LAWRENCE LIVERMORE NATIONAL LABORATORY, HAER No. CA-2353
SITE 300, HIGH EXPLOSIVES PROCESS AREA
North of Corral Hollow Road
Tracy
San Joaquin County
California

WRITTEN HISTORICAL AND DESCRIPTIVE DATA PHOTOGRAPHS

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HISTORIC AMERICAN ENGINEERING RECORD

LAWRENCE LIVERMORE NATIONAL LABORATORY,
SITE 300, HIGH EXPLOSIVES PROCESS AREA

HAER No. CA-2353

Location: West of the North Outer Loop in the northwestern portion of Lawrence Livermore National Laboratory (LLNL), north of Corral Hollow Road, Tracy, San Joaquin County, California.

The entrance to Site 300 is located at latitude: 37.633015, longitude: -121.503803. This point was obtained on April 5, 2019, using Google Earth (WGS84). There is no restriction on its release to the public.

Present Owner: U.S. Government, Department of Energy, National Nuclear Security Administration

Present Use: Research and testing facilities for high explosives (HE) for nuclear weapons

Significance: In 1955, Lawrence Livermore National Laboratory (LLNL) acquired the land for the Site 300 Process Area as a high explosive (HE) process area for the production of HE prototypes for their burgeoning weapons program. The Site 300 Process Area was built to formulate, mix, cast, press, mechanize and assemble conventional HE for use in the physics package of nuclear weaponry. Built from 1957 to 1968, the core of LLNL’s Site 300 Process Area consists of twenty-six buildings compartmentalized into four main buildings and five building complexes. Billets, a processed or formed piece of HE used for testing, for all LLNL-designed nuclear weapons were developed and facilitated by scientists and technicians at the complex. Subsequently, LLNL was one of two American laboratories that devised and developed nuclear weapons for the U.S. stockpile.

Historian Preparer: Alison Garcia Kellar, Senior Architectural Historian, Garavaglia Architecture, Inc., 2018

Project Information: This HAER documentation has been prepared for the US Department of Energy, Livermore Site Office, with supervision from the California State Historic Preservation Office.

In April 2005, the National Nuclear Security Administration (NNSA) Livermore Field Office in consultation with the California State Historic Preservation Officer (SHPO) determined Buildings 805, 806A, 806B, 807, 817A, 817B, 817F, 826, 827A, and 827C to be contributors to a Site 300 High Explosives Process Area Historic District.
For individual building descriptions and histories of the contributors to the determined Site 300 High Explosives Process Area Historic District, see the following:

Building 805: HAER No. CA-2353-A
Building 806 Complex (Buildings 806A and 806B): HAER No. CA-2353-B
Building 807: HAER No. CA-2353-C
Pressing Complex (Buildings 817A, 817B, and 817F): HAER No. CA-2353-D
Building 825: HAER No. CA-2353-E
Building 826: HAER No. CA-2353-F
Chemistry Development Complex (Buildings 827A and 827C): HAER No. CA-2353-G

List of Acronyms:
AEC               Atomic Energy Commission
HE                High explosive
LANL              Los Alamos National Laboratory
LLNL              Lawrence Livermore National Library
NNSA              National Nuclear Security Administration
SHPO              State Historic Preservation Officer
Part I. Historical Information

A. Physical History

1. Date of Erection: 1957–1968

2. Architect: Multiple architects and engineers were involved in the design of the buildings in the Site 300 Process Area. Architects of the buildings within the Site 300 Process Area that were determined to be contributors to a Site 300 Process Area Historic District are listed below.

Building 805: Increment 1 of Building 805 was designed in 1955 by LLNL Plan Engineering and constructed in 1957. Increment 2 was designed in 1958 by Indenco Engineers of San Leandro and completed in 1959. The third and final increment was designed in 1973 by Garretson, Elmendorf, Zinov and Reibin Architects and Engineers of San Francisco and completed in 1975.¹

Building 806 Complex (Buildings 806A and 806B): Buildings 806A and 806B were both designed by Rogers Engineering and constructed in 1957.²

Building 807 was designed in 1958 by Indenco Engineers of San Leandro, California, and constructed in 1960.³

Pressing Complex (Buildings 817A, 817B, and 817F): Buildings 817A and 817B were designed by Rogers Engineering between 1957 and 1959. Building 817F was designed by Ruth and Going, Inc., between 1964 and 1965.⁴

Building 826 was designed in 1959 by Indenco Engineers of San Leandro, California and constructed in 1960.⁵

Chemistry Development Complex (Buildings 827A and 827C): Ruth and Going designed the buildings in the Chemistry Development Complex in 1965, and construction was complete by 1968.⁶

3. Original and subsequent owners, occupants, uses: The Site 300 Process Area has always been owned by the U.S. Government, as part of the Atomic Energy Commission (AEC) and its successor agencies (currently the Department of Energy/National Nuclear Security Administration [DOE/NNSA]).⁷

² Ibid., 261.
³ Ibid.
⁴ Ibid., 265—267.
⁵ Ibid., 270.
⁶ Ibid., 270—272.
The original user was the Lawrence Radiation Laboratory, which evolved into Lawrence Livermore National Laboratory. The occupants had continuously been Lawrence Livermore National Laboratory employees, and the buildings were continuously used for nuclear research, supporting the LLNL weapons program, in addition to chemistry, physics, and biomedical research programs at the LLNL and Lawrence Berkeley National Laboratory (LBNL).
B. Historical Context

Cold War Context
The following context related to the development of LLNL and the Hydrodynamic Test Facilities was created in 2007 as part of the *Historic Context and Building Assessments for the Lawrence Livermore National Laboratory Built Environment*:

The primary historic context for assessing the significance of LLNL buildings is the Cold War. The Cold War, although still a fairly recent event in US history, has been universally recognized as an event of exceptional significance within the nation’s history.

The Cold War spanned the forty-six years from 1945 to 1991 and encompassed a series of events, policy decisions, and conflicts between the United States and Soviet Union over the economic and political orientation of various countries in Europe, Asia, and the Middle East. In essence, the United States and the Soviet Union had incompatible and conflicting visions for the fate of the post-war world. The US was wedded to a world that closely mirrored its capitalist and democratic economic and political structure, while the Soviet Union hoped for a world that resembled its communist political and economic structure.

The Cold War dominated almost every aspect of American life—diplomatic, military, social, economic, scientific, and political. Nevertheless, only two aspects of Cold War history are relevant to LLNL, the history of the arms race and the more general history of nuclear science.8

Early LLNL History
The LLNL was the brainchild of E. O. Lawrence and Edward Teller, physicists affiliated with the Manhattan Engineering District. Lawrence and Teller believed that the existing Los Alamos National Laboratory (LANL) was not working aggressively enough to achieve the goal of accelerating advancements in nuclear weaponry. The two physicists advocated for the founding of a second laboratory, determined that the design and production of a thermonuclear weapon in a new facility would be the next advancement in nuclear weaponry. Lawrence and Teller’s argument was well received within the Atomic Energy Commission (AEC), as the Soviet Union had just detonated its first atomic weapon in 1949. American nuclear policymakers felt an urgency to stay ahead of the Soviet Union both technologically and militarily, fearing the potential actions of an enemy armed with nuclear weapons. To deter the use of such weapons by the opposition, policymakers were determined to significantly increase the U.S. stockpile. Convinced that a second laboratory would accelerate the process of building up a nuclear arsenal, the AEC established the LLNL in Livermore, California, in September of 1952 as a second nuclear weapons design facility.9

Herbert York, the first director of LLNL, articulated four missions for the new laboratory; including designing thermonuclear weapons, providing diagnostic measurements for weapons tests for LANL and LLNL, developing a controlled

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9 Ibid.
thermonuclear reaction for power sources, and basic physics research. York was in strong pursuit of both weapons and non-weapons related research, as he felt that a diversified research program at LLNL would attract the country's brightest young scientists.\(^\text{10}\)

**Establishment of the HE Process Area**

LLNL administrators noted the need for a remote site to conduct HE tests for the weapons program in 1953. LLNL administrators decided that the LANL in New Mexico was too distant to be reliable for the fabrication and test firing of various devices. Considering that obtaining land for a self-sufficient high explosives test site was crucial for the long-term success of the weapons design program, LLNL purchased 3,400 acres of ranch land east of Livermore, California in 1955. The first two buildings of LLNL’s Process Area were Building 805 and the Building 806 Complex, both built in 1957. The Process Area would continue to expand to twenty-six buildings with construction being complete in 1968. The HE Process program remained dedicated to the creation and progression of HE for LLNL through the end of the Cold War in 1991.\(^\text{11}\)

**The HE Assembly Process**

The Site 300 Process Area was devoted to the formulation, blending, casting, pressing, machining, and assembling of HE into billets for use in nuclear weapons. To make HE billets, chemicals are first formulated and mixed; then dried in ovens; then pressed into forms; and finally, machined into custom shapes. The Site 300 Process Area produced two kinds of HE billets: paste and plastic. Paste billets were extruded into molds, which were then precisely machined. Plastic HE billets were mixed with plastic and then mechanically or isostatically pressed into specific shapes. Mechanically pressed plastic billets would be ready for immediate use, while isostatically pressed billets would have to be machined like paste billets. HE billets would be X-rayed multiple times during the production process to make sure that the billets did not have any cracks or impurities. Finished HE billets were assembled into device designs.\(^\text{12}\)

**Construction Chronology of the Site 300 Process Area**

The first buildings in the Site 300 Process Area were built in 1957. These included Building 805 and the Building 806 Complex. HE billets were machined in the Building 806 Complex and then assembled for hydrodynamic test shots in Building 805. The Site 300 Process Area had expanded by 1960 to have buildings devoted to each step of the HE development and fabrication process. These included building 825, which was constructed in 1959 to house chemistry laboratories for formulating and testing large batches of HE. Building 809 was also constructed in 1959, and was where workers would X-ray HE billets to make sure there were no deformities, cracks, or other mistakes in each of the billets. Buildings 825 and 826, built in 1959 and 1960, respectively, housed additional chemistry facilities for the Site 300 Process Area. Building 807 was completed in 1960 to house the process area’s large-scale mixing and blending work. The Pressing Complex was built between 1959 and 1964, and contained ovens and isostatic presses that were controlled remotely from a separate building. Between 1964 and 1967, the Building 828 Complex was built as an experimental remote-machining facility. The


\(^{12}\) Ibid.
Chemistry Development Complex opened in 1968, and took over many of the former duties of Building 807.\textsuperscript{13} 

\textsuperscript{13} Ibid., 253–258.
Part IV. Sources of Information

A. Architectural drawings:


“Figure A-1, Facility Floor Plan—Building 805” in Appendix A—Facility Plot Plans and Floor Plans. Lawrence Livermore National Laboratory, 1997.

“Figure A-2, Facility Floor Plan—Building 806” in Appendix A—Facility Plot Plans and Floor Plans. Lawrence Livermore National Laboratory, 1997.

“Figure A-3, Facility Floor Plan—Building 807” in Appendix A—Facility Plot Plans and Floor Plans. Lawrence Livermore National Laboratory, 1997.

“Figure A-9, Facility Floor Plan—Building 817 Complex” in Appendix A—Facility Plot Plans and Floor Plans. Lawrence Livermore National Laboratory, 1997.


B. Interviews:
Scott, John E., LLNL Site 300 Manager, and Dawn Chase, LLNL Special Projects Manager. “LLNL Site 300.” Personal interview. 16 Sept. 2014.

C. Secondary sources:
Hallam, John S. Energetic Materials Facility: Operated by the Chemistry and Materials Science Department. Livermore: Lawrence Livermore National Laboratory, University of California. 1978.


Appendix

Figure 1. Map of LLNL Site 300 from the 2007 Historic Context and Building Assessments for the Lawrence Livermore National Laboratory Built Environment report (UCRL-TR-234717).

Figure 66. Map of LLNL Site 300. Areas assessed are indicated.
LAWRENCE LIVERMORE NATIONAL LABORATORY,  HAER No. CA-2353-A
SITE 300, HIGH EXPLOSIVES PROCESS AREA
BUILDING 805
North of Corral Hollow Road
Tracy
San Joaquin County
California

WRITTEN HISTORICAL AND DESCRIPTIVE DATA PHOTOGRAPHS

HISTORIC AMERICAN ENGINEERING RECORD
Pacific West Region
National Park Service
U.S. Department of the Interior
1111 Jackson Street, Suite 700
Oakland, CA 94607
Location: West of the North Outer Loop in the northwestern portion of Lawrence Livermore National Laboratory (LLNL), north of Corral Hollow Road, Tracy, San Joaquin County, California.

Building 805 is located at latitude: 37.641316, longitude: -121.515988. This point was obtained on July 18, 2018, using Google Earth (WGS84). There is no restriction on its release to the public.

Present Owner: U.S. Government, Department of Energy, National Nuclear Security Administration

Present Use: Laboratory and Research/Testing Facility

Significance: In 1955, Lawrence Livermore National Laboratory (LLNL) acquired the land for Site 300—which contains Building 805—as a high explosive (HE) process area for the production of HE prototypes for their burgeoning weapons program. The High Explosive Process Area (Process Area) was built to formulate, mix, cast, press, mechanize and assemble conventional HE for use in the physics package of nuclear weaponry. Built from 1957 to 1968, the core of LLNL’s Process Area consists of twenty-six buildings compartmentalized into four main buildings and five building complexes. Billets, a processed or formed piece of HE used for testing, for all LLNL-designed nuclear weapons were developed and facilitated by scientists and technicians at the Process Area at Site 300. Subsequently, LLNL was one of two American laboratories that devised and developed nuclear weapons for the U.S. stockpile.

Building 805 was the first of two Process Area structures built at Site 300, and contains nine shops, one mechanical room, five offices and three service shops. Built specifically for the trimming and assembly of HE components, the manufacturing processes that occurred at Building 805 were one component of the larger mission to develop and fabricate HE for LLNL’s nuclear weapons designs.

Historian Preparer: Alison Garcia Kellar, Senior Architectural Historian, Garavaglia Architecture, Inc., 2018

Project Information: This HAER documentation has been prepared for the US Department of Energy, Livermore Site Office, with supervision from the California State Historic Preservation Office.
In April 2005, the National Nuclear Security Administration (NNSA) Livermore Field Office in consultation with the California State Historic Preservation Officer (SHPO) determined Buildings 805, 806A, 806B, 807, 817A, 817B, 817F, 826, 827A, and 827C to be contributors to a Site 300 Process Area Historic District.
Part I. Historical Information

A. Physical History

1. Date of Erection: 1957

2. Architect: Increment 1 of Building 805 was designed in 1955 by LLNL Plant Engineering and constructed in 1957. Increment 2 was designed in 1958 by Indenco Engineers of San Leandro and completed in 1959. The third and final increment was designed in 1973 by Garretson, Elmendorf, Zinov and Reibin Architects and Engineers of San Francisco and completed in 1975.¹

3. Original and subsequent owners, occupants, uses: The building has always been owned by the U.S. Government, as part of the Atomic Energy Commission (AEC) and its successor agencies (currently the Department of Energy/National Nuclear Security Administration [DOE/NNSA]).²

The original user was the Lawrence Radiation Laboratory, which evolved into Lawrence Livermore National Laboratory. The occupants had continuously been Lawrence Livermore National Laboratory employees, and the building was continuously used for nuclear research, supporting the LLNL weapons program, in addition to chemistry, physics, and biomedical research programs at the LLNL and Lawrence Berkeley National Laboratory (LBNL).

5. Original plans and construction: The original rectangular 1,100 square foot structure, Increment 1, sits within the eastern portion of Building 805, measuring 55 feet long and 20 feet wide. Increment 1 has 6-inch-thick poured concrete exterior walls on all elevations with a concrete masonry unit wall on the southern elevation, enclosing the tool room. As noted in early construction photographs (1956 and 1959) Building 805 is of steel frame construction.³

6. Alterations and additions: Constructed in 1958–59, Increment 2 is similar in configuration and style to Increment 1 but nearly double in size, measuring 2,650 square feet.⁴ The construction of Increment 3 in 1975 enclosed the existing two increments within pre-cast and cast-in-place concrete walls. Extending the entire length of the

³ This assumption is based on construction photographs of Building 805 Increment 1 in 1956 and of Increment 2 in 1959 which depicts Increment 1 still under construction (UCRL Livermore Photograph Numbers 7287 and 16119).
building’s west side, Increment 3 added 5,450 gross square feet to the facility.\textsuperscript{5} These modifications transformed the entire structure to house an HE lens facility.\textsuperscript{6}

B. Historical Context

Cold War Context
The following context related to the development of LLNL and the Hydrodynamic Test Facilities was created in 2007 as part of the \textit{Historic Context and Building Assessments for the Lawrence Livermore National Laboratory Built Environment}:

The primary historic context for assessing the significance of LLNL buildings is the Cold War. The Cold War, although still a fairly recent event in US history, has been universally recognized as an event of exceptional significance within the nation’s history.

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The Cold War dominated almost every aspect of American life—diplomatic, military, social, economic, scientific, and political. Nevertheless, only two aspects of Cold War history are relevant to LLNL, the history of the arms race and the more general history of nuclear science.\textsuperscript{7}

Early LLNL History
The LLNL was the brainchild of E. O. Lawrence and Edward Teller, physicists affiliated with the Manhattan Engineering District. Lawrence and Teller believed that the existing Los Alamos National Laboratory (LANL) was not working aggressively enough to achieve the goal of accelerating advancements in nuclear weaponry. The two physicists advocated for the founding of a second laboratory, determined that the design and production of a thermonuclear weapon in a new facility would be the next advancement in nuclear weaponry. Lawrence and Teller's argument was well received within the AEC, as the Soviet Union had just detonated its first atomic weapon in 1949. American nuclear policymakers felt an urgency to stay ahead of the Soviet Union both technologically and militarily, fearing the potential actions of an enemy armed with nuclear weapons. To deter the use of such weapons by the opposition, policymakers were determined to significantly increase the U.S. stockpile. Convinced that a second laboratory would accelerate the process of building up a nuclear arsenal, the AEC established the LLNL in

\textsuperscript{5} “Plot Plan for the H.E. Lens Facility Building 805—Site 300” (San Francisco: Gattetson, Elmendorf, Zinov, Reibin Architects and Engineers, revised 1974).
\textsuperscript{6} Sullivan and Ullrich, \textit{Historic Context and Building Assessments}, 261.
\textsuperscript{7} Sullivan and Ullrich, \textit{Historic Context and Building Assessments}, 8-9.
Livermore, California, in September of 1952 as a second nuclear weapons design facility.\(^8\)

Herbert York, the first director of LLNL, articulated four missions for the new laboratory; including designing thermonuclear weapons, providing diagnostic measurements for weapons tests for LANL and LLNL, developing a controlled thermonuclear reaction for power sources, and basic physics research. York was in strong pursuit of both weapons and non-weapons related research, as he felt that a diversified research program at LLNL would attract the country’s brightest young scientists.\(^9\)

**Establishment of the HE Process Area**

LLNL administrators noted the need for a remote site to conduct HE tests for the weapons program in 1953. LLNL administrators decided that the LANL in New Mexico was too distant to be reliable for the fabrication and test firing of various devices. Considering that obtaining land for a self-sufficient high explosives test site was crucial for the long-term success of the weapons design program, LLNL purchased 3,400 acres of ranch land east of Livermore, California in 1955. The first two buildings of LLNL’s Process Area were Building 805 and the Building 806 Complex, both built in 1957. The Process Area would continue to expand to twenty-six buildings with construction being complete in 1968. The HE Process program remained dedicated to the creation and progression of HE for LLNL through the end of the Cold War in 1991.\(^10\)

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\(^8\) Ibid., 247–249.


Part II. Structural/Design/Equipment Information

A. General Statement

1. Architectural character: Building 805 looks like the other buildings in the Site 300 Complex, as they share a similar visual language of non-ornamented, industrial construction, made to serve utilitarian purposes. Highly utilitarian in character, Building 805 is comprised of a long, monolithic volume, void of ornamental features or decorative finish treatments.


B. Description of Exterior

1. Overall dimensions: The building is approximately 380’-0” by 560’-0” at the main rectangular volume, and 180’-0” by 180’-0” at the square addition at the northwest corner. The one story, 6,802-gross-square-foot industrial building is rectangular in footprint.

2. Foundations: Building 805 has a poured concrete slab foundation.

3. Walls: The walls are a mixture of poured, precast, and cast-in-place concrete.

4. Structural system, framing: Building 805 is of steel frame construction.

5. Porches and loading docks: Concrete walkways surround the perimeter of the building. A slight roof overhang projects from the concrete eastern façade to shelter the main walkway.

7. Openings:
   a. Doorways and doors: Three metal double doors line the eastern façade. Three double doors and three single doors are present at the western elevation.

   b. Windows and shutters: A single casement window, possibly of acrylic glazing, sits in the east façade adjacent to the southernmost pair of doors.

8. Roof:
   a. Shape, covering: The pitched roof connecting Increments 1 and 2 was originally clad in corrugated cement-asbestos material. Increment 3 of Building 805 features a flat roof with piping and building utilities/mechanical equipment atop.

C. Description of Interior

1. Floor plans: The building is presently 6,802 square feet. The Increment 1 floor plan was originally rectangular, and after the construction of Increments 2 and 3, the building is presently still rectangular. There are 21 rooms in Building 805; Rooms 101-104, 107, 110, 112, 114, 116, 118, 120, 126, 130, 132, 134, 136, 140, 144 and 148. The three Increments are internally joined by a long central hallway that runs lengthwise through
the building. The orientation of the individual rooms to the interior hallways is not
regular, and about half of the rooms have direct access to the exterior.\textsuperscript{11}

Increment 1 consisted of two large rooms for trim and assembly processes, separated by a
central utility room. Larger in its overall footprint, Increment 2 to the north followed an
identical floor plan with two large machine rooms, a central utility and control room, and
a tool room. This eastern collective portion of the structure was renovated in 1975 to
house a press room, HE storage vault, X-ray room, environmental test chamber, support
room, firing tank, camera room, and a dark room. To the west, Increment 3 housed an
explosives preparation room, utility room, machine room and technical area, storage
room, date reduction room, and office.

3. Flooring: Vinyl flooring is present in the control rooms, Room 138 (dedicated to the
explosives press), and office spaces. Finished concrete comprises the flooring of the
radiography room, machine shop, and other laboratory spaces.

4. Wall and ceiling finish:
   a. Wall finish: The concrete interior walls are finished in plaster and painted
      white. Vinyl baseboards line the perimeter of each room.

   b. Ceiling finish: The office spaces have acoustical tile ceilings, while the
      exposed ceilings of laboratory spaces include white painted structural framing
      and corrugated metal roofing.

6. Openings:
   a. Doorways and doors: Nine of the building’s 21 rooms have doors that allow
      for both interior hallway and exterior access. 11 rooms can be accessed solely
      from within the interior of the building, while one room is accessed directly from
      the exterior. There are approximately 23 interior doors within the building.

7. Hardware: The hardware present in this building includes several electrically powered
   tracks with hoists at the ceiling, warning lights, fume hoods, PA alarm horns, cable trays,
   and secrecy lights in conference rooms.

8. Mechanical equipment:
   a. Heating, air conditioning, ventilation: The heating, air conditioning, and
      ventilation equipment of this building is unknown. It appears that much of the
      mechanics for these systems sits on top of the flat, concrete roof.

   b. Lighting: Recessed fluorescent fixtures embedded within acoustic tiles
      comprise the lighting in control rooms and office areas of Building 805, while
      suspended fluorescent fixtures are present in laboratory and shop areas.

   c. Plumbing: There is an interior drain trench in the floor of the original HE trim
      room.\textsuperscript{12}

\textsuperscript{11} “Figure A-1, Facility Floor Plan—Building 805” in Appendix A: Facility Plot Plans and Floor Plans (Lawrence
Livermore National Laboratory, 1997).
D. Machines: Building 805 contains remote machining equipment, radiography equipment, a lathe, and an explosives press.

E. Site Layout: The building is located in the southeastern portion of the Site 300 Complex. Cement trenches, unlined disposal lagoons (removed from service in 1985), and a septic tank with two cesspools are auxiliary landscape features that contributed to the functions of Building 805. A 300-gallon underground carbon steel diesel fuel tank is located to the west side of the building. Several small portable storage buildings surround the perimeter of Building 805. This includes two 60 square foot storage structures to the north of the building and two flammable-liquid storage buildings to the east and south, respectively. Additionally, there are several smaller auxiliary structures that service Building 805; including two air conditioners, a cooling tower, and a portable storage magazine.

Part III. Operations and Process

A. Operations: Building 805 housed facilities to trim and assemble HE billets (which were manufactured in nearby Building 806) into device designs for hydrodynamic test shots from 1957 to 1975. When the building was first constructed, it had one room for HE trim, one room for HE assembly, and a utility room. When Increment 2 was completed in 1959, it doubled the assembly capabilities of Building 805 by creating additional space for HE trim and assembly. In 1975, the construction of Increment 3 was completed, and Building 805 became an HE Lens facility. Increments 1 and 2 were renovated to hold a 100-ton press room, a small press room with an oven, an HE storage vault, an inspection room, an X-ray room, an environmental test chamber, a support machine room, a firing tank, a camera room, and a dark room. Increment 3 housed an explosives preparation room, a utility room, a machine room and technical area, a storage room, a data reduction room, and an office. Building 805 manufactured HE lenses from 1975 to 1991.

B. Technology: Building 805 contains remote machining equipment, radiography equipment, a lathe, and an explosives press. Due to the confidential nature of the work performed at Building 805, specific information about the technology and machines used in the building is limited.

C. End Product: From 1957 to 1975, Building 805 was devoted to the trim and assembly of HE billets that were manufactured in neighboring Building 806. From 1975 to 1991, Building 805 was devoted to the manufacturing of HE lenses.

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14 Ibid., 277.
Part IV. Sources of Information

A. Architectural drawings:


“Figure A-1, Facility Floor Plan—Building 805” in Appendix A—Facility Plot Plans and Floor Plans. Lawrence Livermore National Laboratory, 1997.


B. Interviews:
Scott, John E., LLNL Site 300 Manager, and Dawn Chase, LLNL Special Projects Manager. “LLNL Site 300.” Personal interview. 16 Sept. 2014.

C. Secondary sources:
Hallam, John S. Energetic Materials Facility: Operated by the Chemistry and Materials Science Department. Livermore: Lawrence Livermore National Laboratory, University of California. 1978.


Appendix

Figure 1. Building 805, Facility Floor Plan, 1997. (Lawrence Livermore National Laboratory Archives)
Figure 2. Increments 1 and 2 of Building 805 under construction, ca. 1958. (Lawrence Livermore National Laboratory Archives)

Figure 3. Increments 1 and 2 of Building 805 completed, ca. 1959. (Lawrence Livermore National Laboratory Archives)
Figure 4. Building 805 facing west, ca. 1975. (Lawrence Livermore National Laboratory Archives)

Figure 5. Building 805, looking northwest, ca. 1975. (Lawrence Livermore National Laboratory Archives)
Figure 6. Interior view of Control Room in Building 805, 1975. (Lawrence Livermore National Laboratory Archives)

Figure 7. Interior view of detonator tanks in Building 805, ca. 1975. (Lawrence Livermore National Laboratory Archives)
Figure 8. Interior view of Building 805, ca. 1975. (Lawrence Livermore National Laboratory Archives)
LAWRENCE LIVERMORE NATIONAL LABORATORY,  HAER No. CA-2353-B
SITE 300, HIGH EXPLOSIVES PROCESS AREA,
BUILDING 806 COMPLEX
(Buildings 806A and 806B)
North of Corral Hollow Road
Tracy
San Joaquin County
California

HISTORIC AMERICAN ENGINEERING RECORD
Pacific West Region
National Park Service
U.S. Department of the Interior
1111 Jackson Street, Suite 700
Oakland, CA 94607
Location:
West of the North Outer Loop in the northwestern portion of Lawrence Livermore National Laboratory (LLNL), north of Corral Hollow Road, Tracy, San Joaquin County, California.

Building 806 is located at latitude: 37.640779, longitude: -121.514307. This point was obtained on July 18, 2018, using Google Earth (WGS84). There is no restriction on its release to the public.

Present Owner:
U.S. Government, Department of Energy, National Nuclear Security Administration

Present Use:
Chemical lens loading and experimental detonator fabrication

Significance:
In 1955, Lawrence Livermore National Laboratory (LLNL) acquired the land for Site 300—which contains The Building 806 Complex—as a high explosive (HE) process area for the production of HE prototypes for their burgeoning weapons program. The High Explosive Process Area (Process Area) was built to formulate, mix, cast, press, mechanize and assemble conventional HE for use in the physics package of nuclear weaponry. Built from 1957 to 1968, the core of LLNL’s Process Area consists of twenty-six buildings compartmentalized into four main buildings and five building complexes. Billets, a processed or formed piece of HE used for testing, for all LLNL-designed nuclear weapons were developed and facilitated by scientists and technicians at the Process Area at Site 300. Subsequently, LLNL was one of two American laboratories that devised and developed nuclear weapons for the U.S. stockpile.

The Building 806 Complex was the second of two Process Area structures built at Site 300. The Building 806 Complex is comprised of two main structures (806A and 806B) with two auxiliary structures (806C and 806D) in between. Constructed specifically to provide functions related to the machining, fabrication, disassembly, and inspection of HE and inert components, the processes that occurred at the Building 806 Complex were one part of the larger mission to develop and fabricate HE for LLNL’s nuclear weapons designs.

Historian Preparer:
Alison Garcia Kellar, Senior Architectural Historian, Garavaglia Architecture, Inc., 2018
**Project Information:** This HAER documentation has been prepared for the US Department of Energy, Livermore Site Office, with supervision from the California State Historic Preservation Office.

In April 2005, the National Nuclear Security Administration (NNSA) Livermore Field Office in consultation with the California State Historic Preservation Officer (SHPO) determined Buildings 805, 806A, 806B, 807, 817A, 817B, 817F, 826, 827A, and 827C to be contributors to a Site 300 Process Area Historic District.
Part I. Historical Information

A. Physical History

1. **Date of Erection:** Buildings 806A and 806B were both constructed in 1957.

2. **Architect:** Buildings 806A and 806B were both designed by Rogers Engineering.¹

3. **Original and subsequent owners, occupants, uses:** The building complex has always been owned by the U.S. Government, as part of the Atomic Energy Commission (AEC) and its successor agencies (currently the Department of Energy/National Nuclear Security Administration [DOE/NNSA]).²

   The original user was the Lawrence Radiation Laboratory, which evolved into Lawrence Livermore National Laboratory. The occupants had continuously been Lawrence Livermore National Laboratory employees, and the complex was continuously used for nuclear research, supporting the LLNL weapons program, in addition to chemistry, physics, and biomedical research programs at the LLNL and Lawrence Berkeley National Laboratory (LBNL).

5. **Original plans and construction:** Rogers Engineering designed Buildings 806A and 806B in 1955 and 1957, and construction was complete by 1957. Building 806A was comprised of two large machining rooms separated by a utility room and a control room. Identical yet slightly larger in construction, Building 806B had an office and control room, inert storage room, remote control machining room, utility room, machining room and an inspection room. A wooden barricade blast wall additionally separates Building 806A from 806B.

6. **Alterations and additions:** Two small, metal Butler buildings—Buildings 806C and 806D—were constructed in 1961 for additional 806 Complex storage. Building 806C was used specifically for inert storage and drum fixture storage and Building 807D was used as a washroom to clean fixtures contaminated with HE compounds.³ An office was added to 806A in 1966, and a lunchroom was added in 1986.⁴

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⁴ Michael A. Sullivan and Rebecca A. Ulrich, *Historic Context and Building Assessments for the Lawrence Livermore National Laboratory Built Environment* (Livermore: Lawrence Livermore National Laboratory, 2007), 261.
B. Historical Context

Cold War Context
The following context related to the development of LLNL and the Hydrodynamic Test Facilities was created in 2007 as part of the *Historic Context and Building Assessments for the Lawrence Livermore National Laboratory Built Environment*:

The primary historic context for assessing the significance of LLNL buildings is the Cold War. The Cold War, although still a fairly recent event in US history, has been universally recognized as an event of exceptional significance within the nation’s history.

The Cold War spanned the forty-six years from 1945 to 1991 and encompassed a series of events, policy decisions, and conflicts between the United States and Soviet Union over the economic and political orientation of various countries in Europe, Asia, and the Middle East. In essence, the United States and the Soviet Union had incompatible and conflicting visions for the fate of the post-war world. The US was wedded to a world that closely mirrored its capitalist and democratic economic and political structure, while the Soviet Union hoped for a world that resembled its communist political and economic structure.

The Cold War dominated almost every aspect of American life-diplomatic, military, social, economic, scientific, and political. Nevertheless, only two aspects of Cold War history are relevant to LLNL, the history of the arms race and the more general history of nuclear science.\(^5\)

Early LLNL History
The LLNL was the brainchild of E. O. Lawrence and Edward Teller, physicists affiliated with the Manhattan Engineering District. Lawrence and Teller believed that the existing Los Alamos National Laboratory (LANL) was not working aggressively enough to achieve the goal of accelerating advancements in nuclear weaponry. The two physicists advocated for the founding of a second laboratory, determined that the design and production of a thermonuclear weapon in a new facility would be the next advancement in nuclear weaponry. Lawrence and Teller's argument was well received within the AEC, as the Soviet Union had just detonated its first atomic weapon in 1949. American nuclear policymakers felt an urgency to stay ahead of the Soviet Union both technologically and militarily, fearing the potential actions of an enemy armed with nuclear weapons. To deter the use of such weapons by the opposition, policymakers were determined to significantly increase the U.S. stockpile. Convinced that a second laboratory would accelerate the process of building up a nuclear arsenal, the AEC established the LLNL in Livermore, California, in September of 1952 as a second nuclear weapons design facility.\(^6\)

Herbert York, the first director of LLNL, articulated four missions for the new laboratory; including designing thermonuclear weapons, providing diagnostic measurements for weapons tests for LANL and LLNL, developing a controlled

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\(^6\) Ibid., 247–249.
thermonuclear reaction for power sources, and basic physics research. York was in strong pursuit of both weapons and non-weapons related research, as he felt that a diversified research program at LLNL would attract the country’s brightest young scientists.\(^7\)

**Establishment of the HE Process Area**

LLNL administrators noted the need for a remote site to conduct HE tests for the weapons program in 1953. LLNL administrators decided that the LANL in New Mexico was too distant to be reliable for the fabrication and test firing of various devices. Considering that obtaining land for a self-sufficient high explosives test site was crucial for the long-term success of the weapons design program, LLNL purchased 3,400 acres of ranch land east of Livermore, California in 1955. The first two buildings of LLNL’s Process Area were Building 805 and the Building 806 Complex, both built in 1957. The Process Area would continue to expand to twenty-six buildings with construction being complete in 1968. The HE Process program remained dedicated to the creation and progression of HE for LLNL through the end of the Cold War in 1991.\(^8\)

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Part II. Structural/ Design/ Equipment Information

A. General Statement:

1. Architectural character: The buildings in the Building 806 Complex looks like the other buildings in the Site 300 Complex, as they share a similar visual language of non-ornamented, industrial construction, made to serve utilitarian purposes. Highly utilitarian in character, The Building 806 Complex is comprised of a long, monolithic volumes, void of ornamental features or decorative finish treatments.

2. Condition of fabric: The exterior concrete has weathered over time and hairline cracks prevalent throughout the material surface. The fiberglass panels have become brittle over time with sun exposure.

B. Description of Exterior:

1. Overall dimensions: The building is approximately 380’-0” by 560’-0” at the main rectangular volume, and 180’-0” by 180’-0” at the square addition at the northwest corner. Rectangular in footprint, Building 806A is a one-story, 3,408-gross-square-foot industrial building. Similar in configuration, Building 806B is slightly longer, measuring 4,074 gross square feet. Situated between the two main structures, Building 806C and 806D are rectangular in plan, measuring 640 gross square feet each. The buildings are organized side-by-side lengthwise, forming a long, shallow complex.\(^9\)

2. Foundations: Poured concrete slab foundations are present at all complex buildings.

3. Walls: Building 806A has pre-cast and cast-in-place concrete walls on the north, west and east elevations and a concrete masonry wall on the south elevation. Building 806B is constructed of concrete masonry units, pre-cast and cast-in-place concrete. The walls of Buildings 806C and 806D are of corrugated metal.

4. Structural system, framing: Buildings 806A and 806B are of steel frame construction.\(^10\)

5. Porches and loading docks: Concrete walkways surround the perimeters of the buildings in the complex. A significant eave overhang projects from the main façades of Buildings 806A and 806B forming an enclosure with upright fiberglass sightscreen and windscreen panels, which provide the exterior walkway with shelter.

7. Openings:
   a. Doorways and doors: Exterior doors in Building 806A are on the east, west, and south walls. Exterior doors in Building 806B sit on the north, east and west walls.

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\(^9\) Figure A-2, Facility Floor Plan - Building 806. Appendix A - Facility Plot Plans and Floor Plans, Lawrence Livermore National Laboratory, 1997.

\(^10\) This assumption is based on construction photographs of Building 805 Increment 1 in 1956 and of Increment 2 in 1959, which depict Increment 1 still under construction (UCRL Livermore Photograph Numbers 7287 and 16119). Building 805 was built a year earlier than the Building 806 Complex, and are similar in their original floor plan configuration, building materials and roof type.
b. **Windows and shutters:** There are no windows present at this building complex.

8. **Roof:**
   a. **Shape, covering:** Buildings 806A and 806B originally featured pitched cement-asbestos paneled roofs. Buildings 806C and 806D have shallow pitched roofs of the same metal material as their siding. Each of the smaller buildings has three prominent vents atop.

C. **Description of Interior**

1. **Floor plans:** The rooms in buildings 806A and 806B are each accessible directly from the exterior walkway, and are not accessible to one another from the interior. Rooms are organized linearly.

   Building 806A has five enclosed rooms, Room 101, 103, 105, 113 and 119, with an unattached Mechanical Room and Room 146 across the walkway from Room 113 and Room 101, respectively. The two main large machining rooms in Building 806A are separated by a utility room and control room.

   Building 806B is comprised of five main spaces, Room 109, 121, 129, 134 and 145. Building 806B has an office and control room, an inert storage room, a remote control machining room, a utility room, a machining room and an inspection room.

   Buildings 806C and 806D are both comprised of a single room.

3. **Flooring:** Finished concrete and vinyl flooring comprise the original flooring of the buildings in this complex.

4. **Wall and ceiling finish:**
   a. **Wall finish:** The concrete interior walls are finished with white panels of an unknown material. Vinyl baseboards line each room.

   b. **Ceiling finish:** The ceilings of machining areas are painted white with exposed structural framing, mechanical piping and corrugated metal roofing. Remote control rooms have dropped, acoustical ceilings.

6. **Openings:**
   a. **Doorways and doors:** There are several interior doors in Building 806A leading from Room 101 to Room 101-A and from Room 103 to Room 102.

   b. **Windows:** There are no windows present in the interior of this building complex.

8. **Mechanical equipment:**
   a. **Heating, air conditioning, ventilation:** The heating, air conditioning and ventilation equipment of the 806 Building Complex is unknown.
b. Lighting: Suspended fluorescent fixtures are present throughout the interior. Several types of industrial-grade exterior light fixtures surround the building, suspended from the building’s eaves or mounted directly onto the walls.

D. Machines: Buildings 806A and B contain a Lathe, milling machine, Bostomatic machine, band saw, and a Moore measuring machine.

E. Site Layout: The Building 806 Complex is located in the southeastern portion of the Site 300 Complex.

Building 806A has an adjacent septic tank equipped with two cesspools.

Soon after building construction, large protective earthen berms were created between Buildings 806 and 807 and the adjacent road. These berms were built to serve as protective building barriers in the event of an explosion.\footnote{John E. Scott, LLNL Site 300 Manager, and Dawn Chase, LLNL Special Projects Manager, “LLNL Site 300,” Personal interview. 16 Sept. 2014.}
Part III. Operations and Process

A. Operations: The Building 806 Complex was one of the first two buildings (along with Building 805) to be constructed in the Site 300 Process Area, and provided functions related to the machining, fabrication, disassembly, and inspection of HE and inert components.

B. Technology: The Building 806 Complex was devoted to the machining and assembly of HE explosives. The HE-machining tools were controlled remotely from separate control rooms in Buildings 806A and 806B.

C. End Product: The Building 806 Complex was devoted to the machining and assembly of HE explosives. HE billets were machined in the Building 806 Complex and then trimmed and assembled for hydrodynamic test shots in nearby Building 805.
Part IV. Sources of Information

A. Architectural drawings:
“Figure A-2, Facility Floor Plan—Building 806” in Appendix A—Facility Plot Plans and Floor Plans. Lawrence Livermore National Laboratory, 1997.

B. Interviews:
Scott, John E., LLNL Site 300 Manager, and Dawn Chase, LLNL Special Projects Manager. “LLNL Site 300.” Personal interview. 16 Sept. 2014.

C. Secondary sources:
Hallam, John S. Energetic Materials Facility: Operated by the Chemistry and Materials Science Department. Livermore: Lawrence Livermore National Laboratory, University of California. 1978.


Appendix

Figure 1. Building 806, Facility Floor Plan, 1997. (Lawrence Livermore National Laboratory Archives)
Figure 2. Building 806A upon completion of construction, ca. 1958. (Lawrence Livermore National Laboratory Archives)
Figure 3. Building 806B in the foreground with wooden blast barrier at center and Building 806A in the background, ca. 1959. (Lawrence Livermore National Laboratory Archives)

Figure 4. Building 806C adjacent to wooden blast barrier, ca. 1961. (Lawrence Livermore National Laboratory Archives)
Figure 5. Technicians machining HE components in Room 134 of Building 806B, 1975. (Lawrence Livermore National Laboratory Archives)

Figure 6. Control panel for remote machining in Building 806B, 1975. (Lawrence Livermore National Laboratory Archives)
LAWRENCE LIVERMORE NATIONAL LABORATORY,     HAER No.  CA-2353-C
SITE 300, HIGH EXPLOSIVES PROCESS AREA,
BUILDING 807
North of Corral Hollow Road
Tracy
San Joaquin County
California

WRITTEN HISTORICAL AND
DESCRIPTIVE DATA PHOTOGRAPHS

HISTORIC AMERICAN ENGINEERING RECORD
Pacific West Region
National Park Service
U.S. Department of the Interior
1111 Jackson Street, Suite 700
Oakland, CA 94607
Location: West of the North Outer Loop in the northwestern portion of Lawrence Livermore National Laboratory (LLNL), north of Corral Hollow Road, Tracy, San Joaquin County, California.

Building 807 is located at latitude: 37.640543, longitude: -121.515650. This point was obtained on July 18, 2018, using Google Earth (WGS84). There is no restriction on its release to the public.

Present Owner: U.S. Government, Department of Energy, National Nuclear Security Administration

Present Use: HE machining and workshop space

Significance: In 1955, Lawrence Livermore National Laboratory (LLNL) acquired the land for Site 300—which contains Building 807—as a high explosive (HE) process area for the production of HE prototypes for their burgeoning weapons program. The High Explosive Process Area (Process Area) was built to formulate, mix, cast, press, mechanize and assemble conventional HE for use in the physics package of nuclear weaponry. Built from 1957 to 1968, the core of LLNL’s Process Area consists of twenty-six buildings compartmentalized into four main buildings and five building complexes. Billets, a processed or formed piece of HE used for testing, for all LLNL-designed nuclear weapons were developed and facilitated by scientists and technicians at the Process Area at Site 300. Subsequently, LLNL was one of two American laboratories that devised and developed nuclear weapons for the U.S. stockpile.

Building 807 was built to house the mixing and blending operations of HE fabrication. The manufacturing processes that occurred at Building 807 were one component of the larger operation to develop and fabricate HE for LLNL’s nuclear weapons designs. It is currently used for HE machining and as shop space.

Historian Preparer: Alison Garcia Kellar, Senior Architectural Historian, Garavaglia Architecture, Inc., 2018

Project Information: This HAER documentation has been prepared for the US Department of Energy, Livermore Site Office, with supervision from the California State Historic Preservation Office.

In April 2005, the National Nuclear Security Administration (NNSA) Livermore Field Office in consultation with the California State Historic
Preservation Officer (SHPO) determined Buildings 805, 806A, 806B, 807, 817A, 817B, 817F, 826, 827A, and 827C to be contributors to a Site 300 Process Area Historic District.
Part I. Historical Information

A. Physical History

1. Date of Erection: 1960

2. Architect: Building 807 was designed in 1958 by Indenco Engineers of San Leandro, California, and constructed in 1960.¹

3. Original and subsequent owners, occupants, uses: The building has always been owned by the U.S. Government, as part of the Atomic Energy Commission (AEC) and its successor agencies (currently the Department of Energy/National Nuclear Security Administration [DOE/NNSA]).²

The original user was the Lawrence Radiation Laboratory, which evolved into Lawrence Livermore National Laboratory. The occupants had continuously been Lawrence Livermore National Laboratory employees, and the building was continuously used for nuclear research, supporting the LLNL weapons program, in addition to chemistry, physics, and biomedical research programs at the LLNL and Lawrence Berkeley National Laboratory (LBNL).

5. Original plans and construction: Indenco Engineers designed Building 807 in 1958 and construction was complete by 1960. The building was constructed for the preparation of HE explosives. Building 807 originally consisted of two large remote controlled mixing rooms, separated by an inert storage room, HE storage vault, and a utility room.³

6. Alterations and additions: The building is currently used for HE machining and shop space, although the extent and date of the conversion are unknown.

B. Historical Context

Cold War Context

The following context related to the development of LLNL and the Hydrodynamic Test Facilities was created in 2007 as part of the Historic Context and Building Assessments for the Lawrence Livermore National Laboratory Built Environment:

The primary historic context for assessing the significance of LLNL buildings is the Cold War. The Cold War, although still a fairly recent event in US history,

³ Sullivan and Ullrich, Historic Context and Building Assessments 259.
has been universally recognized as an event of exceptional significance within the nation’s history.

The Cold War spanned the forty-six years from 1945 to 1991 and encompassed a series of events, policy decisions, and conflicts between the United States and Soviet Union over the economic and political orientation of various countries in Europe, Asia, and the Middle East. In essence, the United States and the Soviet Union had incompatible and conflicting visions for the fate of the post-war world. The US was wedded to a world that closely mirrored its capitalist and democratic economic and political structure, while the Soviet Union hoped for a world that resembled its communist political and economic structure.

The Cold War dominated almost every aspect of American life-diplomatic, military, social, economic, scientific, and political. Nevertheless, only two aspects of Cold War history are relevant to LLNL, the history of the arms race and the more general history of nuclear science.  

**Early LLNL History:**
The LLNL was the brainchild of E. O. Lawrence and Edward Teller, physicists affiliated with the Manhattan Engineering District. Lawrence and Teller believed that the existing Los Alamos National Laboratory (LANL) was not working aggressively enough to achieve the goal of accelerating advancements in nuclear weaponry. The two physicists advocated for the founding of a second laboratory, determined that the design and production of a thermonuclear weapon in a new facility would be the next advancement in nuclear weaponry. Lawrence and Teller's argument was well received within the AEC, as the Soviet Union had just detonated its first atomic weapon in 1949. American nuclear policymakers felt an urgency to stay ahead of the Soviet Union both technologically and militarily, fearing the potential actions of an enemy armed with nuclear weapons. To deter the use of such weapons by the opposition, policymakers were determined to significantly increase the U.S. stockpile. Convinced that a second laboratory would accelerate the process of building up a nuclear arsenal, the AEC established the LLNL in Livermore, California, in September of 1952 as a second nuclear weapons design facility.

Herbert York, the first director of LLNL, articulated four missions for the new laboratory; including designing thermonuclear weapons, providing diagnostic measurements for weapons tests for LANL and LLNL, developing a controlled thermonuclear reaction for power sources, and basic physics research. York was in strong pursuit of both weapons and non-weapons related research, as he felt that a diversified research program at LLNL would attract the country’s brightest young scientists.

**Establishment of the HE Process Area**

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5 Ibid., 247–249.
LLNL administrators noted the need for a remote site to conduct HE tests for the weapons program in 1953. LLNL administrators decided that the LANL in New Mexico was too distant to be reliable for the fabrication and test firing of various devices. Considering that obtaining land for a self-sufficient high explosives test site was crucial for the long-term success of the weapons design program, LLNL purchased 3,400 acres of ranch land east of Livermore, California in 1955. The first two buildings of LLNL’s Process Area were Building 805 and the Building 806 Complex, both built in 1957. The Process Area would continue to expand to twenty-six buildings with construction being complete in 1968. The HE Process program remained dedicated to the creation and progression of HE for LLNL through the end of the Cold War in 1991.7

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Part II. Structural/ Design/ Equipment Information

A. General Statement

1. Architectural character: Building 807 looks like the other buildings in the Site 300 Complex, as they share a similar visual language of non-ornamented, industrial construction, made to serve utilitarian purposes. Highly utilitarian in character, Building 807 is comprised of a long, monolithic volume, void of ornamental features or decorative finish treatments.


B. Description of Exterior:

1. Overall dimensions: The building is approximately 380'-0" by 560'-0" at the main rectangular volume, and 180'-0" by 180'-0" at the square addition at the northwest corner. The one story, 1,575-gross-square-foot industrial building is rectangular in footprint.

2. Foundations: Building 807 has a poured concrete slab foundation.

3. Walls: The walls are a mixture of concrete masonry units, precast concrete, and cast-in-place concrete.

4. Structural system, framing: Building 807 is of steel frame construction.

5. Porches and loading docks: Concrete walkways surround the perimeter of the building. A significant eave overhang projects from the main façade forming an enclosure with upright fiberglass sightscreen and windscreen panels, which provide the exterior walkway with shelter.

7. Openings:
   a. Doorways and doors: There are five single doors on the south facade and three pairs of doors on the rear, north wall.

   b. Windows and shutters: There are no windows present at this building.

8. Roof:
   a. Shape, covering: Building 807 originally featured cement-asbestos paneled material on the pitched roof. Within the past decade, the roof has been replaced with a corrugated metal material.8

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8 John E. Scott, LLNL Site 300 Manager, and Dawn Chase, LLNL Special Projects Manager. "LLNL Site 300." Personal interview. 16 Sept. 2014.
C. Description of Interior:

1. **Floor plans:** The rooms in Building 807 are accessible directly from the exterior walkway, and are not accessible to one another from the interior. Rooms are organized linearly. There are five enclosed rooms, Room 104, 106, 107, 108, 109, and 110. The two main large remote control mixing rooms are separated by an inert storage room, HE storage vault, and a utility room.

Building 807 consists of two large remote controlled mixing rooms, separated by an inert storage room, HE storage vault and a utility room.⁹

2. **Flooring:** Vinyl flooring is present in the remote control mixing rooms. The flooring of other rooms is unknown.

3. **Wall and ceiling finish:**
   a. **Wall finish:** The concrete interior walls are finished with white concrete asbestos panels. Vinyl baseboards line each room.
   
   b. **Ceiling finish:** The ceilings are painted white with exposed structural framing, mechanical piping and corrugated metal roofing.

4. **Openings:**
   a. **Doorways and doors:** There are no interior doors present in this building.

5. **Mechanical equipment:**
   a. **Heating, air conditioning, ventilation:** The heating, air conditioning, and ventilation equipment of this building is unknown.
   
   b. **Lighting:** Several types of industrial-grade exterior light fixtures surround the building, suspended from the building’s eaves or mounted directly onto the walls.
   
   c. **Plumbing:** The plumbing system of this building is unknown.

D. **Machines:** Building 807 historically housed all of the Site 300 Process Area’s large-scale HE mixing and blending functions.

E. **Site Layout:** The building is located in the southeastern portion of the Site 300 Complex. A cooling tower and Building 807B, a solvent storage facility, sit to the south of Building 807. A cement-lined trench, dry well, two HE process rinse water lagoons (removed from service in 1985), and a septic tank with two cesspools are auxiliary landscape features that contributed to the functions of Building 807.

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Part III. Operations and Process

A. Operations: Building 807 was constructed to house HE explosive preparation, including mixing and blending operations of HE component fabrication.

B. Technology: Building 807 housed all of the Site 300 Process Area’s large-scale HE blending and mixing functions. The building had technology for receiving, weighing, and inspecting raw explosive material in granular or pellet form. Mixers in the building blended explosives with inert materials, with the capacity to blend up to 100 pounds of explosives at a time.¹⁰

C. End Product: The building was initially constructed for the preparation of HE explosives. The building is currently used for HE machining and shop space, although the extent and date of the conversion are unknown.

¹⁰ Ibid., 255.
Part IV. Sources of Information

A. Architectural drawings:
“Figure A-3, Facility Floor Plan—Building 807” in Appendix A—Facility Plot Plans and Floor Plans. Lawrence Livermore National Laboratory, 1997.

B. Interviews:
Scott, John E., LLNL Site 300 Manager, and Dawn Chase, LLNL Special Projects Manager. “LLNL Site 300.” Personal interview. 16 Sept. 2014.

C. Secondary sources:
Hallam, John S. Energetic Materials Facility: Operated by the Chemistry and Materials Science Department. Livermore: Lawrence Livermore National Laboratory, University of California. 1978.


Appendix

Figure 1. Building 807, Facility Floor Plan, 1997. (Lawrence Livermore National Laboratory Archives)
Figure 2. Building 807 under construction, ca. 1958. (Lawrence Livermore National Laboratory Archives)
Figure 3. Rear view of Building 807 nearing completion, ca. 1959. (Lawrence Livermore National Laboratory Archives)

Figure 4. View of the facade of Building 807 nearing completion, ca. 1959. (Lawrence Livermore National Laboratory Archives)
Figure 5. Storage Building 807A and Building 807 upon completion, ca. 1960. (Lawrence Livermore National Laboratory Archives)
Location: West of the North Outer Loop in the northwestern portion of Lawrence Livermore National Laboratory (LLNL), north of Corral Hollow Road, Tracy, San Joaquin County, California.

The Pressing Complex is located at latitude: 37.641316, longitude: -121.515988. This point was obtained on July 18, 2018, using Google Earth (WGS84). There is no restriction on its release to the public.

Present Owner: U.S. Government, Department of Energy, National Nuclear Security Administration

Present Use: HE press and oven facility

Significance: In 1955, Lawrence Livermore National Laboratory (LLNL) acquired the land for Site 300—which contains The Pressing Complex—as a high explosive (HE) process area for the production of HE prototypes for their burgeoning weapons program. The High Explosive Process Area (Process Area) was built to formulate, mix, cast, press, mechanize and assemble conventional HE for use in the physics package of nuclear weaponry. Built from 1957 to 1968, the core of LLNL’s Process Area consists of twenty-six buildings compartmentalized into four main buildings and five building complexes. Billets, a processed or formed piece of HE used for testing, for all LLNL-designed nuclear weapons were developed and facilitated by scientists and technicians at the Process Area at Site 300. Subsequently, LLNL was one of two American laboratories that devised and developed nuclear weapons for the U.S. stockpile.

The Pressing Complex consists of eight buildings—Buildings 817A through 817H—that were built for the preparation and isostatic pressing of bulk explosives and MOCK HE. The manufacturing processes that occurred at the Pressing Complex were one component of the larger operation to develop and fabricate HE for LLNL’s nuclear weapons designs. The complex has retained its original use since its inception. Buildings 817A, 817B and 817F have been identified as the primary buildings within the complex and will be profiled in the following analysis.

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Historian Preparer: Alison Garcia Kellar, Senior Architectural Historian, Garavaglia Architecture, Inc., 2018

Project Information: This HAER documentation has been prepared for the US Department of Energy, Livermore Site Office, with supervision from the California State Historic Preservation Office.

In April 2005, the National Nuclear Security Administration (NNSA) Livermore Field Office in consultation with the California State Historic Preservation Officer (SHPO) determined Buildings 805, 806A, 806B, 807, 817A, 817B, 817F, 826, 827A, and 827C to be contributors to a Site 300 Process Area Historic District.
Part I. Historical Information

A. Physical History

1. **Date of Erection:** Buildings 817A and 817B were constructed in 1959. Building 817F was constructed in 1965.

2. **Architect:** Buildings 817A and 817B were designed by Rogers Engineering between 1957 and 1959. Building 817F was designed by Ruth and Going, Inc., between 1964 and 1965.²

3. **Original and subsequent owners, occupants, uses:** The complex has always been owned by the U.S. Government, as part of the Atomic Energy Commission (AEC) and its successor agencies (currently the Department of Energy/National Nuclear Security Administration [DOE/NNSA]).³

   The original user was the Lawrence Radiation Laboratory, which evolved into Lawrence Livermore National Laboratory. The occupants had continuously been Lawrence Livermore National Laboratory employees, and the complex was continuously used for nuclear research, supporting the LLNL weapons program, in addition to chemistry, physics, and biomedical research programs at the LLNL and Lawrence Berkeley National Laboratory (LBNL).

5. **Original plans and construction:** Rogers Engineering designed Buildings 817A and 817B starting in 1957, and construction was complete by 1959. Building 817A has a flat roof and an earthen-filled, concrete retaining wall. The structure is covered in a gravel mound. Building 817B is a metal building on a concrete foundation with a gently pitched roof. Buildings 817A and 817B sit at the northwest corner of the Building 817 Complex. Ruth and Going, Inc., designed building 817F starting in 1964, and construction was complete by 1965. This building is a concrete bunker with a flat roof.

6. **Alterations and additions:** The buildings at the Pressing Complex are still being used for their originally designed functions. Minor equipment and mechanical system upgrades have taken place over time. Building 817F was originally a cold-storage facility for HE compounds, and now operates as oven facility to heat and anneal explosives.

B. Historical Context

**Cold War Context**

The following context related to the development of LLNL and the Hydrodynamic Test Facilities was created in 2007 as part of the *Historic Context and Building Assessments for the Lawrence Livermore National Laboratory Built Environment*:


The primary historic context for assessing the significance of LLNL buildings is the Cold War. The Cold War, although still a fairly recent event in US history, has been universally recognized as an event of exceptional significance within the nation’s history.

The Cold War spanned the forty-six years from 1945 to 1991 and encompassed a series of events, policy decisions, and conflicts between the United States and Soviet Union over the economic and political orientation of various countries in Europe, Asia, and the Middle East. In essence, the United States and the Soviet Union had incompatible and conflicting visions for the fate of the post-war world. The US was wedded to a world that closely mirrored its capitalist and democratic economic and political structure, while the Soviet Union hoped for a world that resembled its communist political and economic structure.

The Cold War dominated almost every aspect of American life—diplomatic, military, social, economic, scientific, and political. Nevertheless, only two aspects of Cold War history are relevant to LLNL, the history of the arms race and the more general history of nuclear science.\(^5\)

**Early LLNL History**

The LLNL was the brainchild of E. O. Lawrence and Edward Teller, physicists affiliated with the Manhattan Engineering District. Lawrence and Teller believed that the existing Los Alamos National Laboratory (LANL) was not working aggressively enough to achieve the goal of accelerating advancements in nuclear weaponry. The two physicists advocated for the founding of a second laboratory, determined that the design and production of a thermonuclear weapon in a new facility would be the next advancement in nuclear weaponry. Lawrence and Teller's argument was well received within the AEC, as the Soviet Union had just detonated its first atomic weapon in 1949. American nuclear policymakers felt an urgency to stay ahead of the Soviet Union both technologically and militarily, fearing the potential actions of an enemy armed with nuclear weapons. To deter the use of such weapons by the opposition, policymakers were determined to significantly increase the U.S. stockpile. Convinced that a second laboratory would accelerate the process of building up a nuclear arsenal, the AEC established the LLNL in Livermore, California, in September of 1952 as a second nuclear weapons design facility.\(^6\)

Herbert York, the first director of LLNL, articulated four missions for the new laboratory; including designing thermonuclear weapons, providing diagnostic measurements for weapons tests for LANL and LLNL, developing a controlled thermonuclear reaction for power sources, and basic physics research. York was in strong pursuit of both weapons and non-weapons related research, as he felt that a diversified research program at LLNL would attract the country’s brightest young scientists.\(^7\)


6 Ibid., 247–249.

Establishment of the HE Process Area
LLNL administrators noted the need for a remote site to conduct HE tests for the weapons program in 1953. LLNL administrators decided that the LANL in New Mexico was too distant to be reliable for the fabrication and test firing of various devices. Considering that obtaining land for a self-sufficient high explosives test site was crucial for the long-term success of the weapons design program, LLNL purchased 3,400 acres of ranch land east of Livermore, California in 1955. The first two buildings of LLNL’s Process Area were Building 805 and the Building 806 Complex, both built in 1957. The Process Area would continue to expand to twenty-six buildings with construction being complete in 1968. The HE Process program remained dedicated to the creation and progression of HE for LLNL through the end of the Cold War in 1991.8

Part II. Structural/ Design/ Equipment Information

A. General Statement

1. Architectural character: The buildings in the Pressing Complex look like the other buildings in the Site 300 Complex, as they share a similar visual language of non-ornamented, industrial construction, made to serve utilitarian purposes. Highly utilitarian in character, The Pressing Complex buildings are void of ornamental features or decorative finish treatments.

Constructed as the primary control facility for the complex, the rectangular central node of Building 817A is partially enclosed by three poured concrete walls; two angled concrete walls flank from the central western elevation. Earthen infill and gravel covers the flat roof of this structure. The building contains two control rooms and an office.

Building 817B is rectangular in footprint and comprised of one double-height room with an exterior staircase. Clad in painted metal/Masonite panels, the building features a gently pitched roof.

The facade of the one-room Building 817F features a single poured-in-place concrete elevation in the form of an isosceles trapezoid. With a flat roof, the building is topped with gravel, creating a steep earthen slope on all remaining sides.

2. Condition of fabric: Efflorescence and minor cracks are present on the façades of buildings 817A and 817F. Paint is peeling off of Building 817B’s Masonite panels, and there is some exterior oxidation of the metal components toward the base of the building.

B. Description of Exterior

1. Overall dimensions: The building is approximately 380’-0” by 560’-0” at the main rectangular volume, and 180’-0” by 180’-0” at the square addition at the northwest corner. Rectangular in footprint, Building 817A is a one-story, 459-gross-square-foot bunker. Building 817B is a rectangular metal building with a double-height single story, measuring 4,074 gross square feet, and an exterior staircase. Building 817F is a rectangular one-story bunker with 565 gross square feet.

2. Foundations: Poured concrete slab foundations are present at all complex buildings.

3. Walls: Constructed as the primary control facility for the complex, the rectangular central node of Building 817A is partially enclosed by three poured concrete walls; two angled concrete walls flank from the central western elevation. Building 817B has metal walls with Masonite panels. The façade of the one-room Building 817F features a single poured-in-place concrete elevation in the form of an isosceles trapezoid.

5. Porches and loading docks: Concrete walkways surround the perimeter of Building 817A and portions of Buildings 817B and 817F.
7. Openings:
   a. Doorways and doors: Building 817A has three metal exterior doors on its east
elevation. Building 817B has one paired metal-door entrance at its north
elevation and a matching door at its south elevation. Building 817F has one
paired metal-door entrance at its

b. Windows and shutters: There are no windows present at this building complex.

8. Roof:
   a. Shape, covering: Earthen infill and gravel covers the flat roof of Building
817A. Building 817B features a gently pitched roof. Building 817F has a flat roof
topped with gravel, creating a steep earthen slope on all remaining sides.

C. Description of Interior
   1. Floor plans: Building 817A contains two control rooms and an office. Buildings 817B
and 817F both consist of one room.

   Historically, Building 817A housed a control room/office and an equipment room. The
control room operated the presses and ovens in the complex, located in buildings 817B
and 817F, respectively. Powdered HD was dried in ovens, including those found in
Building 817F, before being pressed into various shapes of billets. Building 817B’s
single room held multiple presses, which would press dried powdered HE into billets.

3. Flooring: Finished concrete and vinyl flooring comprise the original flooring of the
buildings in this complex.

4. Wall and ceiling finish:
   a. Wall finish: The concrete interior walls are finished with white panels of an
unknown material.

   b. Ceiling finish: The ceilings of machining areas are painted white with
exposed structural framing, mechanical piping and corrugated metal roofing.
Remote control rooms have dropped, acoustical ceilings.

6. Openings:
   a. Doorways and doors: There are no doors present in the interior of this
building complex.

   b. Windows: There are no windows present in the interior of this building
complex.

8. Mechanical equipment:
   a. Heating, air conditioning, ventilation: The heating, air conditioning and
ventilation equipment of the Pressing Complex is unknown.

   b. Lighting: Suspended fluorescent fixtures are present throughout the interior.
Several types of industrial-grade exterior light fixtures surround the buildings,
mounted directly onto the walls.
D. **Machines:** Building 817B contains isostatic presses, including a 14-inch press and an 18-inch press. Building 817F contains ovens.

E. **Site Layout:** The Pressing Complex is located in the southeastern portion of the Site 300 Complex.

Buildings 817A and 817B sit at the northwest corner of the Pressing Complex. Building 817F sits to the south of Buildings 817A and 817B.

A cement-lined trench, dry well, two HE process rinse water lagoons (removed from service in 1985), and a septic tank with two cesspools are auxiliary landscape features that contributed to the functions of Building 805. The disposal lagoon was decommissioned and closed in 1989.\(^9\)

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\(^9\) Ibid., 264.
Part III. Operations and Process

A. Operations: The Pressing Complex was designed to turn powdered HE into pressed and dried billets of explosives, and was in use for more than forty years.\(^\text{10}\) The complex consists of eight structures, with buildings 817A, 817B, and 817F acting as the primary buildings in the complex. Buildings 817A, 817B, and 817C were constructed between 1957 and 1959, and served as the initial HE Press and Oven Facility for the Site 300 Process Area.

B. Technology: Building 817A contained electronic remote controls for the ovens and presses located in other buildings in the Pressing Complex. Theses operations were remote controlled to keep workers from being injured by an accidental detonation. Building 817B housed 14-inch and 18-inch isostatic presses that turned dried powdered HE into billets. Building 817F housed two ovens that would dry the powdered HE on sheets before it was pressed into billets.

C. End Product: The billets produced at the Pressing Complex were machined and then assembled at other buildings in the Site 300 Process Area.

\(^{10}\) Sullivan and Ulrich, *Historic Context and Building Assessments*, 265.
Part IV. Sources of Information

A. Architectural drawings:
“Figure A-9, Facility Floor Plan—Building 817 Complex” in Appendix A—Facility Plot Plans and Floor Plans. Lawrence Livermore National Laboratory, 1997.

B. Interviews:
Scott, John E., LLNL Site 300 Manager, and Dawn Chase, LLNL Special Projects Manager. “LLNL Site 300.” Personal interview. 16 Sept. 2014.

C. Secondary sources:
Hallam, John S. Energetic Materials Facility: Operated by the Chemistry and Materials Science Department. Livermore: Lawrence Livermore National Laboratory, University of California. 1978.


Figure 1. Building 817 Complex, Facility Plot Plan. (Lawrence Livermore National Laboratory Archives)
Figure 2. Building 817A, Facility Plot Plan. (Lawrence Livermore National Laboratory Archives)
Figure 3. Building 817B, Facility Plot Plan. (Lawrence Livermore National Laboratory Archives)
Figure 4. Building 817F, Facility Plot Plan. (Lawrence Livermore National Laboratory Archives)
Figure 5. Building 817 Complex looking north (Lawrence Livermore National Laboratory Archives)

Figure 6. Wall between Buildings 817A and 817B looking south (Lawrence Livermore National Laboratory Archives)
Figure 7. Building 817F looking south west (Lawrence Livermore National Laboratory Archives)
LAWRENCE LIVERMORE NATIONAL LABORATORY, SITE 300, HIGH EXPLOSIVES PROCESS AREA, BUILDING 825
North of Corral Hollow Road
Tracy
San Joaquin County
California

WRITTEN HISTORICAL AND DESCRIPTIVE DATA PHOTOGRAPHS

HISTORIC AMERICAN ENGINEERING RECORD
Pacific West Region
National Park Service
U.S. Department of the Interior
1111 Jackson Street, Suite 700
Oakland, CA 94607
Location: West of the North Outer Loop in the northwestern portion of Lawrence Livermore National Laboratory (LLNL), north of Corral Hollow Road, Tracy, San Joaquin County, California.

Building 825 is located at latitude: 37.646313, longitude: -121.521762. These points were obtained on July 18, 2018, using Google Earth (WGS84). There is no restriction on its release to the public.

Present Owner: U.S. Government, Department of Energy, National Nuclear Security Administration

Present Use: Not in use

Significance: In 1955, Lawrence Livermore National Laboratory (LLNL) acquired the land for Site 300—which contains Building 825—as a high explosive (HE) process area for the production of HE prototypes for their burgeoning weapons program. The High Explosive Process Area (Process Area) was built to formulate, mix, cast, press, mechanize and assemble conventional HE for use in the physics package of nuclear weaponry. Built from 1957 to 1968, the core of LLNL’s Process Area consists of twenty-six buildings compartmentalized into four main buildings and five building complexes. Billets, a processed or formed piece of HE used for testing, for all LLNL-designed nuclear weapons were developed and facilitated by scientists and technicians at the Process Area at Site 300. Subsequently, LLNL was one of two American laboratories that devised and developed nuclear weapons for the U.S. stockpile.

Building 825 was built as a chemistry research building as part of the Chemistry Process Facility, created to test and develop new HE. The manufacturing processes that occurred at Building 825 were one component of the larger operation to develop and fabricate HE for LLNL’s nuclear weapons designs. The building currently houses mechanical presses.

Historian Preparer: Alison Garcia Kellar, Senior Architectural Historian, Garavaglia Architecture, Inc., 2018

Project Information: This HAER documentation has been prepared for the US Department of Energy, Livermore Site Office with supervision from the California State Historic Preservation Office.
In April 2005, the National Nuclear Security Administration (NNSA) Livermore Field Office in consultation with the California State Historic Preservation Officer (SHPO) determined Buildings 805, 806A, 806B, 807, 817A, 817B, 817F, 826, 827A, and 827C to be contributors to a Site 300 Process Area Historic District.
Part I. Historical Information

A. Physical History


2. Architect: Rogers Engineering (consulting engineers) and Starks, Jozens & Nacht (consulting architects) of San Francisco, CA

3. Original and subsequent owners, occupants, uses: The building has always been owned by the U.S. Government, as part of LLNL, one of the laboratories of the Atomic Energy Commission (AEC) and its successor agencies (currently the Department of Energy/National Nuclear Security Administration [DOE/NNSA]).

Building 825 was constructed for the formulation and testing of new HE in 1959. The building currently houses mechanical presses.¹

4. Original plans and construction: Rogers Engineering designed Building 825 in 1957 and construction was complete by 1959. This structure consisted of a control room with two test cells (Cell 1 and Cell 2) separated by a mechanical equipment room. The control room sits to the northeast of the two test cells, forming a “T” with the rest of the building. A corridor runs horizontally along the width of the building separating the Control Room from the test cells. Each of the rooms in the building have direct access outside.²

5. Alterations and Additions: An accidental explosion in the 1970s prompted the rebuilding of the frangible walls.

B. Historical Context

Cold War Context

The following context related to the development of LLNL and the Hydrodynamic Test Facilities was created in 2007 as part of the Historic Context and Building Assessments for the Lawrence Livermore National Laboratory Built Environment:

The primary historic context for assessing the significance of LLNL buildings is the Cold War. The Cold War, although still a fairly recent event in US history, has been universally recognized as an event of exceptional significance within the nation’s history.

The Cold War spanned the forty-six years from 1945 to 1991 and encompassed a series of events, policy decisions, and conflicts between the United States and Soviet Union over the economic and political orientation of various countries in Europe, Asia, and the Middle East. In essence, the United States and the Soviet Union had incompatible and conflicting visions for the fate of the post-war world. The US was wedded to a world that

² Ibid, 259.
closely mirrored its capitalist and democratic economic and political structure, while the Soviet Union hoped for a world that resembled its communist political and economic structure.

The Cold War dominated almost every aspect of American life—diplomatic, military, social, economic, scientific, and political. Nevertheless, only two aspects of Cold War history are relevant to LLNL, the history of the arms race and the more general history of nuclear science.  

**Early LLNL History:**
The LLNL was the brainchild of E. O. Lawrence and Edward Teller, physicists affiliated with the Manhattan Engineering District. Lawrence and Teller believed that the existing Los Alamos National Laboratory (LANL) was not working aggressively enough to achieve the goal of accelerating advancements in nuclear weaponry. The two physicists advocated for the founding of a second laboratory, determined that the design and production of a thermonuclear weapon in a new facility would be the next advancement in nuclear weaponry. Lawrence and Teller's argument was well received within the AEC, as the Soviet Union had just detonated its first atomic weapon in 1949. American nuclear policymakers felt an urgency to stay ahead of the Soviet Union both technologically and militarily, fearing the potential actions of an enemy armed with nuclear weapons. To deter the use of such weapons by the opposition, policymakers were determined to significantly increase the U.S. stockpile. Convinced that a second laboratory would accelerate the process of building up a nuclear arsenal, the AEC established the LLNL in Livermore, California, in September of 1952 as a second nuclear weapons design facility.  

Herbert York, the first director of LLNL, articulated four missions for the new laboratory; including designing thermonuclear weapons, providing diagnostic measurements for weapons tests for LANL and LLNL, developing a controlled thermonuclear reaction for power sources, and basic physics research. York was in strong pursuit of both weapons and non-weapons related research, as he felt that a diversified research program at LLNL would attract the country’s brightest young scientists. 

**Establishment of the HE Process Area:**
LLNL administrators noted the need for a remote site to conduct HE tests for the weapons program in 1953. LLNL administrators decided that the LANL in New Mexico was too distant to be reliable for the fabrication and test firing of various devices. Considering that obtaining land for a self-sufficient high explosives test site was crucial for the long-term success of the weapons design program, LLNL purchased 3,400 acres of ranch land east of Livermore, California in 1955. The first two buildings of LLNL’s Process Area were Building 805 and Building 806, both built in 1957. The Process Area would continue to expand to twenty-six buildings with construction being complete in 1968. The HE Process program remained dedicated to the creation and progression of HE for LLNL through the end of the Cold War in 1991. 

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Part II. Structural/ Design/ Equipment Information

A. General Statement

1. Architectural character:
   Process Area
   Most of the buildings in the Process Area were constructed of poured concrete, concrete block or cement-asbestos panels with frangible walls to direct blasts in the event of an accidental explosion. Few structures are made of corrugated metal. The buildings at Site 300 were generally constructed with inexpensive and sometimes less durable materials than at the main Livermore site.

Building 825
   Building 825 looks like the other buildings in the Site 300 Complex, as they share a similar visual language of non-ornamented, industrial construction, made to serve utilitarian purposes. Completed in 1959, Building 825 was constructed to develop and test HE components. Building 825 has cast-in-place concrete walls and a flat roof surmounted by wooden shrapnel baffles that run above the building to the nearby hillside. Highly utilitarian in character, the building is a monolithic volume, void of ornamental features or decorative finish treatments.


B. Description of Exterior

1. Overall dimensions: The one story 1,323 gross square foot industrial building is like a “T” in footprint. The structure is 10’ tall

2. Foundations: A 4” concrete slab comprises the foundation of this building.

3. Walls: Building 825 is constructed of pre-cast, and cast-in-place reinforced concrete. The west wall is frangible and made of wood with exposed metal strips to help form a Faraday Cage. The north and south walls are clad in cement-asbestos panels.7
   A safety-wall/windbreak constructed of pressed board and piping projects from the east elevation.

4. Structural system and framing: As noted in early construction photographs (ca. 1958) Building 825 is of reinforced concrete construction.8

5. Porches, stoops, balconies, and bulkheads: There are no porches, stoops, balconies or bulkheads present at this building. There is a concrete entrance overhang above the single door in the Control Room’s eastern facade. An overhead wooden open slat shade system (shrapnel baffle) projects from the south, west and north roof edges and extends to the surrounding hills.

6. Openings

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7 Ibid.
8 This assumption is based on construction photographs of Building 825 still under construction (UCRL Livermore Photograph numbers 14135, 14641 and 14443).
a. **Doorways and doors**: There are three pairs of metal double doors on the northern elevation which lead to the Equipment Room/corridor, to Cell 2 and to the additional Equipment Room. The southern elevation has two pairs of metal double doors, one of which leads to the Equipment Room and the other to Cell 1. The eastern elevation has one single metal door leading to the Control Room and Office. The western elevation features two single metal doors which lead to Cell 1 and 2, respectively.

b. **Windows and shutters**: There are no exterior windows present at this building.

7. **Roof**
   a. **Shape and covering**: The roof of this building is flat, covered with tar and gravel.

C. **Description of Interior**

1. **Floor plans**: Each of the five main rooms of Building 825 are accessible directly from the exterior. Internally, two test cells (Rooms 102 and 108) flank the mechanical equipment area (Room 104). Room 104 is comprised of a rectangular room and north-south running hallway. Projecting east of Room 104, is the Control Room, Room 103. This rectangular room completes the “T”-formation of the building and is accessible from the exterior at the eastern elevation. Room 107, used for mechanical equipment, sits to the northeast of the Control Room, and is accessed from the north elevation.

2. **Flooring**: 6” vinyl flooring is present in the remote control room. Painted concrete comprises the flooring of both test cells. The flooring of other rooms is unpainted concrete.

3. **Wall and ceiling finish**: The concrete interior walls are finished with white paint. Vinyl baseboards line each room. The ceilings are painted white with exposed structural framing, mechanical piping and corrugated metal roofing.

4. **Openings**
   a. **Doorways and doors**
      Building 825 is built with five sets of double doors and with four single doors. Double doors open to both equipment rooms, with Room 104 having a set of double doors at both the north and south entrances, and Room 107 having a set of double doors at the north entrance. Each explosives test cell has a single door leading into it from the west and a double door leading into it from the south for Room 102 and the north for Room 108. The Control Room has a single door leading into it from the east. There is only one interior door, and that is for the restroom which is located inside the Control Room. There is a single metal interior door that leads to the control room, Room 103.

   b. **Windows and shutters**
      Behind the control panel in the Control Room, there are two deep, rounded viewports, which face west looking into the equipment room (Room 104). Further, equipment room 104 has two identical viewports on the west wall of the corridor which look into each of the explosives test cells. This building has no other windows and no shutters.

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*Figure 1. Lab Building 825, Facility Key plan, 1996. Lawrence Livermore National Laboratory Archives.*
5. **Hardware:** The hardware in this building is most likely of commercial grade, intended for utilitarian purposes.

6. **Mechanical equipment:**
   
   **a. Heating, air conditioning, and ventilation**
   An air-conditioning system is located on the eastern exterior wall.

   **b. Lighting**
   Ceiling mounted T8 fluorescent fixtures line the ceiling of the control room. Explosive-rated industrial lighting is located in each test cell.

   **c. Plumbing**
   The sewer system for this building runs to a septic tank.

   **D. Machines:** A control panel lines the west wall of the Control Room. Cell 1 contains a remote control press and small oven. Cell 2 contains a calorimeter within a 5' deep pit, a two-inch diameter ram press, and a 250-pound crane.

   **E. Site Layout:** The building is located in the southern portion of the Site 300 Complex. Building 825 was built adjacent to a surrounding hillside, a feature that serves as extra site protection in the event of an accidental explosion within the building. An auxiliary metal Butler-type structure sits to the south of the control room. The structure is used for storing supplies and equipment, and has a slightly pitched roof and a rounded roof vent.
Part III. Operations and Process

A. Operations: Building 825 was constructed as the Chemistry Research Building (Chemistry Process Facility) for the Site 300 Process Area. The building housed initial chemical formulation activities, and was operated largely by chemists. Here, new HE recipes were tested in small quantities before being scaled up.\(^\text{10}\)

B. Technology: Building 825 had manufacturing technology for developing and testing new HE. It originally housed small ovens and a one-inch and a four-inch press. The ram presses could press billets from 1/4” to 4-1/2” long at pressures up to 30,000 psi from ambient to 120 degrees Celsius. The press could be operated either locally or remotely.\(^\text{11}\) By 1978, Building 825 housed a 4-foot in diameter Monel sphere which allowed for sampling gaseous detonation products. Due to the confidential nature of the work performed at Building 825, specific information about the technology and machines used in the building is limited.

D. End Product: The HE developed and tested at Building 825 included billets of various densities and lengths.\(^\text{12}\) Small experimental recipes were created and tested here and then scaled up, mixed, and pressed at neighboring Building 826. From there, the HE was machined and assembled at other buildings in the Site 300 Process Area.

\(^\text{10}\) Sullivan and Ullrich, 2007: p. 255.
\(^\text{12}\) Ibid.
Part IV. Sources of Information

A. Primary sources:
“Figure A-3, Facility Floor Plan—Building 825” in Appendix A—Facility Plot Plans and Floor Plans. Livermore: LLNL, 15 June 1997.

Hallam, John S. Energetic Materials Facility: Operated by the Chemistry and Materials Science Department. Livermore: Lawrence Livermore National Laboratory, University of California. 1978.

“Lab Building 825,” Facility Key plan, 1996. PKS96-825-001B.

Scott, John E., LLNL Site 300 Manager, and Dawn Chase, LLNL Special Projects Manager. “LLNL Site 300.” Personal interview. 16 Sept. 2014.

B. Secondary sources:


C. Likely sources not yet investigated: There is tremendous related research material from the Energy Research and Development Administration (ERDA) and material in the Office of Fusion Energy/Office of Energy Research records. The DOE Headquarters and the National Archives would additionally yield information pertinent to this report. The Lawrence Livermore National Laboratory Archives located in Livermore, California have extensive building and equipment documentation, photographs, plans and related reports.
Figure 1. Lab Building 825, Facility Key plan, 1996. Lawrence Livermore National Laboratory Archives.
Figure 2. Hillside view of Building 825 under construction, looking northeast, ca. 1958. Lawrence Livermore National Laboratory Archives.

Figure 3. View of Building 825 under construction, looking northwest, ca. 1958. Lawrence Livermore National Laboratory Archives.
Figure 4. View of Building 825 under construction looking northeast as shrapnel baffles are installed, ca. 1958. Lawrence Livermore National Laboratory Archives.

Figure 5. View of Building 825 looking southwest just after construction, note the shrapnel baffles extending to the hillside, ca. 1959. Lawrence Livermore National Laboratory Archives.
Figure 6. View of Building 825 looking northwest just after construction, note the shrapnel baffles extending to the hillside, ca. 1959. Lawrence Livermore National Laboratory Archives.
LAWRENCE LIVERMORE NATIONAL LABORATORY, SITE 300, HIGH EXPLOSIVES PROCESS AREA
BUILDING 826
North of Corral Hollow Road
Tracy
San Joaquin County
California

WRITTEN HISTORICAL AND DESCRIPTIVE DATA PHOTOGRAPHS

HISTORIC AMERICAN ENGINEERING RECORD
Pacific West Region
National Park Service
U.S. Department of the Interior
1111 Jackson Street, Suite 700
Oakland, CA 94607
HAER No. CA-2353-F

Location: West of the North Outer Loop in the northwestern portion of Lawrence Livermore National Laboratory (LLNL), north of Corral Hollow Road, Tracy, San Joaquin County, California.

Building 826 is located at latitude: 37.645681, longitude: -121.521291. These points were obtained on July 18, 2018, using Google Earth (WGS84). There is no restriction on its release to the public.

Present Owner: U.S. Government, Department of Energy, National Nuclear Security Administration

Present Use: HE mixing and mechanical pressing

Significance: In 1955, Lawrence Livermore National Laboratory (LLNL) acquired the land for Site 300—which contains Building 826—as a high explosive (HE) process area for the production of HE prototypes for their burgeoning weapons program. The High Explosive Process Area (Process Area) was built to formulate, mix, cast, press, mechanize and assemble conventional HE for use in the physics package of nuclear weaponry. Built from 1957 to 1968, the core of LLNL’s Process Area consists of twenty-six buildings compartmentalized into four main buildings and five building complexes. Billets, a processed or formed piece of HE used for testing, for all LLNL-designed nuclear weapons were developed and facilitated by scientists and technicians at the Process Area at Site 300. Subsequently, LLNL was one of two American laboratories that devised and developed nuclear weapons for the U.S. stockpile.

Building 826 was built as an additional chemical research building for the Chemical Process Facility to development and testing of HE. The manufacturing processes that occurred at Building 826 were one component of the larger operation to develop and fabricate HE for LLNL’s nuclear weapons designs. It is currently used for HE machining and as shop space.

Historian Preparer: Alison Garcia Kellar, Senior Architectural Historian, Garavaglia Architecture, Inc., 2018

Project Information: This HAER documentation has been prepared for the US Department of Energy, Livermore Site Office, with supervision from the California State Historic Preservation Office.
In April 2005, the National Nuclear Security Administration (NNSA) Livermore Field Office in consultation with the California State Historic Preservation Officer (SHPO) determined Buildings 805, 806A, 806B, 807, 817A, 817B, 817F, 826, 827A, and 827C to be contributors to a Site 300 Process Area Historic District.
Part I. Historical Information

A. Physical History


2. Architect: Building 826 was designed in 1959 by Indenco Engineers of San Leandro, California, and constructed in 1960.1

3. Original and subsequent owners, occupants, uses: The building has always been owned by the U.S. Government, as part of the Atomic Energy Commission (AEC) and its successor agencies (currently the Department of Energy/National Nuclear Security Administration [DOE/NNSA]).2

The original user was the Lawrence Radiation Laboratory, which evolved into Lawrence Livermore National Laboratory. The occupants had continuously been Lawrence Livermore National Laboratory employees, and the building was continuously used for nuclear research, supporting the LLNL weapons program, in addition to chemistry, physics, and biomedical research programs at the LLNL and Lawrence Berkeley National Laboratory (LBNL).

5. Original plans and construction: Indenco Engineering designed Building 826 in 1959 and construction was complete by 1960. This rectangular structure consisted of a control room, mechanical equipment room, and storage room to the east and two chemistry cells to the west. A central control room spans the entire building in a north-south orientation. Each of the rooms is accessible from the exterior walkway, which surrounds the building on each side.3

6. Alterations and additions: There are no known alterations or additions.

B. Historical Context

Cold War Context

The following context related to the development of LLNL and the Hydrodynamic Test Facilities was created in 2007 as part of the Historic Context and Building Assessments for the Lawrence Livermore National Laboratory Built Environment:

The primary historic context for assessing the significance of LLNL buildings is the Cold War. The Cold War, although still a fairly recent event in US history, has been universally recognized as an event of exceptional significance within the nation’s history.

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3 Sullivan and Ulrich, Historic Context and Building Assessments, 259.
The Cold War spanned the forty-six years from 1945 to 1991 and encompassed a series of events, policy decisions, and conflicts between the United States and Soviet Union over the economic and political orientation of various countries in Europe, Asia, and the Middle East. In essence, the United States and the Soviet Union had incompatible and conflicting visions for the fate of the post-war world. The US was wedded to a world that closely mirrored its capitalist and democratic economic and political structure, while the Soviet Union hoped for a world that resembled its communist political and economic structure.

The Cold War dominated almost every aspect of American life-diplomatic, military, social, economic, scientific, and political. Nevertheless, only two aspects of Cold War history are relevant to LLNL, the history of the arms race and the more general history of nuclear science.4

Early LLNL History
The LLNL was the brainchild of E. O. Lawrence and Edward Teller, physicists affiliated with the Manhattan Engineering District. Lawrence and Teller believed that the existing Los Alamos National Laboratory (LANL) was not working aggressively enough to achieve the goal of accelerating advancements in nuclear weaponry. The two physicists advocated for the founding of a second laboratory, determined that the design and production of a thermonuclear weapon in a new facility would be the next advancement in nuclear weaponry. Lawrence and Teller's argument was well received within the AEC, as the Soviet Union had just detonated its first atomic weapon in 1949. American nuclear policymakers felt an urgency to stay ahead of the Soviet Union both technologically and militarily, fearing the potential actions of an enemy armed with nuclear weapons. To deter the use of such weapons by the opposition, policymakers were determined to significantly increase the U.S. stockpile. Convinced that a second laboratory would accelerate the process of building up a nuclear arsenal, the AEC established the LLNL in Livermore, California, in September of 1952 as a second nuclear weapons design facility.5

Herbert York, the first director of LLNL, articulated four missions for the new laboratory; including designing thermonuclear weapons, providing diagnostic measurements for weapons tests for LANL and LLNL, developing a controlled thermonuclear reaction for power sources, and basic physics research. York was in strong pursuit of both weapons and non-weapons related research, as he felt that a diversified research program at LLNL would attract the country’s brightest young scientists.6

Establishment of the HE Process Area
LLNL administrators noted the need for a remote site to conduct HE tests for the weapons program in 1953. LLNL administrators decided that the LANL in New Mexico was too distant to be reliable for the fabrication and test firing of various devices. Considering that obtaining land for a self-sufficient high explosives test site was crucial for the long-term success of the weapons design program, LLNL purchased 3,400 acres of ranch land east of Livermore, California in 1955. The first two buildings of LLNL’s

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4 Ibid., 8-9.
5 Ibid., 247-249.
Process Area were Building 805 and the Building 806 Complex, both built in 1957. The Process Area would continue to expand to twenty-six buildings with construction being complete in 1968. The HE Process program remained dedicated to the creation and progression of HE for LLNL through the end of the Cold War in 1991.7

Part II. Structural/ Design/ Equipment Information

A. General Statement

1. Architectural character: Building 826 looks like the other buildings in the Site 300 Complex, as they share a similar visual language of non-ornamented, industrial construction, made to serve utilitarian purposes. Completed in 1960, Building 826 was constructed as an additional Chemistry Facility for the development and testing of HE. A gently pitched gabled roof with a large overhang surmounts the concrete and frangible walls. Wooden shrapnel baffles extend from the north, south and west rooflines to the abutting hillside. Highly utilitarian in character, the building is comprised of a rectangular monolithic volume, void of ornamental features or decorative finish treatments.


B. Description of Exterior

1. Overall dimensions: The building is approximately 380’-0” by 560’-0” at the main rectangular volume, and 180’-0” by 180’-0” at the square addition at the northwest corner. The one story 1,678 gross square foot industrial building is rectangular in footprint.

2. Foundations: A 4-inch concrete slab comprises the foundation of this building.

3. Walls: The north and south walls are constructed of cast-in-place reinforced concrete. The frangible east and west walls are made of wood panels and cement asbestos panels with exposed Faraday Cage metal strips.

4. Structural system, framing: As noted in early construction photographs (ca. 1959), Building 826 is of reinforced concrete construction.8

5. Porches and loading docks: Each of the rooms is accessible from the exterior concrete perimeter walkway, which surrounds the building on all sides.

7. Openings:
   a. Doorways and doors: The north elevation has two single metal doors, one of which leads to the Control Room, Room 100. The other is a vault door that leads to Cell 2, Room 108. A wood louvered protective wall/screen sits just beyond the Cell 2 door. The southern elevation features a pair of double doors leading to the Control Room, a single metal vault door leading to Cell 1. A wood louvered protective wall/screen just beyond the Cell 1 vault door. Three doors allow for access into the eastern elevation. The Equipment Room and Lavatory both have single metal doors, while the Office has a pair of metal double doors. Two pairs of metal double doors sit in the rear west elevation, leading to Cell 1 and 2, respectively.

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8 This assumption is based on construction photographs of Building 826 still under construction (UCRL Livermore Photograph numbers 17667 and 17943).
b. Windows and shutters: There are no windows present at this building.

8. Roof:
   a. Shape, covering: Building 826 has a gently pitched gabled roof with a large overhang. An overhead wooden open slat shade system (shrapnel baffle) projects from the north, south and west roof edges and extends to the surrounding hills.

C. Description of Interior

1. Floor plans: The building is essentially rectangular in footprint, and is comprised of six main rooms; with two test cells to the west and a control room, mechanical equipment room and lavatory to the east, with a central, north-south running control room.

3. Flooring: 6-inch vinyl flooring is present in the remote control mixing rooms. Painted concrete comprises the flooring of both cells.

4. Wall and ceiling finish:
   a. Wall finish: The western wall in the Control Room is covered with metal panels. Additional interior walls are assumed to be of gypsum board or concrete. The concrete interior walls are finished with white concrete asbestos panels. Vinyl baseboards line each room.

   b. Ceiling finish: The ceilings are painted white with exposed structural framing, mechanical piping and corrugated metal roofing.

6. Openings:
   a. Doorways and doors: There are two interior doors leading from Room 100 to Room 107, and Room 101.

7. Hardware: The hardware in this building is most likely of commercial grade, intended for utilitarian purposes.

8. Mechanical equipment:
   a. Heating, air conditioning, ventilation: An air-conditioning system is located on the eastern exterior wall.

   b. Lighting: Ceiling mounted T8 fluorescent fixtures line the ceiling of the control rooms.

   c. Plumbing: The plumbing system of this building is unknown.

   d. Electrical: A control panel lines the east wall of the control room.

E. Site Layout: The building is located in the central portion of the Site 300 Complex. Building 826 was built into the surrounding hillside, and as such, contours to the earth. This feature serves as extra site protection in the event of an accidental explosion within the building.
Part III. Operations and Process

A. Operations: Building 826 was constructed as additional chemistry facilities for the Site 300 Process Area.

B. Technology: Building 826 had technology for mixing and pressing HE. Due to the confidential nature of the work performed at Building 826, specific information about the technology and machines used in the building is limited.

C. End Product: The HE mixed and pressed at Building 826 were machined and assembled at other buildings in the Site 300 Process Area.
Part IV. Sources of Information

A. Architectural drawings:
“Figure A-3, Facility Floor Plan—Building 807” in Appendix A—Facility Plot Plans and Floor Plans. Lawrence Livermore National Laboratory, 1997.

B. Interviews:
Scott, John E., LLNL Site 300 Manager, and Dawn Chase, LLNL Special Projects Manager. “LLNL Site 300.” Personal interview. 16 Sept. 2014.

C. Secondary sources:
Hallam, John S. Energetic Materials Facility: Operated by the Chemistry and Materials Science Department. Livermore: Lawrence Livermore National Laboratory, University of California. 1978.


Appendix

Figure 1. Lab Building 826, Facility Keyplan, 1996. (Lawrence Livermore National Laboratory Archives)
Figure 2. Building 826 under construction, looking northwest, ca. 1959. (Lawrence Livermore National Laboratory Archives)
Figure 3. View of Building 826 under construction, looking northwest, ca. 1959. (Lawrence Livermore National Laboratory Archives)

Figure 4. View of Building 826 just after construction looking northwest, note the shrapnel baffles extending to the hillside ca. 1960. (Lawrence Livermore National Laboratory Archives)
LAWRENCE LIVERMORE NATIONAL LABORATORY, SITE 300, HIGH EXPLOSIVES PROCESS AREA, CHEMISTRY DEVELOPMENT COMPLEX (Buildings 827A and 827C) North of Corral Hollow Road Tracy San Joaquin County California

WRITTEN HISTORICAL AND DESCRIPTIVE DATA PHOTOGRAPHS

HISTORIC AMERICAN ENGINEERING RECORD Pacific West Region National Park Service U.S. Department of the Interior 1111 Jackson Street, Suite 700 Oakland, CA 94607
Location: West of the North Outer Loop in the northwestern portion of Lawrence Livermore National Laboratory (LLNL), north of Corral Hollow Road, Tracy, San Joaquin County, California.

Buildings 827A and 827C are generally located at latitude: 37.638459, longitude: -121.523148. This point was obtained on July 18, 2018, using Google Earth (WGS84). There is no restriction on its release to the public.

Present Owner: U.S. Government, Department of Energy, National Nuclear Security Administration

Present Use: Chemistry laboratories for the creation of explosives

Significance: In 1955, Lawrence Livermore National Laboratory (LLNL) acquired the land for Site 300—which contains The Chemistry Development Complex—as a high explosive (HE) process area for the production of HE prototypes for their burgeoning weapons program. The High Explosive Process Area (Process Area) was built to formulate, mix, cast, press, mechanize and assemble conventional HE for use in the physics package of nuclear weaponry. Built from 1957 to 1968, the core of LLNL’s Process Area consists of twenty-six buildings compartmentalized into four main buildings and five building complexes. Billets, a processed or formed piece of HE used for testing, for all LLNL-designed nuclear weapons were developed and facilitated by scientists and technicians at the Process Area at Site 300. Subsequently, LLNL was one of two American laboratories that devised and developed nuclear weapons for the U.S. stockpile.

Built in 1967, the Building 827 Complex—consisting of Buildings 827A, 827B, 827C, 827D, and 827E—was constructed as the Chemistry Development Complex to serve as chemistry laboratories and house equipment to melt, heal, mix, and cast explosives. Buildings 827A and 827C have been identified as the primary buildings within the complex and will be profiled in the following analysis.

Historian Preparer: Alison Garcia Kellar, Senior Architectural Historian, Garavaglia Architecture, Inc., 2018
Project Information: This HAER documentation has been prepared for the US Department of Energy, Livermore Site Office, with supervision from the California State Historic Preservation Office.

In April 2005, the National Nuclear Security Administration (NNSA) Livermore Field Office in consultation with the California State Historic Preservation Officer (SHPO) determined Buildings 805, 806A, 806B, 807, 817A, 817B, 817F, 826, 827A, and 827C to be contributors to a Site 300 Process Area Historic District.
Part I. Historical Information

A. Physical History

1. Date of Erection: The Chemistry Development Complex was constructed in 1968.

2. Architect: The Chemistry Development Complex was designed by Ruth and Going, based in Santa Clara, California.¹

3. Original and subsequent owners, occupants, uses: The complex has always been owned by the U.S. Government, as part of the Atomic Energy Commission (AEC) and its successor agencies (currently the Department of Energy/National Nuclear Security Administration [DOE/NNSA]).²

The original user was the Lawrence Radiation Laboratory, which evolved into Lawrence Livermore National Laboratory. The occupants had continuously been Lawrence Livermore National Laboratory employees, and the complex was continuously used for nuclear research, supporting the LLNL weapons program, in addition to chemistry, physics, and biomedical research programs at the LLNL and Lawrence Berkeley National Laboratory (LBNL).

5. Original plans and construction: Ruth and Going designed the buildings in the Chemistry Development Complex in 1965, and construction was complete by 1968.

B. Historical Context

Cold War Context

The following context related to the development of LLNL and the Hydrodynamic Test Facilities was created in 2007 as part of the Historic Context and Building Assessments for the Lawrence Livermore National Laboratory Built Environment:

The primary historic context for assessing the significance of LLNL buildings is the Cold War. The Cold War, although still a fairly recent event in US history, has been universally recognized as an event of exceptional significance within the nation’s history.

The Cold War spanned the forty-six years from 1945 to 1991 and encompassed a series of events, policy decisions, and conflicts between the United States and Soviet Union over the economic and political orientation of various countries in Europe, Asia, and the Middle East. In essence, the United States and the Soviet Union had incompatible and conflicting visions for the fate of the post-war world. The US was wedded to a world that closely mirrored its capitalist and

democratic economic and political structure, while the Soviet Union hoped for a world that resembled its communist political and economic structure.

The Cold War dominated almost every aspect of American life-diplomatic, military, social, economic, scientific, and political. Nevertheless, only two aspects of Cold War history are relevant to LLNL, the history of the arms race and the more general history of nuclear science.  

Early LLNL History
The LLNL was the brainchild of E. O. Lawrence and Edward Teller, physicists affiliated with the Manhattan Engineering District. Lawrence and Teller believed that the existing Los Alamos National Laboratory (LANL) was not working aggressively enough to achieve the goal of accelerating advancements in nuclear weaponry. The two physicists advocated for the founding of a second laboratory, determined that the design and production of a thermonuclear weapon in a new facility would be the next advancement in nuclear weaponry. Lawrence and Teller's argument was well received within the AEC, as the Soviet Union had just detonated its first atomic weapon in 1949. American nuclear policymakers felt an urgency to stay ahead of the Soviet Union both technologically and militarily, fearing the potential actions of an enemy armed with nuclear weapons. To deter the use of such weapons by the opposition, policymakers were determined to significantly increase the U.S. stockpile. Convinced that a second laboratory would accelerate the process of building up a nuclear arsenal, the AEC established the LLNL in Livermore, California, in September of 1952 as a second nuclear weapons design facility.  

Herbert York, the first director of LLNL, articulated four missions for the new laboratory; including designing thermonuclear weapons, providing diagnostic measurements for weapons tests for LANL and LLNL, developing a controlled thermonuclear reaction for power sources, and basic physics research. York was in strong pursuit of both weapons and non-weapons related research, as he felt that a diversified research program at LLNL would attract the country’s brightest young scientists.  

Establishment of the HE Process Area
LLNL administrators noted the need for a remote site to conduct HE tests for the weapons program in 1953. LLNL administrators decided that the LANL in New Mexico was too distant to be reliable for the fabrication and test firing of various devices. Considering that obtaining land for a self-sufficient high explosives test site was crucial for the long-term success of the weapons design program, LLNL purchased 3,400 acres of ranch land east of Livermore, California in 1955. The first two buildings of LLNL’s Process Area were Building 805 and the Building 806 Complex, both built in 1957. The Process Area would continue to expand to twenty-six buildings with construction being complete in 1968. The HE Process program remained dedicated to the creation and progression of HE for LLNL through the end of the Cold War in 1991.

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4 Ibid., 247-249.
Part II. Structural/ Design/ Equipment Information

A. General Statement

1. Architectural character: The buildings in the Chemistry Development Complex look like the other buildings in the Site 300 Complex, as they share a similar visual language of non-ornamented, industrial construction, made to serve utilitarian purposes. Highly utilitarian in character, The Chemistry Development Complex buildings are long, monolithic volumes, void of ornamental features or decorative finish treatments.


B. Description of Exterior

1. Overall dimensions: The building is approximately 380’-0” by 560’-0” at the main rectangular volume, and 180’-0” by 180’-0” at the square addition at the northwest corner. Rectangular in footprint, Building 827A is a 4,489-gross-square-foot one-story industrial building with a basement. Building 827C measures 3,222 gross square feet.

2. Foundations: Poured concrete slab foundations are present at all complex buildings.

3. Walls: Building 827A’s walls are constructed of concrete. The primary facade of Building 827C is constructed of concrete with concrete retaining walls projecting from either end, while the remainder of the structure is embedded in a gravel mound. The lower portion of the facade is frangible, and constructed with clear Plexiglas panels interspersed with opaque asbestos panels.7

4. Structural system, framing: The Chemical Development Complex buildings have concrete structural elements.

5. Porches and loading docks: Building 827A has a raised concrete walkway, resembling a loading dock, which extends from the northern portion of the building. Two short staircases with metal railings lead to the entryway.

7 Ibid.

6. Openings:
   a. Doorways and doors: There are doors on the north, east and west elevations of Building 827A. Building 827C has double metal doors leading to each of the interior rooms.

   b. Windows and shutters: There are no exterior windows present at this building complex.

8. Roof:
   a. Shape, covering: Building 827A has a flat roof. Building 827 has a flat roof, which is covered in sloping gravel on all sides.
C. Description of Interior

1. Floor plans: Building 827A is essentially rectangular in footprint with its first floor encompassing seven rooms. Building 827A’s first floor includes a control room, workshop, office, service room, storage room, and analytical laboratory. The building’s basement is comprised of two large utility and equipment rooms. A large room comprises the western portion of the building while an east-west running corridor bisects the eastern portion. Off of this corridor are two rooms to the north (Rooms 102 and 106), and three rooms feeding off of the corridor to the south (Rooms 101, 103 and 105). This includes a control room, workshop, office, service room, storage room, and analytical laboratory. The building’s basement is comprised of two large utility and equipment rooms (Rooms B101 and B107). An exterior staircase in the southeastern portion of Building 827A leads from the outside of the building, directly to the basement. An enclosed staircase towards the center of the northern elevation also leads to the basement.

Building 827C is identical in construction to Buildings 827D and 827E, with minor modifications in interior room configuration. Two main “cells” flank either end of Building 827C, with a mechanical equipment room, HE vault, and an inert storage room in the center. A mezzanine above is centered over the first-floor rooms, and is comprised of two rooms. The rooms in Building 827C are organized linearly, and are each accessible from the “breezeway,” which is an enclosed interior hallway that runs the length of the building and serves as an interstitial entryway. Two main “cells” flank either end of the building, with a mechanical equipment room, HE vault, and an inert storage room in the center. The mezzanine above is centered over the first floor rooms, and is comprised of two rooms. Access to the mezzanine level of the building is granted through a staircase located towards the center of the building.

3. Flooring: In Building 827A, the flooring in the analytical lab is of painted concrete, while the flooring of the control room is of sheet linoleum. Cells 1 and 2 of Building 827C have concrete floors.

4. Wall and ceiling finish:
   a. Wall finish: The flanking test cells in Building 827C have concrete walls.
   b. Ceiling finish: The flanking test cells in Building 827C have concrete ceilings, while the breezeway has a corrugated metal ceiling.

6. Openings:
   a. Windows: There are no windows present in the interior of this building complex.

8. Mechanical equipment:
   a. Heating, air conditioning, ventilation: An air-conditioning system is located on the eastern exterior wall of Building 827A.
   b. Lighting: Fluorescent tube lighting is prevalent within most of the buildings of the Chemistry Development Complex.

D. Machines: The Chemistry Development Complex has vertical and horizontal mixers, roll mills, a ball mill, large-scale area loaders and extrusion presses, a 500-ton press, large kettles for
synthesis work, and 10- and 30-liter kettles for slurry work. Building 827C currently houses mixers in its Cell 1 and an area loader in its Cell 2.

E. Site Layout: The Chemistry Development Complex is located in the central portion of the Site 300 Complex.

The majority of the Chemistry Development Complex is organized linearly, with building numbers ascending from west to east. The surrounding land is primarily flat.

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9 Ibid., 273.
Part III. Operations and Process

A. Operations: When the Chemistry Development Complex was constructed in 1968, it took over the large-scale chemical mixing, blending, and casting activities that had previously been housed in Building 807 in the Site 300 Process Area.\footnote{Ibid., 258.}

B. Technology: The Chemistry Development Complex houses equipment to melt, heal, mix and cast explosives, including vertical and horizontal mixers, roll mills, a ball mill, large-scale area loaders and extrusion presses, large kettles for synthesis work, and kettles for slurry work.

C. End Product: Chemicals were mixed, blended, and cast into HE billets in the Chemical Development Complex for later machining and assembly in other parts of the Site 300 Process Area.
Part IV. Sources of Information

A. Architectural drawings:

“Building 827A First Floor, Facility Keyplan.” Lawrence Livermore National Laboratory Archives, 1996.


B. Interviews:
Scott, John E., LLNL Site 300 Manager, and Dawn Chase, LLNL Special Projects Manager. “LLNL Site 300.” Personal interview. 16 Sept. 2014.

C. Secondary sources:
Hallam, John S. Energetic Materials Facility: Operated by the Chemistry and Materials Science Department. Livermore: Lawrence Livermore National Laboratory, University of California. 1978.


Figure 1. Building 827A First Floor, Facility Keyplan, 1996. (Lawrence Livermore National Laboratory Archives)
Figure 2. Building 827A Basement, Facility Keyplan, 1996. (Lawrence Livermore National Laboratory Archives)
Figure 3. Building 827 Complex site, n.d. (Lawrence Livermore National Laboratory Archives)

Figure 4. Building 827A, looking northeast, 2009 (Kelly Heidecker, Lawrence Livermore National Laboratory Archives)
Figure 5. Building 827C, looking southeast, 2009 (Kelly Heidecker, Lawrence Livermore National Laboratory Archives)

Figure 6. Unknown breezeway in Building 827 Complex, 2009 (Kelly Heidecker, Lawrence Livermore National Laboratory Archives)
Figure 7. Control room in Building 827A, n.d. (Kelly Heidecker, Lawrence Livermore National Laboratory Archives)