DOUGLAS MISSILE TEST FACILITY,
ALPHA TEST COMPLEX
West of Security Park Drive
Rancho Cordova
Sacramento County
California

BLACK AND WHITE PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

U.S. Department of the Interior
National Park Service
Pacific West Regional Office
San Francisco, California
HISTORIC AMERICAN ENGINEERING RECORD

DOUGLAS MISSILE TEST FACILITY, ALPHA TEST COMPLEX

HAER No. CA-2310-A

Location: Sacramento County, California

The Douglas Missile Test Facility is in the City of Rancho Cordova, Sacramento County, California, about twelve 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 Alpha Test Complex is located west of Security Park Drive, in the southeastern quadrant of the testing facilities.

Approximate center of Alpha Test Complex: Latitude 38°34'18.31"N; Longitude 121°12'59.22"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: The Douglas Missile Test Facility has been determined eligible for listing in the National Register of Historic Places as a district under significance criterion A (Events) and criterion C (Design/Construction) for advances in science and technology. The Alpha Test Complex has been determined eligible under criterion A for its involvement with the Thor Intermediate Range Ballistic Missile (IRBM), liquid propellant testing and static acceptance firings of completed missiles (1957-60), and testing of the NASA Saturn S-IV and S-IVB booster engines (1963-69). The structures and landscape at the testing facility reflect architectural qualities unique to this facility, and reflect the specialized uses and development that occurred at the Test Facility (Criterion C).

Historians: Rebecca Allen, Ph.D., Katherine Anderson, M.A.
Architectural Historians
Environmental Science Associates
2600 Capitol Ave, Ste 200
Sacramento, CA 95816
January 2014
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. 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, 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-1

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

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

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DOUGLAS MISSILE TEST FACILITY, ALPHA TEST COMPLEX
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Part I. Historical Information

A. Physical History

1. Date of Construction: 1956-57

2. Architect/Engineer: Aerojet General engineers

3. Builder: Douglas Aircraft Company

4. Original Plans and Construction: In December 1955, the U.S. Air Force awarded the Douglas Aircraft Company to design, test, and deliver Thor Intermediate Range Ballistic Missile (IRBM). The following year, Douglas Aircraft Company entered into a lease agreement with Aerojet General to develop 1,700 acres on western edge of Aerojet to build the Douglas Missile Test Facility, also known as the Sacramento Test Operations (SACTO) site. Construction began at the Alpha Test Complex before October 1956. Alpha 1 and Alpha 2A/B vertical missile stands were developed and constructed in 1956-57.

5. Alterations and Additions: In April 1960, the U.S. government awarded Douglas the contract to design, build, and test S-IV second stage for the Saturn I booster. Testing occurred at Alpha Test Complex.

From 1973-77, McDonnell Douglas dismantled the majority of steel superstructure on the four test stands in the Alpha Test Complex and Beta Test Complex, and then initiated sales of parcels and buildings in the Administration Area. In 1984, Aerojet bought back the original property from McDonnell Douglas. The complex was mostly derelict by then. The site is currently slated for demolition.

B. Historical Context:

The Alpha Test Complex featured the first large-scale test stands erected for the Douglas Missile Test Facility at Rancho Cordova, and occupied forty-five acres in the southeast quadrant of the facility. The engineers of Aerojet General designed the facilities within the Alpha Test Complex in 1956, with construction underway in 1957. Douglas initiated static firings at the Alpha Test Complex in January 1958. The first missile in test was the Thor IRBM. Both test stands in the Alpha Test Complex were captive firing stands, and both used deluge systems. Douglas used Test Stand No. 1 to static-fire early production line Thor missiles selected from those manufactured in the company's Santa Monica facilities. Test Stand No.2 included two positions, Test Stand No. 2A and Test Stand No. 2B. Douglas fired battleship versions of Rocketdyne's Thor engines on Test Stand No. 2A.

Douglas completed its research and development tests of Thor at the Alpha Test Complex in December 1959, and in mid-1960, full-scale Initial Operational Capacity (IOC) testing
of Thor moved to Vandenberg Air Force Base in southern California. Douglas next used Test Stand No. 2A for battleship tests of the Aerojet Titan ICBM second-stage engine. Also in 1960, Douglas initiated activities for NASA at its Rancho Cordova location, beginning with tests for a developmental Saturn booster, the DSV-IV, on Alpha Test Stand No. 1. By 1962, activities conducted on Test Stand No. 1 were also focused on the Saturn DSV-IV, and included static firings of the A-1 and A-3 versions of the RL10 liquid hydrogen engine placed in a battleship version of the booster.

On January 24, 1964, the S-IV stage exploded near Test Stand No. 1. This was the first ground explosion involving liquid hydrogen and liquid oxygen propellants. This explosion provided important data, and generated safety protocols.²

During the 1965-1968 years, Douglas conducted acceptance testing of Saturn S-IV boosters on Alpha Test Stand No. 2B for NASA. The company shipped S-IV boosters from its plant in Santa Monica for check-out, firing, and post-firing checks at the missile test facility in Rancho Cordova. After completion of the acceptance testing, Douglas shipped the Saturn S-IV boosters by air to NASA’s facilities at Cape Kennedy in Florida.

All static testing ended in 1969, although Douglas maintained the test stands in the complex in a state of readiness into late 1972. After deactivation of the Alpha Test Complex, Douglas dismantled the superstructure of the test stands.

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 Thor and Titan missiles, and Saturn boosters. They reflect the specialized uses and development that occurred at the Douglas Missile Test Facility. The Alpha Complex was one of seven grouping of facilities within the larger complex.

2. Condition of fabric: Where facilities remain, the overall condition is considered good, although there are also many missing structures in the complex (see table below)

B. Description of Facility:

1. Alpha Test Complex: As part of the Douglas Missile Test Facility, Aerojet General constructed the first large-scale test stands in what was labeled the Alpha Test Complex. Aerojet General engineers designed the facilities in 1956, and construction began the same year, with additional structures built in 1957. The site occupied about forty-five acres, originally consisted of thirty-one numbered structures and several unnumbered support units and pads, with the primary buildings including two massive test stands and

² Lawrie 2007, p. 4.
a central control area. The character-defining components within the complex are its control-center blockhouse and test stands. Test Stand No. 1 is a single-position structure with ancillary buildings, while Test Stand No. 2 is a dual-position structure with ancillary buildings. Ancillary buildings and structures vary from the larger secondary support facilities such as the generator-compressor building, test stand shops, and the pumphouse, to the critical, but smaller, equipment units and test observation shelters. The table below lists all extant structures at the time of documentation, as well as ancillary structures that are no longer present.

<table>
<thead>
<tr>
<th>Date of Construction</th>
<th>Common name</th>
<th>Description</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Control Center</strong></td>
<td>Control center</td>
<td>One-story reinforced concrete</td>
<td>Good</td>
</tr>
<tr>
<td>1956-57</td>
<td>Generator and Compressor Building</td>
<td>One-story prefabricated metal</td>
<td>Good</td>
</tr>
<tr>
<td>1957</td>
<td>Pump house</td>
<td>One-story prefabricated metal</td>
<td>Good</td>
</tr>
<tr>
<td></td>
<td>Large fuel tank</td>
<td>East of Unit 65, water tank</td>
<td>tank missing; footings remain</td>
</tr>
<tr>
<td>1956-57</td>
<td>Water tank</td>
<td>Large steel structure</td>
<td>Good</td>
</tr>
<tr>
<td>1957</td>
<td>Liquid Nitrogen tank Pedestal mount</td>
<td>Raised concrete pedestal mounts</td>
<td>good</td>
</tr>
<tr>
<td></td>
<td>Helium Storage Area</td>
<td>Reinforced concrete barricade wall and footing</td>
<td>tank missing; footings and wall</td>
</tr>
<tr>
<td>1956-57</td>
<td>Weather station</td>
<td>South of Unit 63 (pump house)</td>
<td>concrete pad only (no building)</td>
</tr>
<tr>
<td></td>
<td>Power substation</td>
<td>South of Unit 63 (pump house)</td>
<td>concrete pad only (no building)</td>
</tr>
<tr>
<td>1956-57</td>
<td>Instrumentation tunnels</td>
<td>Between control center and test stands</td>
<td>good</td>
</tr>
<tr>
<td>1956-57</td>
<td>Roadways</td>
<td>In and around structures</td>
<td>Good</td>
</tr>
<tr>
<td><strong>Test Stand No. 1</strong></td>
<td>Test cell</td>
<td>3-sided flat roofed steel frame</td>
<td>Good</td>
</tr>
<tr>
<td>1957</td>
<td>Test Stand No. 1</td>
<td>Steel-beamed tower</td>
<td>Good</td>
</tr>
<tr>
<td>1956-57</td>
<td>LOX Tank Stands</td>
<td>Reinforced concrete barricade wall</td>
<td>tanks missing; wall remains</td>
</tr>
<tr>
<td>1956-57</td>
<td>Observation Shelter No. 1</td>
<td>One-story reinforced concrete</td>
<td>Good</td>
</tr>
<tr>
<td><strong>Test Stand No. 2</strong></td>
<td>Test Stand No. 2</td>
<td>Steel-beam tower</td>
<td>Good</td>
</tr>
<tr>
<td>1956-57</td>
<td>LOX Tank Stand</td>
<td>Stand only; tank no longer present</td>
<td>Good</td>
</tr>
</tbody>
</table>
C. Mechanicals/Operation: Tests conducted in The Douglas Missile Test Facility developed propellant and missile launchers during the Cold War era. When it operated as the Sacramento Test Operations (SACTO), the facility played a critical role in the conversion of missile technology for use on battleships. The Thor missile was the first Intermediate-Range Ballistic Missile (IRBM) in the arsenal of the United States Air Force. The Douglas Missile Test Facility supported captive test firings of early Thor missiles and engines. Firing stages for Saturn rockets, developed as part of the 1960s era space quest to explore the moon, were also developed and tested at this facility.

D. Site Information: The Douglas Missile Test Facility was constructed 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 earthen berms integral to the testing and captive firings. Although additional suburban shopping areas and commercial development now

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3 Weitze, 2005, p. 65
exist in the area south of Highway 50, this development has not encroached upon the main Douglas Missile Test Facility. Attached maps and figures best illustrate the setting and extent of Alpha Test Complex.

**Part III. Sources of Information**
**A. Primary Sources**


Douglas Missile & Space System Division, Sacramento Test Center MSSD Beta Complex Facts, prepared by Logistics Support Services, Sacramento Test Center, approved by W.L. Duval, Director, Sacramento Test Center, no date given. Brochure in possession of D.R. Brincka, copy held by Alan Lawrie.


B. Secondary Sources


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.