DOUGLAS MISSILE TEST FACILITY, BETA TEST COMPLEX,
TERMINAL EQUIPMENT ROOM AND ANCILLARY STRUCTURES
North of Douglas Road
Rancho Cordova
Sacramento County
California

HAER CA-2310-B-1
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WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
PACIFIC WEST REGIONAL OFFICE
National Park Service
U.S. Department of the Interior
1111 Jackson Street, Suite 700
Oakland, CA 94607

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HAER No. CA-2310-B-1

Location: Sacramento County, California

The Douglas Missile Test Facility is in the City of Rancho Cordova, Sacramento County, California, about 12 miles east of the City of Sacramento. The testing facilities are contained within 1,700-acres located south of White Rock Road, north of Douglas Road, east of Sunrise Boulevard, and west of Grant Line Road in eastern Sacramento County. The Beta Test Complex is located west of the Alpha Test Complex, and north of Douglas Road. The Terminal Equipment Room and related structures are in the western portion of the complex, adjacent to Test Stand No. 3.

Approximate center of Control Center area: Latitude 38°34'16.91"N; Longitude 121°12'58.50"W

USGS 7.5 minute quadrangles Carmichael and Buffalo Creek, California, Photorevised 1992

Present Owner: Elliott Homes and Easton Development Company, LLC

Present Use: Abandoned

Significance: As a part of the Douglas Missile Test Facility in Rancho Cordova, the Beta Test Area was actively involved in the development and testing of liquid- and solid-propellant rocket booster engines, including NASA Saturn S-IV and S-IVB booster engines (testing, 1963-1969). Existing facilities contain specialized buildings, structures, and a landscape that reflects the region's scientific heritage, advances in general engineering, and examples of important new technologies and innovation. The Terminal Equipment Room associated with Test Stand No. 3 of the Beta Complex meets Criteria A and C of the National Register, but is best understood and interpreted as part of the larger facility.

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January 2014

Project Information: Elliot Homes currently plans to demolish all facilities associated with the Douglas Missile Test Facility. As part of the permitting process, the Army Corps of Engineers determined that buildings and structures associated with this facility are considered potentially eligible for listing in the National Register of Historic Places, and recommended HAER photo documentation and recordation of this facility. Environmental Science Associates conducted the background historical research, assisted by previous studies of the facility.[1] Robert Hicks provided all HAER quality photographs. Alan Lawrie provided technical expertise.

For additional information, see:

Douglas Missile Test Facility, HAER-CA-2310

Douglas Missile Test Facility, Alpha Test Complex, HAER-CA-2310-A
Douglas Missile Test Facility, Alpha Test Complex, Control Center, HAER-CA-2310-A-1
Douglas Missile Test Facility, Alpha Test Complex, Test Stand No. 1, HAER CA-2310-A-2
Douglas Missile Test Facility, Alpha Test Complex, Test Stand No. 2, HAER CA-2310-A-3

Douglas Missile Test Facility, Beta Test Complex, HAER-CA-2310-B
Douglas Missile Test Facility, Beta Test Complex, Test Stand No. 3, HAER-CA-2310-B-2

Douglas Missile Test Facility, Gamma Test Complex, HAER CA-2310-C
Douglas Missile Test Facility, Gamma Test Complex, Test Structure, HAER CA-2310-C-1

Douglas Missile Test Facility, Kappa Test Complex, HAER CA-2310-D

Douglas Missile Test Facility, Sigma Test Complex, HAER CA-2310-E

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[1] Karen Weitze, Draft Historic Buildings and Structures Inventory Douglas Missile Test Facility Rio del Oro Specific Project Plan. Report to City of Rancho Cordova and U.S. Army Corps of Engineers, Sacramento District, from EDAW, Sacramento, and Weitze Research. (2005); Alan Lawrie, Return to Sacramento: a Review of Saturn Rocket Firings and Explosion. Paper presented at 43rd AIAA/ASME/SE/ASEE Joint Propulsion Conference and Exhibit, July, Cincinnati, Ohio. Published by the American Institute of Aeronautics and Astronautics, manuscript number AIAA 2007-5343. (2007); Rebecca Allen, National Register of Historic Places Evaluation of Structures Associated with the Douglas Missile Test Facility (P-34-4317), Rio del Oro, Rancho Cordova, California. Report to ECORP Consulting, Rocklin, and Elliot Homes, Folsom, from Past Forward, Inc., Garden Valley, California. (2011).

Douglas Missile Test Facility, Solid Propellant Test Complex, HAER CA-2310-F

Part I. Historical Information

A. Physical History

1. Date of Construction: 1963-1964

2. Architect/Engineer: Ralph M. Parsons

3. Builder: Douglas Aircraft Company

4. Original Plans and Construction: The Beta Test Complex was the final group of large-scale test stands constructed at the Douglas Missile Test Facility. Ralph M. Parsons designed the facilities within the Beta Test Complex in 1963, and construction immediately began. The complex occupied about 325 acres; much of this is a buffer zone in case of accidental explosions of liquid oxygen and hydrogen. The main components of the complex were the central blockhouse and two static test stands (original plans called for three test stands, but only two were construction). Additional ancillary features were also constructed to support the function of the test stands. The facilities expanded NASA's test capabilities for the Saturn S-IVB booster. Beta Test Stand No. 3 test stand is where the Apollo 8 third stage was tested, and subsequently exploded. This was the only flight stage in the Apollo-Saturn program that exploded. The Terminal Control Room directly abuts Test Stand No. 3.

5. Alterations and Additions: Static testing ended in 1969, but the test stands and adjacent terminal control rooms were maintained in a state of readiness into late 1972. Douglas had removed the steel superstructure of the tower and of flame deflector in 1977.

B. Historical Context:

On 21 December 1961, NASA awarded Douglas a contract to design, build, and test the upgraded S-IVB stage to be used in two configurations. The 200 model was used as the second stage of the Saturn IB launcher and the 500 model was used as the third stage of the Saturn V launcher. Both versions of the S-IVB stage had a diameter of 22 feet and utilized one J-2 engine. To support this new program Douglas initiated work on a new test complex that became known as the Beta complex.

The Beta Test Complex was the final group of large-scale test stands constructed at the Douglas Missile Test Facility, Sacramento Test Operations. The Ralph M Parsons Company completed the design of the Beta test stands on 6 November 1963. Construction began in 1964. Because of the nature of the testing, a large buffer zone also comprised the Beta Test Complex; it made up about 325 acres.

Although originally designed to support three test stands only two were finally constructed. Beta Test Stand No. 3 became operational and was used for the first flight stage firing of S-IVB-201 on 8 August 1965. Between 1965 and 1969 nine S-IVB-200 and eleven S-IVB-500 flight stages were static fired at SACTO.

Between 1973 and 1977, McDonnell Douglas dismantled the majority of the steel superstructure on the four test stands in the Alpha Test Complex and in the Beta Test Complex. The company sold the steel as scrap. Douglas removed the steel superstructure of the tower and flame deflector in 1977.

Part II. Structural/Design/Equipment Information

A. General Statement:

1. Character: The structures and landscape reflect architectural and engineering characteristics unique to this facility, as they were specifically designed to test the Saturn boosters. They reflect the specialized uses and development that occurred at the Douglas Missile Test Facility. The Beta Complex was one of seven grouping of facilities within the larger complex.

2. Condition of fabric: Good (see table below)

B. Description of Facility:

1. Terminal Equipment Room: The main components of the complex were the central blockhouse and two static test stands. The terminal equipment room is a one-story, rectangular (52 ft. by 90 ft.) reinforced concrete structure that is placed next to the western elevation of the base of Test Stand No. 3. A metal stairway leading to a deck on top of the equipment terminal room is on the south side of the building, along with four bay openings to the east of the base of the stairs. The west side of the building features a covered portico area framed by columns and two door entries on the southern end of the building. The north façade has no openings. On the interior of the equipment room, a second metal stairway leads up to the deck at the rear of the building. A metal railing encases the deck. The east side of the building is attached to Test Stand No. 3.

2. Instrumentation Tunnel: The instrumentation tunnel from the Terminal Equipment room in the Beta Test Complex that led from the Control Center exits from the lower level of the terminal equipment room. The tunnel has mostly demolished.

3. Ancillary Structures. Several ancillary structures once associated with the Terminal Control Room and Test Stand No. 3 have been demolished subsequent to being noted by Weitze in 2005.

(Demolished 2008-2009). The Shop Building was a one-story, steel-frame structure erected in 1964. It had steel I-beam construction with a light truss gable

roof frame, and covered in corrugated siding. A center-opening, track-mounted door was placed on the east façade and a steel blast door on the west façade, with a simple entry on the north. Windows were placed on the north and south sides of the building. A shed extension was in the southwest corner. The interior of the structure was open, with rooms and an upper work space configured at its west end. An associated camera stand has also been demolished.

C. Mechanicals/Operation: The Beta Test Complex was the final group of large-scale test stands constructed at the Douglas Missile Test Facility, Sacramento Test Operations. In 1963, Ralph M. Parsons designed Test Stand No. 3 as a major component of the Beta Test Complex. NASA operated this test stand and the adjacent Terminal Equipment Room to run acceptance and checkout tests for the Saturn S-IVB booster during 1965-1969. The facilities expanded NASA's test capabilities for the Saturn S-IVB booster. Beta Test Stand No. 3 is where the Apollo 8 third stage exploded. This was the only flight stage in the Apollo-Saturn program that exploded. Lessons learned from this explosion were critical to the success of the space program.

D. Site Information: The Douglas Missile Test Facility was located on the outskirts of Sacramento, in what was a suburban area known as Rancho Cordova. The Facility was situated south of the main highway (today known as Highway 50), amongst the remains of large numbers of dredge tailings, which in part provided existing berms integral to the testing and captive firings. Although additional suburban shopping areas and commercial development now exist in the area south of Highway 50, this development has not encroached upon the main Douglas Missile Test Facility.

Part III. Sources of Information

A. Primary Sources

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Douglas Missile & Space System Division, Sacramento Test Center Resources Handbook, Douglas Report No. SM 37538 R1, Approved by D.R. Brincka, Director, Technical Operations, December 1966. Manuscript, in possession of D.R. Brincka, copy held by Alan Lawrie.

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The Saturn V Apollo Moon Rocket, Statement issued by NASA. Available at < http://www.apollosaturn.com/svfacts.htm>, 1963.

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B. Secondary Sources

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Lawrie, Alan, and Robert Godwin, *Saturn V: the Complete Manufacturing and Test Records plus Supplemental Material.* Apogee Books, Burlington, Ontario, Canada, 2005.

Weitze, Karen, Draft Historic Buildings and Structures Inventory Douglas Missile Test Facility Rio del Oro Specific Project Plan. Report to City of Rancho Cordova and U.S. Army Corps of Engineers, Sacramento District, from EDAW, Sacramento, and Weitze Research, 2005.

C. Likely Sources Not Yet Investigated

According to Alan Lawrie, he originally wrote the AIAA (2007) paper as part of his research on the Saturn rockets because the Douglas Missile Test Facility, Sacramento Test Operations, as well as events that took place at the Facility, that had not been previously documented. He noted that Don Brincka, retired Director of Technical Operations at the SACTO facility, had managed to retain some documentation, but more importantly was able to answer some of Lawrie's more obscure questions. Mr. Brincka passed all of his papers over to Mr. Lawrie. Mr. Lawrie also stated that he had researched primary source material at the National Archives and Record Administration in Atlanta, Georgia.

Rebecca Allen contacted Ralph H. Allen, Historic Preservation Officer, Marshall Space Flight Center, Huntsville, Alabama. Mr. Allen noted that sources of information on the SACTO facility held by Marshall were limited. After further conversation, and a visit to the Sacramento area, Mr. Allen mailed Rebecca Allen two CD discs of information that he knew were available at the Marshall facility, including "Facility Inventory Sheets, Liquid Chemical Propulsion Test Facility Inventory," September 1986, completed by Aerojet (96 pages). This paper also details future plans for a facility that was never built. Mr. Allen also provided a CD of historic (unlabelled) photographs. Additional information may be at Marshall Space Flight Center.

The California History Room, California State Library, recently found a box of photographs concerning the Douglas Missile Test Facility that seem to have originated from Douglas archives. The 50+ photographs were indexed, but did not contain additional views critical to the current interpretation and documentation of the facility.

Several buildings associated with the Administrative Area were not recorded as part of this current project. These buildings remain standing, and are being actively used for other purposes.