

ROCKY FLATS PLANT, DESIGN LABORATORY  
(Building 701)  
NW quadrant of the Plant , between bldgs. 776/777 and  
771  
Golden vicinity  
Jefferson County  
Colorado

HAER No. CO-83-P

HAER  
COLO  
30-GOLD.V  
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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD  
National Park Service  
1849 C St. NW  
Washington, DC 20240

## HISTORIC AMERICAN ENGINEERING RECORD

ROCKY FLATS PLANT,  
DESIGN LABORATORY  
(Rocky Flats Plant, Building 701)

HAER No. CO-83-P

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**Location:** Rocky Flats Environmental Technology Site, Highway 93, Golden, Jefferson County, Colorado. Building 701 is located in the northwest quadrant of the Rocky Flats Plant (Plant) between Buildings 776/777 and 771.

**Significance:** This building is a primary contributor to the Rocky Flats Plant historic district, associated with the United States (U.S.) strategy of nuclear military deterrence during the Cold War, a strategy considered of major importance in preventing Soviet nuclear attack. The building was used to design, build, and evaluate bench-scale technologies used in Plant waste treatment processes. The main purpose of the research and design group was to change the form of waste materials for off-site disposal. Information from the waste treatment research and design projects was applied to waste treatment processes throughout the site. All process evaluations conducted in Building 701 were done using non-radioactive materials; once the processes were transferred to the production and waste treatment facilities, they were applied to radioactive waste. Experimental laboratory work, primarily regarding cementing techniques, was also done in Building 701.

**Description:** Building 701 is a relatively small, one-story, rectangular building that encompasses approximately 5,200 square feet. The building has a metal gabled roof on a reinforced concrete foundation. Exterior walls are constructed of corrugated metal; interior walls are constructed of concrete block and gypsum board. The floors are painted concrete.

Building 701 originally contained carpenter shops in the east end of the building and research and design laboratories in the west end. After 1976, only research and design labs remained in the building.

**History:** Built in 1962, Building 701 was a research and design facility used to design, build, and evaluate bench-scale waste treatment processes. The main purpose of the research and design group located in this building was to change the form of waste materials for off-site disposal. Information from the waste treatment research and design projects was applied to waste treatment processes throughout the site. All process evaluations conducted in Building 701 were done using non-radioactive materials; once the processes were transferred to the production and waste treatment facilities, they were applied to radioactive waste. Experimental laboratory work, primarily regarding cementing techniques, was also done in Building 701.

### *Research and Design Projects*

In the late 1970s, the use of a rotary-kiln incinerator to combust radioactive waste was investigated. This type of kiln was later installed in Building 371 for glovebox-generated solid and liquid waste from plutonium processing buildings.

A model of the fluidized bed unit incinerator eventually installed in Building 776/777 was evaluated in Building 701. The fluidized bed unit model was made of glassware to allow researchers to view the process while the incinerator was operating. The fluidized bed unit was used to thermally treat low level radioactive and mixed hazardous waste (liquid and solid). Researchers in Building 701 continued to evaluate and modify the fluidized bed unit after its installation in Building 776/777.

During the mid-1980s, the research and design group began laboratory research to establish the necessary parameters for cementing pond sludge. Cement provided a solid matrix for isolation of wastes, chemically binding water from the sludge wastes. The success of solidification with cement depended upon whether or not the waste adversely affects the strength and stability of the concrete product.

A thin film evaporator was tested as an upgrade for the liquid waste treatment process used in Building 774. The liquid was evaporated from the waste, leaving a solid. The solid was then cemented for disposal.

Beginning in the early 1980s and continuing into the 1990s, the research and design group investigated vitrification technologies. This technology was used to transform waste into a vitreous glass-like substance, thereby immobilizing the waste to prevent leaching of hazardous or radioactive compounds into surrounding media. Several different types of melters were investigated, including joule and induction melters. In the early 1990s, the research and design group in Building 701 developed a microwave melter to vitrify waste material.

The final use of the building was to house limited research and design activities. For example, a process is being developed to stabilize materials containing plutonium and americium. These materials were once considered a waste because the concentration of plutonium and americium was below the economic recovery limit. After the disposal guidelines changed, they were considered a residue. The process being developed would eventually be conducted in glove boxes.

Sources: Nieweg, Ron, employed at the Plant since 1970 by the site contractor. personal communication, February 1998.

Petersell, Jeff, employed at the Plant since 1980 by the site contractor. personal communication, December 1997.

United States Department of Energy. *Rocky Flats Plant, Final Safety Analysis Report, Building 371 (1989)*, by Rockwell International Energy Systems Group. Rocky Flats Repository. Golden, Colorado, 1989.

United States Department of Energy. *Final Cultural Resources Survey Report (1995)*, by Science Applications International Corporation. Rocky Flats Repository. Golden, Colorado, 1995.

Historians: D. Jayne Aaron, Environmental Designer, engineering-environmental Management, Inc. (e<sup>2</sup>M), 1997. Judith Berryman, Ph.D., Archaeologist, e<sup>2</sup>M, 1997.