

Nevada Test Site, Reactor Maintenance and
Disassembly Complex, Jr. Hot Cell
Jackass Flats, Area 25, South of Intersection
of Roads F and G
Mercury Vicinity
Nye County
Nevada

HABS No. NV-26-A

HABS
NEV
12-MERC.V,
1A-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

**Historic American Buildings Survey
National Park Service
Western Region
Department of the Interior
San Francisco, California 94107**

HISTORIC AMERICAN BUILDINGS SURVEY

NEVADA TEST SITE, REACTOR MAINTENANCE AND DISASSEMBLY COMPLEX,
JR. HOT CELL

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1A-

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Location: Southwest corner of the Reactor Maintenance and Disassembly (R-MAD) complex, northern end of Jackass Flats south of the Calico Hills, Area 25, Nevada Test Site, approximately 15 miles northwest of Mercury, Nye County, Nevada

USGS Skull Mountain Quadrangle (7.5'), Universal Transverse Mercator Coordinates: 11. 568030. 4074430

Significance: Built in 1964, the Jr. Hot Cell is significant as a contributing structure in the R-MAD complex. The R-MAD complex is one of seven separate but interconnected complexes associated with the Nuclear Rocket Development Station (NRDS) in Area 25 of the Nevada Test Site. Early Rover program reactors, the KIWI and PHOEBUS series, were developed and assembled at the complex. In contrast to other parts of the NTS which contain structures significant for their association with the Cold War nuclear arms race, this facility is significant for its association with the Cold War race for the dominance of outer space in the 1960s. While constructed later than the main complex, the Hot Cell was still built within the compound's period of significance (1958-1973), and documents an increasing interest and sophistication in the monitoring and testing of radioactive materials. The abandonment and lack of re-use of the facility has created an ideal situation for the study of this era from an architectural and technological perspective.

Description: Jr. Hot Cell consists of a one story, corrugated galvanized metal building measuring 20 ft 3 in x 20 ft 3 in with an eave height of 14 ft 3 in. The building rests on a concrete slab foundation and has a metal-clad gable roof running north to south.

The main entry is on the west elevation. At the center of this facade are a pair of flush metal doors, creating a 6 ft wide opening. This entry is at the top of a gently sloping 3 ft wide x 6 ft 11 in long concrete ramp. The south elevation contains the building's only window, a single sash metal awning unit. A

concrete pad, the former site of a heat pump unit, is at the west end of the wall and a 100 amp power box is also located here.

The east elevation contains a single metal door at the south end. A broken off vent stack hangs precariously at the ridge line of the building, supported only by guy wires. Two 6 in diameter holes are centered in the wall with the metal channels on either side. The north elevation, the only one without doors or windows, has exposed conduit at its center. A sign at the west end of the building reads "Building 3161." A junction box at the building's northwest corner - the apparent power hookup for the building - reads "Crouse Hinds LB67 Condulet."

The interior of this utilitarian building is unfinished, with the exception of the concrete slab floor, which is painted. Walls consist of exposed metal studs and siding, and the ceiling consists of insulation batts tucked between exposed metal trusses.

The concrete-walled Hot Cell dominates the interior of the building. This 8 ft 4 in x 9 ft 4 in structure has 21 in thick concrete walls. A massive door is on the south side, with a view window and robotic arms at the west elevation opposite the main entry door. The interior of the 11 ft 8 in high Jr. Hot Cell originally featured stainless steel trays and flooring, neither of which survive. Ductwork related to the exhaust system also has been removed. Other interior features of the structure, all along the north wall, include a fume hood, shower and sink.

The structure stands at the southwest corner of the R-MAD complex on a slightly sloping, gravelly site, rising to the east. The closest structures are two small brock houses which stand to the immediate south. The structure stands about 50 ft from the outer fence surrounding the R-MAD complex. A smaller fenced-in area stands about 20 ft to the north of the structure; this was the Radioactive Materials Storage Area. Power lines run along the outer fence of the complex.

The main R-MAD structure stands approximately 420 ft to the north of the Jr. Hot Cell. This is a large building with a complex massing. A metal tower with a tank on top of a superstructure stands northwest of the Jr. Hot Cell near the gate. A cluster of

associated metal warehouse buildings stand to the east of the Hot Cell.

Historical Context: Jr. Hot Cell is part of the R-MAD complex, one of seven separate but interconnected complexes associated with the NRDS in Area 25 (originally Area 400). The NRDS mission was to provide a center for the development of nuclear reactors, engines and engine stagings for the national space program. In this era, our country focused national resources, scientists and the imagination of its citizens on being the first country to put a man on the moon and to be the leader in the exploration of other planets. The NTS provided the ideal locale to test new technology for this program due to its remoteness, security and infrastructure. While planning began in the mid-1950s with the setting aside of 318,000 acres of the NTS for the program, it was not until 1961 that the Atomic Energy Commission and the National Aeronautics and Space Administration signed an agreement establishing a joint agency program management office, and formally establishing the NRDS (Miller 1984:1). This program was part of President Kennedy's commitment for United States superiority in space. Research and development work for the project was primarily done by Los Alamos Scientific Laboratory.

The NRDS supported the Rover program to develop nuclear rocket reactors for use in the space program (Space Nuclear Propulsion Office 1969-1970). Between 1959 and 1961, research through initial testing took place on the KIWI series of reactors. Work continued on this program until 1965. KIWI developed graphite reactor technology and design concepts. The PHOEBUS project applied KIWI technology to more powerful reactors through 1970 (Space Nuclear Propulsion Office 1969-1970). Research on the Nuclear Engine for Rocket Vehicle Application (NERVA) continued until 1973, when the entire NRDS program terminated (Miller 1984:5).

The R-MAD complex was built in 1958. The Architect-Engineering firm of Burns & McDonnell designed the facilities (Campbell 1958:9), which were constructed by the Reynolds Electrical and Engineering Corporation. The estimated cost of the complex just prior to completion was \$2,098,400, with a projected completion date of 29 November 1958. Original structures and infrastructure for the complex included the Maintenance Assembly and

Disassembly Building, a warehouse which included temporary office space, a locomotive service building, a guard house, and associated roads, fencing, tracks, and utilities (Campbell 1958: 16). A separate contract for two small Hot Cell additions was awarded in 1958 at a cost of \$345,000, with a January 15, 1959 completion date (Campbell 1958:17). This contract may have been deferred, since construction drawings for the Jr. Hot Cell, prepared by the Catalytic Construction Company are dated 1964. Only this one small hot cell structure currently exists in the R-MAD complex.

The R-MAD building, containing an assembly bay, shop, office, and disassembly bay, was used for KIWI and PHOEBUS reactor assembly and disassembly, and remote inspection of the reactors after tests. Today, other buildings in the complex include a decontamination building, warehouses, a tooling building, and the Jr. Hot Cell. Additionally, a Radioactive Materials Storage Area, served by two railroad spurs, allowed for the storage of spent fuel, used test cars, reactor components, spent tooling, and contaminated waste.

The role of the Jr. Hot Cell was to prepare samples for radiochemical analysis following reactor tests. Trailers containing chemical analysis equipment were located adjacent to the Hot Cell. One inch sections of reactor rods were dissolved in fuming nitric, perchloric and sometimes sulfuric acid. The perchloric acid would vaporize and release through one of the cell's two hepa filter-fitted vent stacks. When the reactor rod was dissolved, a small portion of the solution was used for analysis, while the remainder was mixed with vermiculite and placed in the adjacent Radioactive Materials Storage Area. In addition, an estimated 500-1000 gallons of acid flowed through the Hot Cell drain to a nearby leach field (Trybowski 1995; Whitesides 1993).

Sources:

Architectural Drawings:

Catalytic Construction Company, 1964, *Radiochemistry Trailer and Junior Hot Cell, R-MAD*. Microfiche of file, drawing no. 40510-0051 (3 sheets), Engineering Records Library, Mercury, NV. [architectural plans, sections, and electrical layout for Jr. Hot Cell]

Raytheon Services Nevada, 1995, *Nevada Test Site, Area 25, Jr. Hot Cell Building 3161, D & D Program "As Built": Plan, Sections and Elevations*. Drawing no. SK-025-94-A18, original on file with Raytheon Services Nevada, Las Vegas. [revised drawing of floor plan, sections and elevations for Jr. Hot Cell]

Raytheon Services Nevada, 1995, *Nevada Test Site, Area 25, Jr. Hot Cell Building 3161, D & D Program "As Built": Plans and Sections*. Drawing no. SK-025-94-M19, original on file with Raytheon Services Nevada, Las Vegas. [revised drawing of mechanical (water, waste, and exhaust) systems for Jr. Hot Cell]

Raytheon Services Nevada, 1995, *Nevada Test Site, Area 25, Jr. Hot Cell Building 3161, D & D Program "As Built": Electrical and Lighting Plan*. Drawing no. SK-025-94-E20, original on file with Raytheon Services Nevada, Las Vegas. [revised drawing of electrical systems for Jr. Hot Cell]

Historic Views:

Photographs and artist's renderings of the Nuclear Rocket Development Station facilities and equipment. Document nos. 185051 through 185062, on file at the Coordination and Information Center Library, Las Vegas, Nevada. [includes photos of the reactors and R-MAD buildings; individual photographs are undated, but all were taken prior to 1974]

Bibliography:

NTS News, 1962, New MAD Buildings Contracts Let. *NTS News* Vol. 6, No. 36 p. 7. Reynolds Electrical & Engineering Co., Inc., Document no. 112551 available from the Coordination and Information Center Library, Las Vegas, NV. [describes construction and contractor for NRDS facilities]

Campbell, Robert H., 1958, *Office Memorandum, Rover Quarterly Report, 7 July 1958*. Los Alamos Scientific Laboratory, University of California, Los Alamos, New Mexico. Document no. 129611 available at the Coordination and Information Center Library, Las Vegas, NV. [includes construction dates, brief descriptions and costs for R-MAD facilities]

Miller, M.G., 1984, *Nevada Test Site Area 25 Radiological Survey and Cleanup Project 1974-1983*. Reynolds Electrical & Engineering Co., Inc. Las Vegas, NV. [provides background information on the NRDS program and descriptions of the R-MAD facilities including Jr. Hot Cell.]

Space Nuclear Propulsion Office, 1969-1970, *NRDS Master Plan*. document no. 67511 available from the Coordination and Information Center Library, Las Vegas, NV. [includes background information on the KIWI, PHOEBUS, and NERVA reactor programs.]

Interviews:

Trybowski, Laura (formerly Laura Whitesides), 1995, *Interview With Nate Lencioni, 1/19/95*. Interview record on file at International Technology Corporation, Las Vegas [N. Lencioni was as industrial hygienist with the Westinghouse Corp. and worked at the R-MAD/Jr. Hot Cell facility for approx. 9 years.]

Whitesides, Laura, 1993, *Interview with Nate Lencioni, January 27, 1993*. Interview record on file at International Technology Corporation, Las Vegas. [initial interview with N. Lencioni, an industrial hygienist for the Westinghouse Corp. who worked at R-MAD/Jr. Hot Cell]

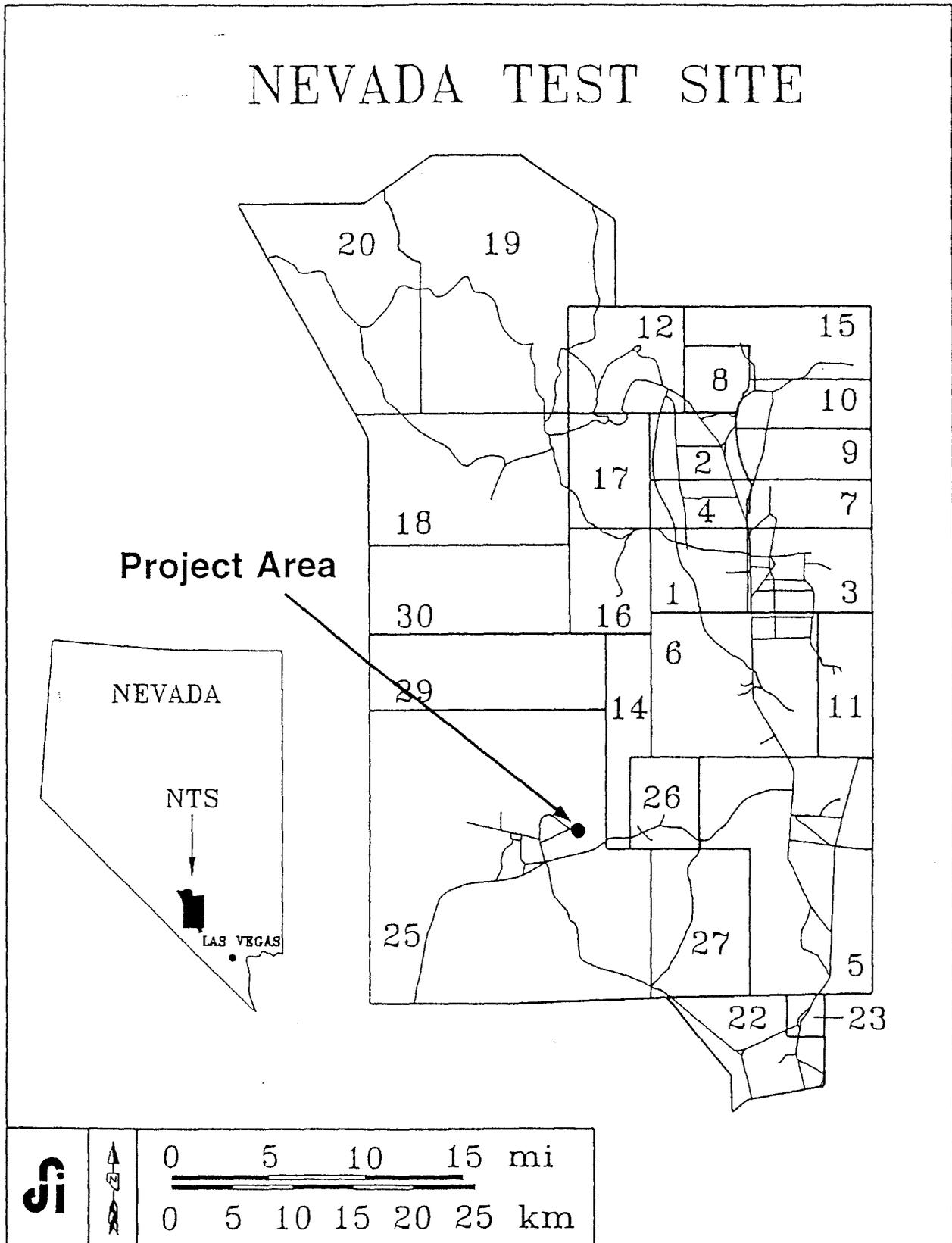
Project Information: The historical evaluation and HABS documentation of the Jr. Hot Cell was conducted as mitigative recording required by a Memorandum of Agreement between the Department of Energy, Nevada Operations Office (DOE/NV) and the Nevada State Historic Preservation Office. This work was requested by the DOE/NV Environmental Restoration Division in support of its plans to decontaminate and decommission Jr. Hot Cell. The building will be demolished during the decontamination and decommissioning activities.

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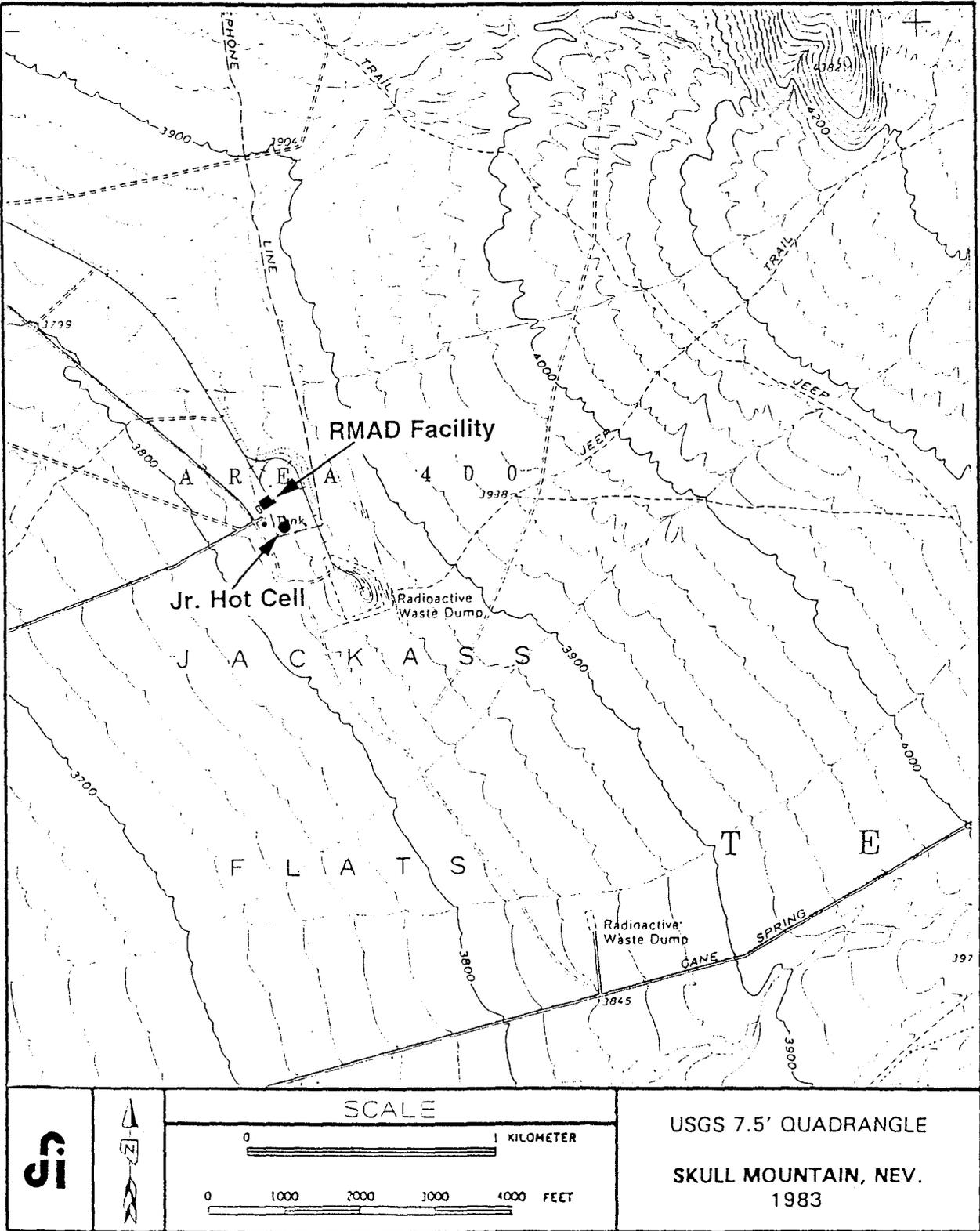
NEVADA TEST SITE, R-MAD
JR. HOT CELL
HABS No. NV-26-A (page 7)

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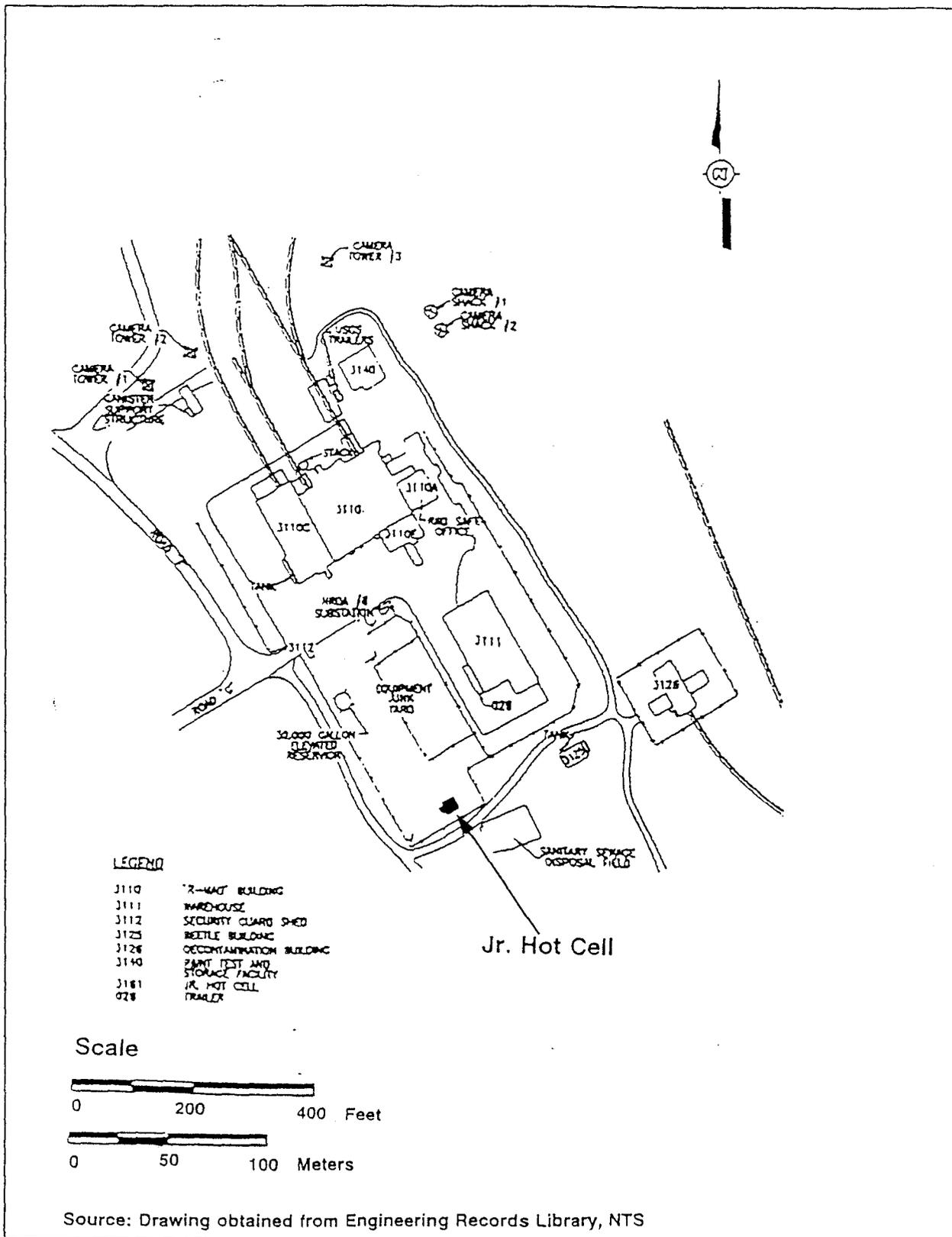
Date: August 28, 1995



Location of Jr. Hot Cell on the NTS.



Location of Jr. Hot Cell on Jackass Flats.



Location of Jr. Hot Cell in the R-MAD Complex.