

MALLINCKRODT CHEMICAL WORKS, Building No. 52
(~~Mallinckrodt Inc.~~)
Bounded by Buildings 51, 51A, 52A,
7th Alley and Lane G
St. Louis, Missouri

HABS No. MO-1929-D

HABS
MO
96-SALU,
134D-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Buildings Survey
National Park Service
Great Plains Support Office
1709 Jackson Street
Omaha, Nebraska 68102-2571

HISTORIC AMERICAN BUILDINGS SURVEY
MALLINCKRODT CHEMICAL WORKS, BUILDING 52
(~~Mallinckrodt Inc.~~)

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- Location:** Bounded by Buildings 51A and 52A, 7th Alley, Lane G and Building 51, Mallinckrodt and Second streets, St. Louis, Missouri
USGS Granite City, Illinois-Missouri Quadrangle (7.5'), Universal Transverse Mercator Coordinates: 744304 E; 4282764 N
- Present Owner:** Mallinckrodt Inc.
- Original Use:** Unknown, site of foundry, Buck's Stove and Range Company
- Present Use:** Demolished September 1996
- Significance:** One of 16 buildings at Mallinckrodt Chemical Works associated with the Manhattan Engineer District/Atomic Energy Commission (MED/AEC)—sponsored program to process uranium for use in the development of atomic weapons, Building 52 was used to purify uranyl nitrate using ether extraction as part of the process to purify uranium.

PART I. HISTORICAL INFORMATION

A. Physical History

1. **Date of erection:** Building 52 was built ca. 1900-1941.
2. **Architect:** The architect for this building is unknown.
3. **Original and subsequent owners:** The original owner of the site where Building 52 is located was the Buck's Stove and Range Company, founded before 1883 in the North Broadway industrial section along the Mississippi River. The property/building was bought by Mallinckrodt Chemical Works (MCW) in 1935.
4. **Builder-contractor:** The contractor is unknown.
5. **Original plans and construction:** This building served as a factory for the Mallinckrodt Chemical Works' uranium processing facilities. It is unknown whether there are original plans extant.
6. **Alterations and additions:** There have been a number of alterations to Building 52, including: addition of gunnite to the walls at the first floor level; infill of window on the second story level with corrugated fiberglass or plywood; infill of the interior west wall of the wide industrial opening into Building 51; a retrofit of the building with steel I-beam posts and piers.

B. Historical Context

The building 50 series (50, 51, 51A, 52, 52A), constructed between 1883 and 1941, consist of five interconnected industrial warehouse buildings. The area where Building 52 was located originally contained a corrugated metal shed associated with activities at the Buck's Stove and Range Company. The Buck's Stove and Range Company, located in the block between Mallinckrodt, Destrehan, Second, and Main streets, was founded in 1846 by Charles H. Buck in partnership with Wiley S. Wright. The company manufactured gas stoves, heating stoves, coal and wood ranges, gray iron castings, and porcelain and enamel ware. It was incorporated in 1875, and maintained warehouses in Chicago, Los Angeles, and San Francisco.

The company facilities consisted of several foundries, a casting house, enameling house, mounting, plating and polishing building, warehouses,

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offices, sample showrooms, a carpenter and pattern shop, pattern vault, tin shop, and boiler building. The majority of the buildings were brick with several wood or corrugated metal buildings as well.¹

In 1935, Mallinckrodt Chemical Works purchased the western half of the Buck's Stove Company (Block 1207), including the site at Building 52. In April 1942, when MCW became involved in purifying large batches of uranium oxide for the U.S. government as part of the wartime effort to develop the atomic bomb, Buildings 50, 51, 51A, 52, and 52A were taken over as the production site for the purification of the uranium oxide. The purification process took place in five stages: conversion of the uranium oxide to uranyl nitrate (which Mallinckrodt had sold for years as an analytical reagent), purification of the uranyl nitrate by ether extraction, recovery of the uranyl nitrate from the ether, conversion of the uranyl nitrate to uranium trioxide, and, finally, the reduction of uranium trioxide to uranium dioxide.²

Building 52 was used to purify uranyl nitrate using ether extraction to produce very pure uranyl nitrate hexahydrate (UNH). At the time, Building 52 had two floors. The ether extractor extended from the second floor to the first, and consisted of a vertical cylindrical tank with a conical bottom, approximately 3 feet in diameter and 10 feet high. Ether and uranyl nitrate were mixed by circulation through a pump at the bottom of the tank.³ A description of the process follows:

When the extractor was completed and ready for service, it was filled with ether, which was then recycled through an ice-water-cooled heat exchanger until it reached a temperature of about 0°C. By this time a 300-gallon pot half full of molten uranyl nitrate at a temperature of about 80°C was ready. This was to be mixed with the cold ether, and the big question was, "Can we get the uranyl nitrate into the extractor and mixed with the ether without an explosion or a fire?" As it developed, the mixing went off smoothly, the extractor operated as expected, and the aqueous phase was separated and drawn off. Then the ether solution containing the purified uranyl nitrate was given several countercurrent washes with small portions of water using

¹ North St. Louis Businessmen's Association, *Who's Who in North St. Louis* (St. Louis: A.S. Werrenmyer, 1925), 303; *Whipple's Fire Insurance Map of St. Louis, Missouri* (St. Louis: A. Whipple, 1897), 136.

² The History Factory, *Mallinckrodt 125th Year Anniversary* (Washington, D.C., 1992), 57.

³ Charles D. Harrington and Archie E. Ruehle, *Uranium Production Technology* (New York: Van Nostrand, Inc., 1959), 126-27.

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several small, stainless-steel tanks associated with the extractor. Operating personnel soon dubbed the extractor and tanks "Snow White and the Seven Dwarfs." ⁴

The resulting UNH, yellow crystals, were then transferred to Building 51A.

PART II. ARCHITECTURAL INFORMATION

A. General Statement

1. **Architectural character:** Building 52 is an industrial brick building with no integrity.
2. **Condition of fabric:** The fabric is in poor condition: the brick is spalling; and the concrete floor is cracking.

B. Description of Exterior

1. **Overall Dimensions:** Building 52 is square in shape and measures 41'-10" in width x 42'-6" x 25' in height.
2. **Foundation:** The foundation is concrete.
3. **Walls:** The load-bearing brick walls are painted red.
4. **Structural system, framing:** Building 52 has steel I-beam framing.
5. **Porches:** There are no porches or steps.
6. **Chimneys:** There are no chimneys.
7. **Openings:**
 - a. **Doorways and doors:** Building 52 has four exterior doors. On the south side is a single door with three recessed panels topped by an opening where a single glass pane was set in originally. On the east side are two double doors and a single door.

⁴ John Ruhoff, "The First Fifty Critical Days," *Uranium Division News*, June 1962: 8.

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b. **Windows:** On the south side are two second floor windows with brick lintels on the second floor level, that have been infilled with metal panels and louvers. On the east side, the three industrial windows with brick lintels have been infilled with corrugated metal.

8. **Roof:**

a. **Shape, covering:** The flat roof is wood tongue-and-groove with rolled asphalt roofing. The roof has a 3' high parapet on all sides.

b. **Cornice, eaves:** There is a concrete cornice.

c. **Dormers, cupolas, towers:** There are no dormers, cupolas or towers.

C. **Description of Interior**

1. **Floor plans:** There are two rooms in Building 52, an entrance foyer with stairs and the main processing room.

2. **Stairways:** The small entrance foyer contained metal stairs leading to the second floor, now removed, and to the roof. The ground level stairs have been removed, making the staircase inoperable.

3. **Flooring:** The building has concrete floors.

4. **Wall and ceiling finish:** The walls in the entrance foyer are glazed white terra cotta. The main room has brick walls; the first floor has been gunnited.

5. **Openings:** The entrance foyer has a single metal clad fire door with a small barred window leading into the main processing room of Building 52. On the west side of the main room an opening to Building 51 has been infilled with concrete blocks. On the north side is a single opening, with an I-beam lintel, cut into the wall to Building 51A.

6. **Decorative features and trim:** The entrance foyer has glazed white terra cotta tile walls.

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7. **Hardware:** The strap-hinged metal door between the foyer and the main room has metal handles and bars.
8. **Mechanical equipment:**
 - a. **Heating, air conditioning, ventilation:** The building was heated with steam from Building C in Plant 1.
 - b. **Lighting:** None of the original lighting remains.
 - c. **Plumbing:** There are no bathrooms. Sprinkler pipes are located on the ceiling.
9. **Furnishings:** None of the furnishings remain. The building is vacant.

D. Site

1. **General setting and orientation:** The 50 series buildings (50, 51, 51A, 52, 52A) are located in Plant 2, set within a number of new buildings on the north, south, and west sides. Oriented east-west, the five buildings are connected and appear as a single unit.
2. **Historic landscape design:** The setting is industrial and there was no landscaping.

PART III. SOURCES OF INFORMATION

- A. **Architectural Drawings:** Original drawings for this building were not located.

B. **Bibliography**

Harrington, Charles D., and Archie E. Ruehle. *Uranium Production Technology*. New York: Van Nostrand Company, Inc., 1959.

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PART IV. PROJECT INFORMATION

This HABS documentation project was undertaken as mitigative recordation required by Section 106 of the National Historic Preservation Act of 1966. The United States Department of Energy Former Sites Restoration Division demolished the Building 50 series in September 1996 as part of site remediation and decontamination.

The documentation was prepared by Alexandra C. Cole, architectural historian at Science Applications International Corporation (SAIC), Santa Barbara, California, in October 1996. Large-format photography was done by Bruce Harms of Louis Berger and Associates, Inc., Marion, Iowa, in August/September 1996. Measured floor plans and elevations were prepared under the supervision of Ohannes Armani of Bechtel National Incorporated (BNI), Oak Ridge, Tennessee, in September 1996.

*FOR SITE PLANS SEE MO-1929 FIELD NOTES