CAPE CANAVERAL AIR FORCE STATION, HAER NO. FL-8-11-S-5
LAUNCH COMPLEX 39,
SOLID ROCKET BOOSTER DISASSEMBLY & REFURBISHMENT COMPLEX
HIGH PRESSURE WASH FACILITY
(Hangar AF Complex-High Pressure Wash Facility)
(John F. Kennedy Space Center)
Cape Canaveral
Brevard County
Florida

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
Department of Interior
100 Alabama St., SW
Atlanta, Georgia 30303

HISTORIC AMERICAN ENGINEERING RECORD

CAPE CANAVERAL AIR FORCE STATION, LAUNCH COMPLEX 39, SOLID ROCKET BOOSTER DISASSEMBLY & REFURBISHMENT COMPLEX HIGH PRESSURE WASH BUILDING
(Hangar AF Complex – High Pressure Wash Building)

HAER No. FL-8-11-S-5

Location: Cape Canaveral Air Force Station, Cape Canaveral, Brevard County, Florida.

USGS Orsino, Florida, Quadrangle, Universal Transverse Mercator Coordinates: E 540465.24 N 3151325.46 Zone 17, NAD 1983.

Date of Construction: 1979

Present Owner: National Aeronautics and Space Administration (NASA)

Present Use: Solid Rocket Booster Disassembly & Refurbishment

Significance: The Solid Rocket Booster (SRB) Disassembly & Refurbishment Complex contains the High Pressure Wash Building and eight other facilities that played an essential role in the reusability of the SRBs in the Space Shuttle Program (SSP). The complex is considered eligible for the NRHP as a historic district in the context of the SSP (1969-2011) under Criterion A for Space Exploration. The High Pressure Wash Building has achieved exceptional significance within the past 50 years, so Criterion Consideration G also applies. The complex was originally designed or modified to process SRBs, from pre-launch manufacture and assembly to post-launch recovery, disassembly, cleaning, and refurbishment. The complex maintains a high level of physical integrity.

Report Prepared by: New South Associates, Stone Mountain, Georgia

Date: October 16, 2012

PART I. HISTORICAL INFORMATION

A. INTRODUCTION

The High Pressure Wash Building (Building 66240) is located at the SRB Disassembly and Refurbishment Complex on Hangar Road in the Industrial Area of the Cape Canaveral Air Force Station (CCAFS). The complex's boundaries are defined as the edges of the concrete hardscape that surrounds Hangar AF. The complex contains nine facilities, including the High Pressure Wash Building (8BR2003). The remaining eight facilities are Hangar AF (8BR2001), the High Pressure Gas Building (8BR2002), the First Wash Building (8BR2004), the SRB Recovery Slip (8BR2005), the SRB Paint Building (8BR2006), the Robot Wash Building (8BR2007), the Thrust Vector Control Deservicing Building (8BR2008), and the Multi-Media Blast Facility (8BR2009).

The complex is a significant historic property for its association with the Space Transportation System (STS), commonly known as the "Space Shuttle." The STS was a unique breakthrough in the history of the U.S. Space Program because it was based on a design that made most of its major components reusable. This model decreased program costs and helped make orbital space flight a routine endeavor. Along with the orbiter spacecraft, the SRBs were two of the Space Shuttle's primary reusable elements, while the external tank (ET) was not reused. The SRBs' reusability was made possible by a number of facilities at Kennedy Space Center (KSC) and CCAFS, including the SRB Disassembly and Refurbishment Complex. The complex is the first place the SRBs were brought after their recovery from sea and where they were disassembled, cleaned, and processed before being moved to other KSC facilities for buildup and assembly.

B. HISTORICAL CONTEXT

A full historical context for the SRB Disassembly and Refurbishment Complex, as well as a summary of the entire disassembly and refurbishment process, can be found in HAER NO. FL-8-11-S (Hangar AF Complex). A detailed explanation for the portions of that process that occurred in this resource is located in Section III of this document.

C. PHYSICAL HISTORY

1. Date of Construction:

1979

2. Architects/Engineers:

Sverdrup & Parcel and Associates, Inc., Jacksonville, Florida.

Sverdrup & Parcel was the engineering, architectural, and planning services branch of the larger Sverdrup Corporation, a broad-based engineering firm that worked throughout the United States and internationally.[1]

The company was founded as Sverdrup and Parcel in 1928 by Norwegian engineer Leif J. Sverdrup and John Ira Parcel, a professor at the University of Minnesota. Together, the men specialized in bridge design and construction and became one of the most respected bridge firms in the country by the 1940s. During World War II, the firm broadened its scope of services to include work for the

[1] *Sverdrup Corporation: Company History*, http://www.fundinguniverse.com/company-histories/Sverdrup-Corporation-Company-History.html. Accessed November 17, 2011.

U.S. Corps of Engineers in the Pacific theater, including a chain of airfields in the South Pacific leading to the Philippines.[2]

Domestically, Sverdrup and Parcel continued to concentrate on somewhat routine bridge, railroad, and highway construction. In the late 1940s, however, the firm expanded into the design of military and aviation test facilities for the U.S. Government, including architectural and engineering services at the new Arnold Engineering Development Center (AEDC) in Tullahoma, Tennessee, and the Air Force's Joint Long-Range Proving Ground at Cape Canaveral, Florida. The work at Cape Canaveral opened the door for the firm to work in the 1960s with NASA and the Air Force, first in the development of rocket test stands, and then in 1977 with modifications to Hangar AF.[3]

3. Builder/Contractor/Supplier:

Holloway Construction

4. Original Plans and Construction:

The original construction plans reveal that the High Pressure Wash Building retains its original appearance.

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[2] International Directory of Company Histories, *Sverdrup Corporation: Company History* (Farmington Hills, MI: St. James Press, 1996), http://www.fundinguniverse.com/company-histories/Sverdrup-Corporation-Company-History.html. Accessed November 17, 2011.

[3] International Directory of Company Histories, *Sverdrup Corporation: Company History* http://www.fundinguniverse.com/company-histories/Sverdrup-Corporation-Company-History.html. Accessed November 17, 2011.

5. Alterations and Additions:

The High Pressure Wash Building has had three alterations to its exterior since it was built. The first of these was a new roll-up door attached to the exterior concrete lintel of the northernmost bay door. Originally, all three of the building's roll-up doors were set inside their concrete lintels. This alteration was completed at an unknown date.

The second and third alterations to the High Pressure Wash Building occurred in 1983. The engineering firm of Burns and Roe designed the modifications. The building's original 1977 construction drawings show that the rear (east) walls of each of its four bays were designed as concrete block "knockout panels" that could be removed to allow for changes and alterations. The 1983 modification drawings illustrate plans to remove the rear knockout panels and replace them with new roll-up doors in three of the building's rooms: the high-pressure wash room (the room with the floor turntable); the mechanical buildup room; and the ETA buildup room. Only the high-pressure wash room, however, actually underwent this specific alteration. The dry room's knockout panel was removed for the construction of a small office space with a metal shed roof and concrete block exterior to match the original building.

PART II. STRUCTURAL/DESIGN/EQUIPMENT INFORMATION

A. GENERAL STATEMENT:

1. Character:

The High Pressure Wash Building is a one-story, rectangular building that contains four work bays and wash areas.

2. Condition of fabric:

The condition of the High Pressure Wash Building's fabric is excellent. The building was regularly maintained and does not exhibit any major signs of neglect or deterioration.

B. BUILDING DESCRIPTION:

High Pressure Wash Building

The High Pressure Wash Building was completed during the 1977-79 modifications of the Hangar AF area. The building was completed to house the manual high-pressure wash system that removed the remaining residue of the TPS off the SRB segments. The segments went to the First Wash Building and then to the High Pressure Wash Building before being disassembled in Hangar AF.

Exterior

The High Pressure Wash Building is a one-story industrial-type building of concrete block and precast concrete construction. It has a rectangular floor plan composed of a line of four side-by-side work bays. From north to south, the work bays include an equipment room, high-pressure washroom (with turntable in floor), mechanical buildup bay, and ETA ring buildup bay. This last room was also used as a storage area for the MPSS. The building has a nearly flat precast concrete slab roof that slopes from front (west) to back (east). The roof is rimmed with a galvanized roof edge fascia and galvanized gutters. A single metal exhaust fan stack protrudes from the roof of the northernmost equipment room.

The building's exterior is similar in design to the First Wash Building, which was completed at the same time. The exterior features painted concrete block with precast 16" concrete pilasters. The building is accessed via a series of four steel roll-up doors on the west elevation, one on each work bay. The equipment room has a small steel roll-up door, which is suitable for people and small equipment, while the other three bays have full bay-sized roll-up doors. There are also pedestrian entrance doors into each of the three work bays. Each of the building's doors is topped by a precast concrete lintel. There are louvered exhaust vents over each bay door; the two southernmost bays each have two louvered vents. There is a steel service ladder on the south side of the building exterior.

Interior

The interior of the High Pressure Wash Building has four rooms. All have concrete block interior walls, concrete slab ceilings, and concrete slab floors. The northernmost room is an equipment storage and observation room that looks into the wash bay next door. The original as-built drawings of the building labeled the mechanical buildup room as the "wash/rinse room," and the ETA buildup room as the "dry room." The equipment room is the smallest of the four with interior dimensions of 28'-6" x 31'-8", while the other three rooms all have dimensions of 33'-8" x 31'-8".

The equipment room is primarily a tool and equipment storage room. There is a non-original partial upper level, or second floor, made of steel framing that extends around the north and east walls. There is also an additional stand-alone enclosed room on a steel platform positioned against the south wall of the room. This room has a wood frame structure with drywall walls; it overlooks the wash

room next door through an observation window. Beneath the partial upper levels are tool storage areas, a hydraulic water pump, and an electrical panel that controls power throughout the building.

The high-pressure washroom contains a 20′-0″ diameter mechanical turntable embedded in the floor. SRB components such as the aft skirts, forward skirts, and frustums were placed on top of the turntable and rotated for high-pressure wash. The turntable slowly turned the SRB segment while personnel stood on the floor, or on an elevated platform on the south wall, and manually washed off the remaining TPS residue in hard-to-reach areas that were missed in the First Wash Building. The turntable controls are accessed via metal panels set in the floor. There is an observation window on the north wall. The room is lit with ceiling-mounted flood lights. There are electrical conduits and plumbing pipes along all of the interior walls.

The mechanical buildup room, originally called the "wash/rinse room," has a similar configuration as the high-pressure washroom, except it has no turntable in the floor, no observation window, and no metal work stand. It also has an additional metal roll-up door on the rear (east) elevation, and an overhead crane. There is a floor drain with a metal grate in the center of floor.

The ETA buildup room, originally called the "dry room," is the southernmost room of the building. The room's configuration is similar to the wash/rinse room. It has a 1-ton crane installed laterally from north to south across the ceiling. There is a small office space built into a recessed area in the rear (east) side of the room, which was added in 1983 (see alterations section).

PART III: OPERATIONS AND PROCESS

A. INTRODUCTION

The primary operations at Hangar AF Complex involved separating all of the SRB segments, removing their electronic and mechanical components and protective TPS finishes, and preparing them for buildup and assembly at the ARF Manufacturing Building/L6-247. The buildings and structures at Hangar AF processed the aft skirts, forward skirts, frustums, TVC systems, MPSS, ETA ring, and a variety of small metal parts contained in each of the segments. The boosters' four SRMs were separated and cleaned and then shipped to their manufacturer for full refurbishment. Typically, the number of people working at Hangar AF Complex during the Space Shuttle era was approximately 150 people. It typically took these workers from two to three weeks to fully process the SRB components from the time of their arrival.

B. HIGH PRESSURE WASH BUILDING

After demating in Hangar AF, the SRB segments were transferred to the High Pressure Wash Building's high-pressure washroom. The segments were placed on the in-floor turntable, which rotated while workers on stationary work stands washed off TPS materials. Additional washing and parts removal occurred in the mechanical buildup room. From the High Pressure Wash Building, the SRB segments were transferred to the MMBF for further blasting of all remaining surface paint down to bare aluminum.

PART IV. SOURCES OF INFORMATION

A. ENGINEERING DRAWINGS AND PLANS

Sverdrup & Parcel and Associates. "Solid Rocket Booster Recovery & Disassembly Facility, Hangar AF, CCAFS, Industrial Area." Kennedy Space Center, Florida. Construction drawings, 1977.

B. EARLY VIEWS

Kennedy Space Center.

Photograph negative number 108-KSC-81PC-459, 1981. On file at Kennedy Space Center Archives.

Photograph negative number 116-KSC-383C-1256, 1983. On file at Kennedy Space Center Archives.

Photograph negative number 108-KSC-378C-364/3, 1978. On file at Kennedy Space Center Archives.

Photograph negative number 108-KSC-3796-1060/3, 1979. On file at Kennedy Space Center Archives.

C. INTERVIEWS

Christy, Howard, RPSF Manager, Personal Communication, February 24, 2010.

Morales, Art. George C. Marshall Space Flight Center Office of the Director Shuttle - ARES Transition Office. Interview with author. September 27, 2011.

Price, David. Hangar AF Facility Manager, United Space Alliance. Interview with the author. September 27, 2011.

D. SECONDARY SOURCES

Deming, Joan, and Patricia Slovinac. *NASA-Wide Survey and Evaluation of Historic Facilities in the Context of the U.S. Space Shuttle Program: Roll-Up Report*. Submitted to the National Aeronautics and Space Administration, Environmental Management Branch. Sarasota, Florida: Archaeological Consultants, Inc. February 2008, revised July 2008.

National Aeronautics and Space Administration (NASA)

NASA Facts: Solid Rocket Boosters. Kennedy Space Center, Florida. IS-2004-09-014-KSC, Revised 2006.

NASA Facts: Solid Rocket Boosters and Post-Launch Processing. Kennedy Space Center, Florida. FS-2004-07-012-KSC (Rev. 2006).

Sverdrup Corporation: Company History. http://www.fundinguniverse.com/company-histories/Sverdrup-Corporation-Company-History.html. Accessed November 17, 2011.

United Space Alliance

"Marine Operations, Revision J." (John F. Kennedy Space Center, n.d.), MO-1.

E. LIKELY SOURCES NOT YET INVESTIGATED

Research was conducted at KSC using primary and secondary sources. Sources that were not investigated that may

contain secondary information include NASA Headquarters and at the offices of the various architects and contractors that constructed the buildings of the Hangar AF Complex.

Additional oral history interviews with other engineers and technicians could also prove useful.

V. PROJECT INFORMATION

NASA determined that the SRB Disassembly & Refurbishment Complex was eligible to the NRHP as a historic district under Criterion A in the area of Space Exploration. This determination was made by NASA's "Shuttle Transition Historic Preservation Working Group" or HPWG, which looked at 335 facilities at thirteen NASA Centers.[4] As a result of this work, seventy properties were identified as either listed, determined eligible, or were potentially eligible to the National Register. Out of twelve property types identified for NASA's SSP, the SRB Disassembly and Refurbishment Complex was identified as Type 2, which includes Resources Associated with Vehicle Processing Facilities.[5] NASA completed this evaluation as the SSP was scheduled for termination in 2011.

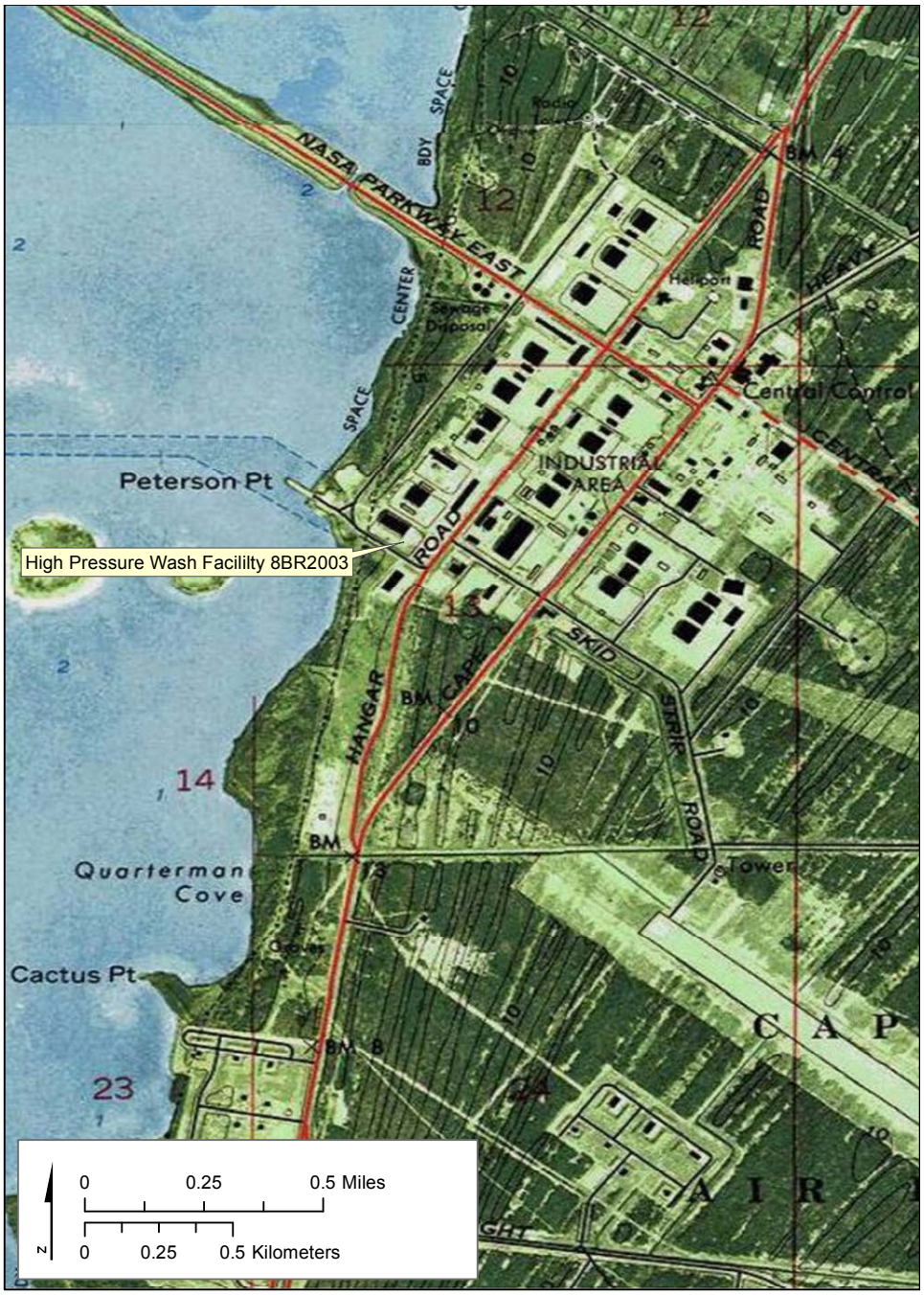
A Programmatic Agreement (PA) was developed to document the identified eligible resources and streamline the Section 106 consultation process. Per Section V.A of the PA between NASA, the Advisory Council on Historic Preservation (ACHP), and the Florida State Historic Preservation Officer (SHPO), dated May 2009, and the Statement of Work provided to New South Associates by KSC/InoMedic Health Applications (IHA),

[4] Deming and Slovinac, *Evaluation of Historic Facilities, Space Shuttle Program*, 5.11.
[5] Deming and Slovinac, *Evaluation of Historic Facilities, Space Shuttle Program*, 5.11.

as part of the Task Order Contract, dated August 2011, the documentation package for the SRB Disassembly & Refurbishment Complex includes the following items: a written narrative; a series of photographs showing both exterior and interior views using large format negatives; and a selection of existing drawings, which were photographed with large format negatives. This HAER documentation fulfills the recordation requirements of the PA for the district.

New South Associates, under contract with IHA, a subcontractor to NASA, conducted the HAER documentation and historic research for this project in September and October 2011. Therefore, NASA is completing HAER documentation of the complex and other KSC properties to record these as they appear and as they existed during the SSP. David Diener served as the project photographer. Julie Coco served as Principal Investigator, while David L. Price served as Project Historian.

In order to complete the project, New South Associates personnel were allowed full access to the facility, under the supervision of Barbara Naylor, KSC Historic Preservation Officer, and Nancy English, Cultural Resources Specialist. Photographs were taken of each building's interior, exterior, and context. David Price conducted a limited number of oral interviews and otherwise compiled the historic documentation required for the project. The following people were interviewed for this project: David Price, Hangar AF Facility Manager, United Space Alliance; Art Morales, George C. Marshall Space Flight Center, Office of the Director Shuttle - ARES Transition Office; and Dave Pappalardo, United Space Alliance, TVC Technician. Elaine Liston, KSC Archivist, provided a wealth of information from her office in the KSC Headquarters Building.



Source: USGS 7.5 Minute Topographic Quadrangle Map, Orsino, FL (1976)

Figure 1. USGS Map Showing the Location of the High Pressure Wash Facility.

Source: ESRI Resource Data, Imagery Layer

Figure 2. Aerial Photograph Showing the Location of the High Pressure Wash Facility.

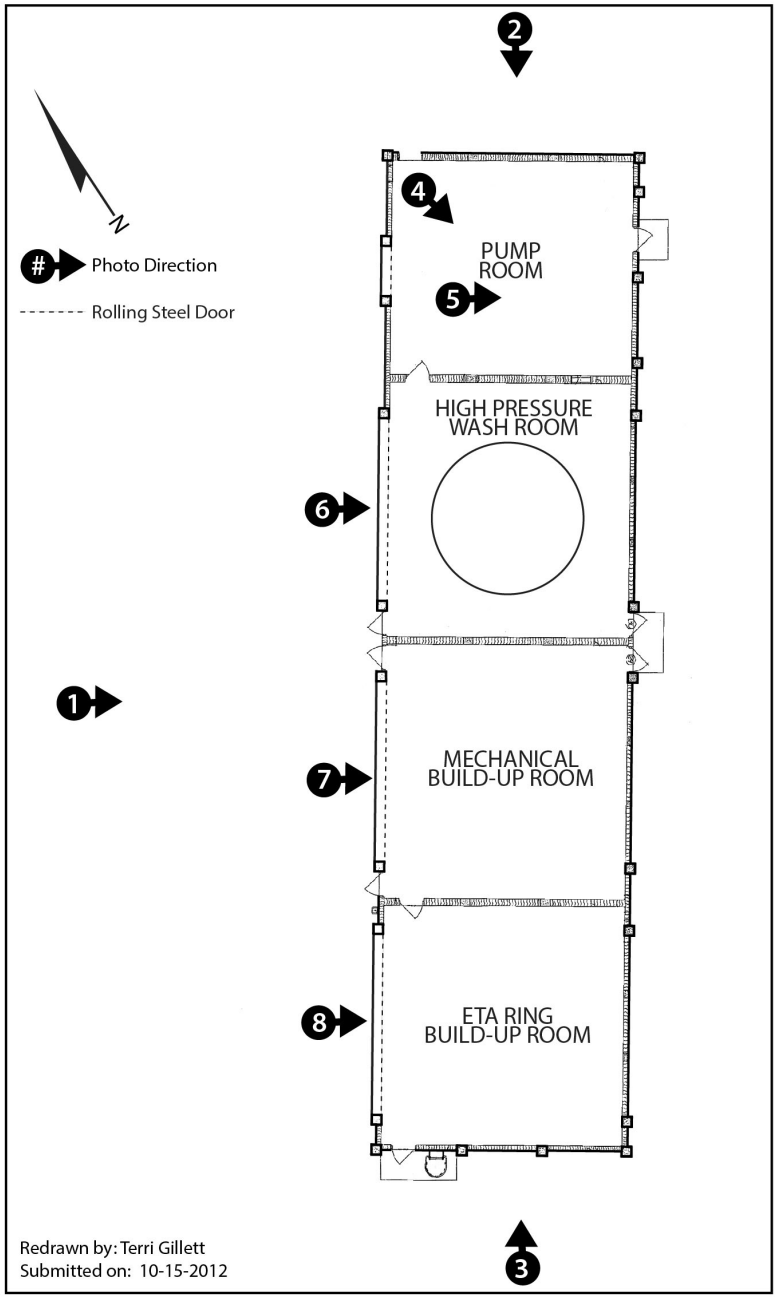


Figure 3. Photograph key for HAER NO. FL-8-11-S-5.