 1 white)</li> <li>metal wire</li> </ul>
Pit A	<ul style="list-style-type: none"> <li>1 boot sole</li> <li>8 pieces hardened rubber</li> <li>1 roofing disk</li> <li>1 metal tube fragment</li> <li>several fragments of a large (bovine?) tibia.</li> <li>1 whole bottle, iridescent glass, rectangular cross-section, machined neck, no markings</li> <li>1 piece corrugated metal</li> </ul>
Level 3	<ul style="list-style-type: none"> <li>200+ round nails</li> <li>75+ glass fragments, some purple</li> <li>75+ unidentifiable metal fragments</li> <li>50+ roofing disks</li> <li>2 round-headed screws</li> <li>13 pieces of hardened rubber</li> <li>11 pieces of non-human bone, unburned</li> <li>5 pieces of non-human bone, burned</li> <li>1 piece of corrugated metal w/two nail holes.</li> <li>8 tin cans: 1 lard bucket, 5 tobacco cans,</li> <li>1 large can, gallon size, 1 gasoline can</li> <li>1 metal key (from sardine can?)</li> <li>1 light bulb base</li> <li>3 shells, 1 shotgun &amp; 2 small caliber</li> <li>2 glass stoppers</li> <li>2 buttons, 1 pearl, 2-hole; 1 white, 4-hole</li> <li>1 spoon fragment, large</li> <li>2 pieces of used up metal tube</li> <li>1 hand pump</li> <li>1 metal handle</li> <li>2 pieces of metal w/rivet</li> <li>2 bottle caps</li> <li>1 whole bottle, iridescent glass, rectangular cross-section, hand-molded throat</li> <li>1 grinding wheel fragment</li> <li>5 pieces of wood</li> <li>5 pieces of glazed white ceramic</li> <li>1 piece of black cloth</li> <li>1 small bundle of black thread</li> <li>1 burned pendant</li> <li>1 piece of glass tube, iridescent</li> <li>newspaper fragments</li> <li>metal wire</li> </ul>

Table 4 (Concluded)

Level	Material
Level 4	2 round nails 1 tobacco can 6 unidentifiable metal fragments 30+ fragments of bone (small fowl) 20+ seeds (squash?) 1 fruit pit 1 piece of braided black thread large quantities of illegible printed matter

soil change which may correspond to an old stream channel somewhat wider than the present one. Artifacts recovered from the excavation included 33 unidentifiable metal fragments, 1 roofing disk, 9 round nails, 1 link of a metal chain, 6 non-human long bone fragments, metal wire, 3 fragments of iridescent glass and 1 piece of thick, red ceramic "drain" pipe.

The drainage on which Feature 51 was located runs diagonally SE to NW past the SW corner of Feature 4B, the small slab with a central drain. The length of the drainage from above Feature 4 to the road was sporadically lined with fragments of thick, red ceramic pipe. Efforts to reconstruct this pipe revealed that it was semi-circular in cross section. The date June, 1908, was stamped on several of the fragments. It is hypothesized that this stream channel, lined with a ceramic drain pipe, was used to drain water from Feature 4B and perhaps from the cistern area further upslope. Presumably, the beam across the drainage at Feature 51 had some function in this system. Unfortunately, this could not be corroborated.

## DOCUMENTARY EVIDENCE

Documentary evidence concerning the Granite Reef Dam work camp occurred in 2 forms, written records and photographs. The principal sources of information about the site were a 3-volume manuscript entitled, "History of the Salt River Project," produced by the Salt River Valley Water Users' Association (n.d.) and the annual reports of the U.S. Reclamation Service which were first published in 1902. In addition, the photograph collections in the Arizona Room of the Hayden Library at Arizona State University, in the Salt River Project files and in the National Archives, yielded important photographs of the dam and the camp.

Written records concerning the dam itself were not extensive and consisted primarily of an enumeration of technical specifications. The activities at Granite Reef Dam were overshadowed in published reports by the construction of Roosevelt Dam, a unique structure designed for flood control and storage of water located 45 km (28 mi) upstream from Granite Reef on the Salt River. The dams were built concurrently and provided the basis for water development in the Salt River Valley. Roosevelt Dam was under construction from 1905 to 1911. Granite Reef Dam was built between 1906 and 1908. The chief engineer in charge of both projects was Louis C. Hill (cf. Peplow 1970:136-140).

The principal function of Granite Reef Dam was to divert water from the Salt River into the Arizona and South Canals which served the irrigation needs of water user's on the north and south sides of the river, respectively. The Arizona Canal had been in existence since the late 1800s when it originated at the Arizona Dam, a timber crib structure located about 3 km (2 mi) upstream from the Granite Reef site (SRV Water Users' Association n.d.). The South Canal was constructed by the U.S. Reclamation Service and completed in June, 1909 (U.S. Department of the Interior 1916:59).

Granite Reef Diversion Dam is a rubble concrete weir with a maximum height of 11.6 m (38 ft) and a base 11 m (36 ft) wide. A concrete apron 45 cm (18 in) thick extended 22.9 m (75 ft) downstream from the toe of the dam. Concrete sluiceways and headworks for the canals are located at each end of the dam. Diversion capacity is 56 m<sup>3</sup>/sec (2000 ft<sup>3</sup>/sec) on the north side and 44.8 m<sup>3</sup>/sec (1600 ft<sup>3</sup>/sec) on the south side (U.S. Department of the Interior 1910:65; 1961:6).

Written documents about the work camp itself were rare. The earliest occupation was the subject of a 3 page summary in the Salt River Project history (SRV Water Users' Association n.d.:149-150, 160). That account is reproduced here in full.

The Granite Reef camp was a model of its kind. It was located on the south side of the river, about thirteen miles from Mesa, the point of supply. Early in October, 1906, construction

was commenced on the camp. The camp buildings were usually wooden frames, with corrugated iron covering and a strip of wire screen running completely around, with cement floors and a canvas fly in addition to the regular roof, for further protection from the sun.

A mercantile store was run by the Government, by a system of coupon tickets, and a complete variety of necessary supplies was sold.

A large building, with concrete floor and screened sides, was built and furnished with chairs and tables for a convenient place of meeting and amusement. Here ice-cream, cigars and soda-water were sold as a department of the mercantile store. The isolated location of the camp and the heat of the climate made this a much appreciated place and helped to keep the camp more orderly and contented. The same may be said of several shower baths which were installed.

The laborers were fed at a Government mess and lodged in bunk-houses of wood and corrugated iron, with concrete floors and screened sides. The mess house was built with two wings, the white men occupying one side and the Mexicans the other.

Water was furnished from wells near the river, being pumped into an elevated tank near the mountain side by a gasoline engine and piped from the tank to the various parts of the camp and corrals.

A power and machine shop was erected, the machine shop wing equipped with both wood and iron working machinery. Electric power was furnished on contract by the Pacific Gas and Electric Company, the current being delivered on the ground by that company at a rate of  $3\frac{1}{2}$  cents per k.w.h.

An electric railway was built for the purpose of carrying rock from the quarries one half mile away. It was equipped with a ten-ton Jeffry locomotive and ten hopper-bottom cars, the rails being 25 lbs. to the yard.

All material and supplies came by way of Mesa, the nearest railroad connection, and were hauled by wagon from that point to the dam. The common freight rate paid for this distance was twenty

cents per hundred pounds. A daily stage from Mesa carried mail and passengers. Shattuck and Desmond had the contract for hauling the mail and miscellaneous freight.

The sources of supply for the more important materials were as follows: Cement from the Government plant at Roosevelt, and also from Iola, Kansas. Gravel was found in several of the excavations in the river bottom. Rock was partly collected from the river bottoms and partly from the quarries. Lumber was shipped from the Pacific coast.

A cableway was erected spanning the river directly over the line of dam and was used for handling materials, and at times, during floods when bridges were washed away, the men were transported to the north side of the river in this manner.

Engineering and Superintendence

Designing . . . . .	\$ 4,193.81
Constructing Engineer . . . . .	5,693.00
Engineering Party . . . . .	6,272.21
General Foreman . . . . .	3,825.00
Clerical and Timekeeping . . . . .	5,950.44
Travel . . . . .	575.35
Stationery . . . . .	162.25
Carrying Mail . . . . .	495.75
Corral Expense and Teaming . . . . .	1,630.84
Miscellaneous Expense . . . . .	494.82
	<u>\$29,293.47</u>

The above expense was distributed to the various features of the work.

Granite Reef Camp Construction

Office Building . . . . .	\$ 493.44
Engineers' Tents . . . . .	713.16
Foremen Tents . . . . .	2,471.22
Bunk Houses . . . . .	2,742.47
Mess House . . . . .	3,070.37
Mercantile Store . . . . .	825.23
Ice House . . . . .	759.79
Ice Cream Parlor . . . . .	432.96
School House . . . . .	136.86
Hospital . . . . .	173.18
Bath Houses . . . . .	113.39
Water Works . . . . .	2,182.09

Camp Lights . . . . .	1,367.27
Cesspool, Sewerage, Water Closets . . . . .	686.51
Corral Buildings . . . . .	1,123.64
Cement Storage Sheds . . . . .	3,008.09
Powder Houses . . . . .	234.65
Bridges and Roads . . . . .	917.81
Miscellaneous Camp Equipment . . . . .	432.47
Miscellaneous Labor and Material . . . . .	2,243.50
	<u>\$24,128.10</u>

The above, after deducting for salvage value, was distributed to various features of the work.

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The price of common labor was \$2.00 per day, other labor \$2.00 to \$3.00 per day; drillers \$2.75; carpenters \$3.50 to \$5.00; helpers \$2.50; sub-foremen \$3.50. Seventy-five cents per day was deducted for meals.

Subsequent occupations took place in 1916 and 1920 when flood damage required major repair efforts. A flood in January, 1916, damaged the apron and sluiceways of the dam and destroyed the wing wall on the north side (U.S. Department of the Interior 1917:49; SRV Water Users' Association n.d.:35,53-57,60-69). A camp was established at Granite Reef in the early part of May, 1916; repair work was started in mid-May and was finished in August. Laborers were paid at the rate of \$2.25 per day and the stock was hired on a monthly basis at the rate of \$10.00 per month (SRV Water Users' Association n.d.:64,69). There was no indication of the size of the work force required to make the necessary repairs.

The work camp was occupied for a third time by a small detachment of soldiers from L Company, 35th Infantry, U.S. Army in 1917 just after the U.S. became involved in World War I (U.S. Army Special Staff n.d.:3:1:610 and 3:2:1378-1379). These troops were stationed at the camp to protect the dam from sabotage attempts. The International Workers of the World ("Wobblies") had made threats against both Granite Reef and Roosevelt Dams, which were at that time the power and water lifelines of the growing communities in the Salt River Valley.

The dam was once more damaged by flood water in November and December, 1919. A large portion of the apron was destroyed. Louis C. Hill, now a consulting engineer for the Reclamation Service in Los Angeles, was sent to oversee the repairs. Facilities for the workers were provided at the work camp site. The work force, which had initially consisted of 100 men and 40 head of stock, grew rapidly to 250 men and 200 head of stock (SRV Water Users' Association n.d.).

In addition to the relatively scant written documentation, there was an invaluable photographic record of the site. The photograph most valuable to this project was a large panoramic view of the entire work camp copyrighted in 1907 by the California Panorama Company,

Los Angeles. It shows the dam under construction and the disposition of all the tent structures and other buildings within the camp. A copy of this photograph was obtained from the Arizona Historical Foundation, Hayden Library, Arizona State University. It was used extensively during the mapping and recording phases of the site investigation. Plate 1, which shows a similar view of the main portion of the site, was obtained from the Salt River Project Archives. The National Archives provided photographs of the completed dam (Plate 3). The remaining photographs show views of the interior and exterior of several structures within the work camp. These were obtained from the Arizona Historical Foundation (Plate 10) and the Salt River Project Archives (Plates 11 through 15). These latter photographs were not individually dated, but they came from a Salt River Project folio marked 1905 to 1911. Therefore, it is assumed that they were associated with the original occupation of the site.



Plate 10. Tent structure and workers. Photograph obtained from the Arizona Historical Foundation.



Plate 11. Small tent structure. Cistern in right center. Photograph obtained from Salt River Project.



Plate 12. Interior of tent structure. Photograph obtained from Salt River Project.



Plate 13. Interior of commissary building. Photograph obtained from Salt River Project.

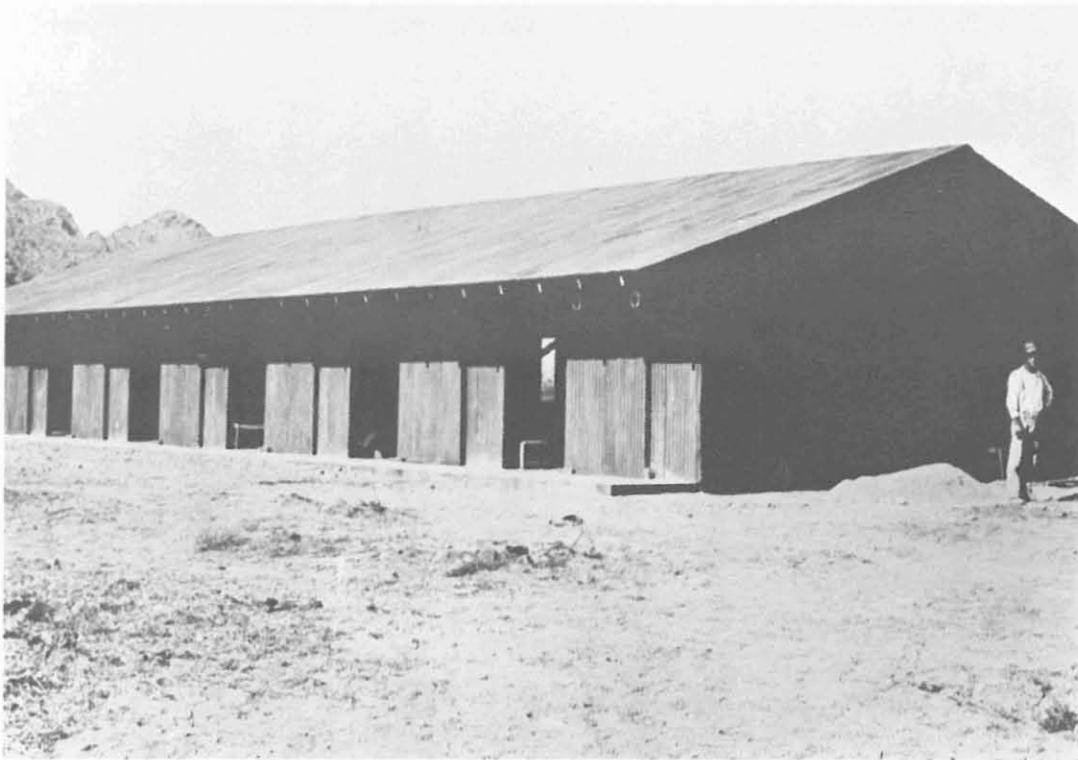


Plate 14. Exterior of "cement house." Photograph obtained from Salt River Project.

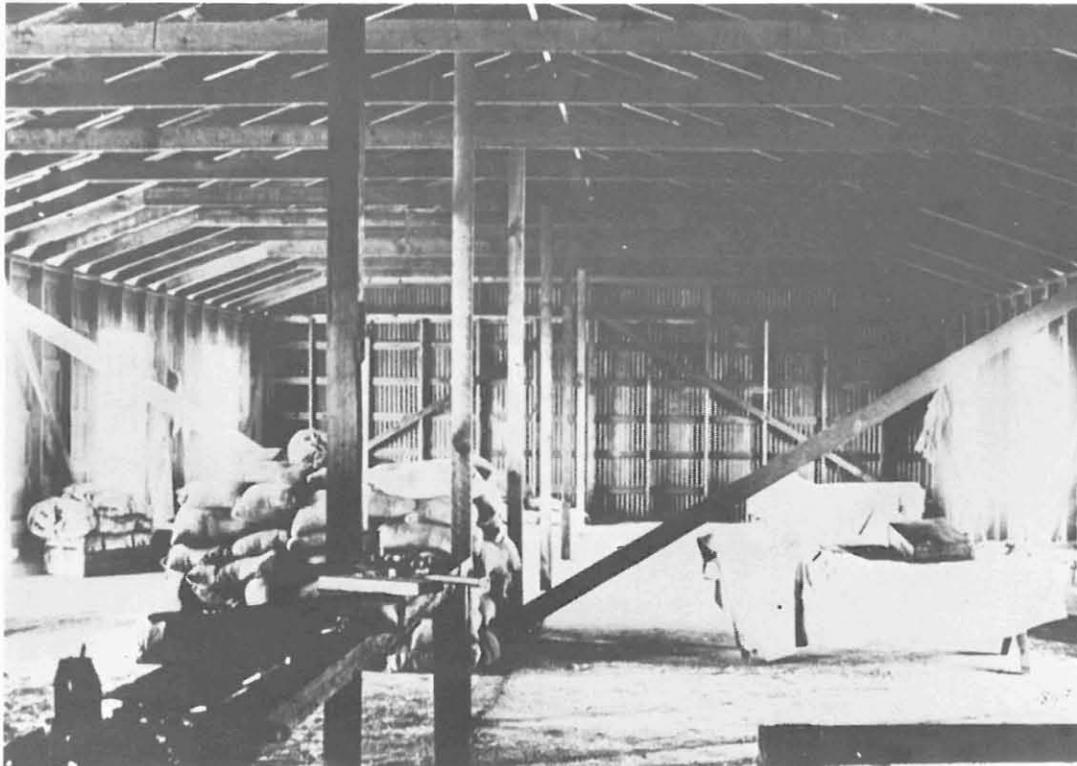


Plate 15. Interior of "cement house." Photograph obtained from Salt River Project.

## ORAL HISTORY

It was very fortunate that an informant was found who had some recollection of the site. Gertrude Hill Muir was born in the gatetender's house at Granite Reef Dam in October, 1909. Her father, Edwin Bliss Hill, was employed by the U.S. Reclamation Service as gatetender for the dam. Edwin Hill had been a journalist before he entered the Reclamation Service, and he operated one of the few private printing presses in the country (Muir n.d.). He wrote and printed many articles about life at the dam and contacts with neighboring ranchers and prospectors. Mrs. Muir's uncle, Louis C. Hill, was the chief engineer in charge of the construction of both Roosevelt and Granite Reef Dams. All during Gertrude's early years she was told facts and stories about the operation of the Granite Reef work camp by her father and uncle. The Hill family left Granite Reef in 1917 when Gertrude was 9 years old.

As Adams (1975:159) has pointed out, there are limitations to the information which can be provided by a person who was a small child at the time a site was occupied. However, Mrs. Muir's observations and reminiscences, taken in conjunction with the archaeological and documentary evidence, were invaluable for the corroboration and interpretation of the activities which were performed at the site. Approximately 4 hours of interviews with Mrs. Muir were tape recorded. Portions of those conversations are paraphrased below.

### On Buildings

One of the largest buildings at the camp was the combined commissary and ice house. In the ice house the ice blocks were packed in sawdust, and fresh meat and vegetables were kept there. The mess hall and kitchens were in a separate building. There were two blacksmith's shops, a small one near the gatetender's house which was in use when Mrs. Muir was a child and a larger one further west, on the edge of the terrace which had been used when the camp was occupied. The corrals were on the level below the large blacksmith's shop. These were used for the large number of horses and mules required to pull the heavy construction machinery such as fresnos and scrapers. One large corral had a feed trough in the middle. There were separate sheds for the buggy and for feed. There was a separate stall with a stone and concrete water tank for the Hill's buggy horse. The corrals were constructed with wood and corrugated metal roofing. The 6 inch square posts were firmly set. The workers were housed in small tent structures and dormitories or barracks. These had cement floors with corrugated metal half the height of the building and corrugated metal roofs. Frequently the metal roof was covered by heavy canvas on a wooden frame to cut down on the heat. A particular tent house, dubbed Honeymoon Cottage, was occupied by the Hills until their house was completed in 1909.

### On Supplies

All supplies were hauled in from Mesa, the end of the railroad line. This included heavy machinery, blacksmith's supplies, such as harness and bellows, and charcoal for heating, as well as food supplies in large quantities, canned goods and staples such as sugar, flour, meal, beans and milk. Supplies could be purchased at the commissary very cheaply.

### On Water

Water was obtained from an underground stream which flowed from the hills to the south. It was tapped at a point between the gate-tender's house and the South Canal. A windmill was used to pump the water up to the cistern at the base of the hills. From the tank the water was dispersed throughout the camp in pipes. There were pipelines which ran to the commissary, cook house, Honeymoon Cottage and the corral where a large water tank was kept full at all times. Mrs. Muir recalls a small seep spring which was located on the side of Schlecht's Butte above the water tank. It was no longer there at the time of this study.

### On Power

Gasoline engines were the primary source of power during the construction of Granite Reef Dam. Coal oil and kerosene lamps were also used. As mentioned above, water was pumped with the use of a windmill. After the Roosevelt Dam power canal was completed, electric power would have been available at the site.

### On the Railroad and Quarry

A quarry for rock used in construction of the dam was located some distance to the east of the camp. A narrow railroad was installed to bring rock from the quarry to the construction site. The quarry was close to the river. The railroad was abandoned and stripped after the dam was finished.

### On Trash

The small railroad was also used to dump trash in the dump area about 0.4 km ( $\frac{1}{4}$  mi) east of the camp enclosure. The tin can dump was located on the flat to the east of the camp. There were also trash pits into which perishables were dumped. These were scavenged by several species of wild life including coyotes, bobcats, rabbits, skunks and wild burros. The government was very strict about the disposal of trash, and the small trash areas found within the enclosure today were probably from a later date. Much of the metal trash was recovered by the Hills during World War I in a scrap metal drive.

### On Workers

The work force was drawn from Anglo, Mexican and Indian groups in the area. The Indians came from Fort McDowell and the Pima-Maricopa Reservations. There was no official policy of segregation, but the different groups tended to keep to themselves. Many of the Indians, particularly those with families, established their habitations outside the fenced enclosure. They also harvested the local natural plant resources such as cactus fruit and mesquite beans in season and hunted small game to supplement the supplies provided by the government.

There were several specialized positions within the work camp structure. The engineers, designers and crew foremen lived apart from the laborers. Other specialized jobs were performed by the blacksmith, cook, office clerks, powder men who supervised the blasting, and teamsters who operated the construction equipment. The work force was entirely male. The only females within the camp were wives of the workers. Hours varied depending on the work that had to be done. A 6-day work week was in effect.

### On Services and Recreation

Medical services were provided by a doctor who visited the camp once or twice a week. He drove a horse and buggy from Mesa, a 3-hour drive. There was little in the way of organized recreation available to the inhabitants of the camp. The Indians and Mexicans sometimes had horse races among themselves. Poker was popular. There were occasional dances in Lehi and Mesa which may have been infrequently visited by members of the camp.

### On the World War I Occupation

The camp was dismantled and abandoned after the original occupation. In 1917, after the outbreak of the war, it was reoccupied by a small detachment of soldiers from L Company, 35th Infantry. Several buildings were reoccupied. The commissary was remodeled as a barracks. Honeymoon Cottage was used as a mess hall. One of the other buildings was used as a field hospital where there was a medical officer on duty at all times. Some buildings were used for storage. The army had a trash dump separate from the one used during the earliest occupation. There was an area for target practice for the soldiers to the east of the enclosure. A trench was dug in front of the targets for the scorekeeper.

### On External Connections

The closest point of contact with the outside world was Mesa 24 km (15 mi) to the southwest. At first the only road connecting Mesa with Granite Reef ran through a pass in the Utery Mountains to

the east of the camp approximately where the Bush Highway runs now. It ran straight south until it intersected Roosevelt Road (now the Apache Trail) near Desert Wells, an early homestead owned by the Hills. Later a dirt road was completed along the south side of the South Canal which headed more directly to Mesa. A telephone line ran between Granite Reef, Mesa and Roosevelt Dam.

Despite these connections, Granite Reef Camp was very isolated from the "civilized" world. However, there were frequent contacts with neighboring sheep and cattle ranchers and prospectors. The Granite Reef work camp straddled 2 ways of life in a time of very rapid change. It maintained contact with the disappearing life of the frontier, and, at the same time, it was a part of the commercial and industrial development in the region.

## SUMMARY AND CONCLUSION

The 3 lines of evidence used in the study of the Granite Reef work camp, archaeological, documentary and oral history, were meshed to obtain a general outline of the site's structure. Several of the foundations noted during the mapping process could be tentatively correlated with buildings described in written documents, photographs, and Mrs. Muir's recollections.

During the mapping phase of the project, the complex of features near the center of the extant site area had been identified as special purpose public buildings on the basis of their distinctive size and configuration. The features south of the road were tentatively linked with administrative and service activities. The large "Y"-shaped concrete slab (Feature 27) on the western edge of the borrow pit was probably the mess hall and kitchen, the 2 arms of the "Y" being the segregated wings of the dining hall separating the Mexican (and Indian?) workers from the Anglos and the base of the "Y" being the kitchen area. Several of the outbuildings associated with this feature had been destroyed by the borrowing activities. There was very little trash around the feature to support or dispute the above interpretation. To the west of the mess hall was the large, square slab with a central drain (Feature 28) which was probably the location of the "shower baths" described in the written description of the site (SRV Water Users' Association n.d.). This feature was not a "tent-house" as were most of the other structures in the camp, but appeared to have been constructed entirely of corrugated metal. The commissary building and ice house were consistently linked with each other in Mrs. Muir's recollections. If these 2 features were associated, then the large rectangular slab with the small appended room with a central drain (Feature 4 and 4B) may represent that combination. Again, there was no artifactual evidence to support this supposition. The last feature in the central complex south of the road was a 3-section, rectangular slab with a well-worn entryway (Feature 1) in association with primarily non-domestic trash. In the panoramic photograph of the site, the only flagpole visible in the site area stood in front of this building which may have housed the administrative offices. The latrine (Feature 5) which was excavated was located directly behind this feature. The excavation did not yield definitive artifactual evidence to support the inferred function of Feature 1.

North of the road there were 3 main features, 2 rectangular concrete slabs on the level of the camp (Features 44 and 45) and a pattern of post supports and 2 water tanks on the bench below to the west (Feature 46). This latter feature fits closely with Mrs. Muir's description of the location of the corral for the stock; the configuration of the posts, the absence of other architectural remains and the presence of the water troughs support this correlation. One of the blacksmith's shops discussed by Mrs. Muir was located on the ledge above the corral. This corresponds well to the location of Feature 45, a crumbling concrete slab which had been interpreted as a possible blacksmith's shop on the basis of the large number of nails covering the feature and the presence

of horseshoes. The function of the other concrete slab (Feature 44) was not determinable in the field. It was a very large slab with a unique pattern of internal support features, but there was almost no associated trash (Plate 5). However, there was a striking similarity between the remnant support pattern at Feature 44 and the internal structure illustrated for the building used for the storage of cement (Plates 14 and 15). The position of the feature corresponds with a building marked "cement house" on an early map of the site. To the east of these features is the southern abutment of the dam. As seen in the photograph, the narrow gauge railroad encircled the construction yard at the base of the dam (Plate 1) and ran east to the quarry; however, there is no longer any evidence of its presence. Power poles were concentrated in the central area north of the road (Plate 1). They apparently supplied electricity for the operation of the railroad and other machinery. The general area adjacent to the dam abutment appears to have been the site of most of the maintenance and construction activities related to the dam itself.

The remaining features within the fenced enclosure were characterized as habitations, either communal or individual. The listing of structures at the Granite Reef camp reproduced in the Documentary Evidence section indicates that the engineer's tents, foremen's tents and the bunk houses for the laborers were all separate structures. Three types of generalized features were identified which may correspond to these 3 identified divisions. A field examination of the surface artifacts associated with each of the 3 types was disappointing. None of the features had a significant amount of surface trash except for Feature 8 which was systematically collected. An element common to all 3 types of inferred habitation structures was the presence of clusters of river cobbles in close proximity. These may have been the bases for hearths or open fires as suggested by the cobble and wood debris in the foreground of Plate 10. The western cluster of habitation units consisted of 2 multi-roomed structures. The southern cluster consisted of 9 small, single-roomed tent houses in 2 slightly varying sizes. The eastern cluster included 3 long, narrow features which could have been bunk houses.

There were several specialized structures included in the list of buildings at the camp which could not be confidently correlated with any of the recorded features during the present study. These included the ice cream parlor, school house, hospital and powder houses. Remains from these buildings may have been present and unrecognized, or they may have been destroyed by the borrowing activities or construction of the experimental station.

The distribution of trash at the site was somewhat problematical. Mrs. Muir was emphatic in asserting that the main area for the disposal of trash in both the construction occupation and the Army occupation was in localized areas to the east of the fenced enclosure. A survey of this area revealed small scatters of trash but nothing of the magnitude expected from a prolonged occupation. The scarcity of artifactual debris in the vicinity of most of the structural features argues for an effective control of littering which would be expected in a camp run

by the government or Army. The localized areas of trash which do occur were probably deposited when the camp was not fully occupied, in areas which were not currently in use.

The association of the surface trash with any particular occupation was not possible. All of the documented occupations of the work camp occurred between 1905 and 1920. In distinguishing diagnostic changes in artifacts of the post-1900 period, World War I is used as a convenient time divider. Such characteristics as purple glass, hand-molded bottle necks and tin cans with soldered seams generally are classified as pre-WWI, but there is no specific cut-off date (Hunt 1959). All the occupations could fall reasonably within the range of these early diagnostics. Some of the later characteristics such as machined bottle necks could probably be excluded from the earliest occupation, but the trash deposits were generally so mixed that no distinguishing set of characteristics occurred in isolation.

The original camp was designed as a specialized site oriented toward the completion of a specific task, the construction of Granite Reef Dam. Once that task was accomplished, there was no longer any need for the site. It was never intended as a permanent installation. Most of the buildings had a removable and reusable superstructure of metal, wood and canvas. The salvage value of the materials was calculated to offset partially the costs of construction, as indicated by the footnote to the price lists for the various features at the camp (SRV Water Users' Association n.d.:160).

Subsequent occupations of the camp also represented specialized functions, such as repairing flood damage to the dam or protecting it from sabotage. These occupations were generally of short duration and also made use of recyclable materials. Their presence did little to change the physical character of the site.

There was little specific information available about the character and organization of the human population at the site. The work force was drawn from at least 3 ethnic groups, Indians, Mexicans and Anglos. The overwhelming number of workers participating in the operation of the site were adult males. There was some level of racial and social discrimination evident in the segregation of dining facilities and the separation of the living quarters of the engineers, foremen and laborers.

The Granite Reef Camp and the Roosevelt Camp, which had been constructed 1 year earlier in 1905, were the prototypes for Reclamation Service construction camps of that period. While these camps relied on the surrounding communities, particularly Mesa for personal and subsistence needs, their administration and technical operation were more directly under the jurisdiction of the federal government.

Historically, the work camp represents a transitional period between the frontier way of life which had characterized the early settlement in the Southwest and the modern pattern of industrialization and growth. The frontier period was initiated by the efforts of individuals

or small groups of individuals to establish a foothold in the harsh desert environment. This pattern was gradually superceded in the late 19th and early 20th centuries by more concerted efforts toward ordered growth and development. The conception of the Salt River Project and the construction of Roosevelt and Granite Reef Dams were among the first organized steps in that direction.

## EVALUATION

The Granite Reef Dam work camp played a significant role in the historical development of the Salt River Valley. However, as it stands now, its principal value lies in the study and documentation of its early occupations rather than in its preservation as a site of national historic importance. Therefore, on the basis of the archaeological survey which identified AZ U:6:2 (ASU) (Rogge 1977), a determination of "no adverse effect" was made for the impact of the Salt River Siphon on that site. This decision was made by the Bureau of Reclamation in conjunction with the State Historic Preservation Officer in accordance with Part I of the Guidelines for Making "Adverse Effect" and "No Adverse Effect" Determinations for Archaeological Resources in Accordance with 36 C.F.R. Part 800, prepared by the Advisory Council on Historic Preservation. This determination was contingent upon the implementation of a systematic program of data recovery and site documentation as outlined in Part II of the Guidelines. This report documents the second phase of investigations at the site.

Portions of the Granite Reef Camp site still remain intact subsequent to the construction of the siphon. These areas may still yield useful information. Therefore, it is recommended that any further impact on the site should require additional archaeological evaluation.

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