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Mitigation for Remediation and Demolition of the RTL Research Technology Laboratory (RTL) Complex, Pacific Northwest National Laboratory, Richland, Washington:

A Historic Context of RTL's Mid-20th Century Commercial Modern Architectural Style

April 2018

DW Harvey
EP Kennedy
MR Sackschewsky

Prepared for the U.S. Department of Energy
under Contract DE-AC05-76RL01830

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Pacific Northwest National Laboratory
Richland, Washington 99352

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1.0 Introduction

The purpose of this document is to present documentation required by Stipulation A.1 of the *Memorandum of Agreement Between the Department of Energy and the Washington State Historic Preservation Officer Regarding the Research Technology Laboratory Complex Deactivation, Decontamination, Decommissioning and Demolition.* The Memorandum of Agreement (MOA) was executed between the Department of Energy Pacific Northwest Site Office (DOE-PNSO), and the Washington State Historic Preservation Officer (SHPO) on March 23, 2017 to resolve the adverse effect of DOE-PNSO's undertaking to remediate and demolish National Register of Historic Places (National Register)-eligible Research Technology Laboratory (RTL) Buildings 520 and 530. Specifically, Stipulation A.1 (DOE-PNSO 2017) directs DOE-PNSO to produce a historical context document on RTL's Mid-20th Century Commercial Modern architectural style and the role of RTL 520 Building's architect S. Kenneth Johnson and his firm of Daniel, Mann, Johnson and Mendenhall (DMJM) in promoting Mid-20th Century Commercial Modern architectural style.

2.0 Background on RTL 520 and RTL 530

RTL 520 (Research Technology Laboratory) and 530 (RTL Radioactive Storage) are located in North Richland, Washington on the Pacific Northwest National Laboratory's (PNNL's) Richland Campus. Currently owned and operated by Battelle Memorial Institute (Battelle) for the DOE-PNSO, PNNL's RTL Buildings 520 and 530 are two of eight buildings that comprise the RTL complex (see Table 1; Figures 1 - 5). The rest of the RTL complex consists of warehouse, storage, and other secondary support facilities that were constructed after RTL 520 was constructed in 1966 (Harvey et al. 2015).

Table 1. RTL Complex Buildings and Construction Dates

Building Number	Building Name	Construction Date
RTL510	Chemical and Flammable Storage	1977-1978
RTL520	Research Technology Laboratory	1966
RTL530	RTL Radioactive Storage	Unknown
RTL550	RTL Technical Services	Unknown
RTL560	RTL Utility Building	1966
RTL570	RTL Autoclave Center	Unknown
RTL580	RTL Crafts Shop	Unknown
RTL590	RTL Warehouse	1978-1979

The RTL complex is situated in the former 3000 Area of the Hanford Site, which was owned and operated in the 1960s by the Atomic Energy Commission (AEC) (the U.S. Department of Energy's predecessor). The Douglas Aircraft Company constructed RTL Building 520, initially called Donald W. Douglas Laboratories, in 1966 (Figure 6). During the early 1960s, the Douglas Aircraft Company, Inc. and United Nuclear Corporation established a joint venture called Douglas United Nuclear (DUN) to bid on work at the Hanford Site in Richland, Washington. In April 1965, the AEC awarded DUN a contract to operate the Hanford Site's reactor complex and fuel fabrication facilities, and to design and construct a commercial plutonium fuel fabrication plant. The contract also required DUN to form a small business investment corporation to assist and encourage the growth of small business enterprises in the Tri-Cities (Tri-City Herald 1966).

A provision of the agreement called for the Douglas Aircraft Company to establish a new facility to bring additional business activity to the Tri-Cities. Accordingly, the Douglas Aircraft Company constructed the Donald W. Douglas Laboratories in 1966 as part of the Douglas Missile & Space Systems Division. The scientists in the Laboratories initially conducted research and development (R&D) of nonmilitary applications of nuclear power for space exploration and energy application systems (Harvey et al. 2015), expanding the Douglas Aircraft Company's capability in these fields (Douglas Aircraft Company 1966).

DOE-PNSO and the Washington SHPO have determined that RTL Building 520 is individually eligible for listing in the National Register under Criterion A for being one of the AEC's four innovative, economic diversification programs undertaken in Richland during the mid-1960s. The AEC's contract award to DUN was part of the AEC's commitment to economic diversification of Hanford and the Tri-Cities economy. RTL Building 520 is also eligible under Criterion C as an intact example of Mid-20th Century Commercial Modern architecture found in research and corporate office parks/campuses across the country. RTL Building 530 is also eligible for listing in the National Register as a contributing component to Building 520 in support of radiological research conducted in Building 520 and throughout the RTL complex (Griffith 2015).

Figure 1. RTL Complex, Buildings 520 and 530, in Center of Aerial

Figure 2. RTL 520 South (Front) Elevation (Harvey et al. 2015)

Figure 3. RTL 520 South (Front) Elevation (Harvey et al. 2015)

Figure 4. RTL 520 Northwest Corner (Harvey et al. 2015)

Figure 5. RTL 530 Southwest Corner (Harvey et al. 2015)

Figure 6. RTL 520, North and East Elevations (circa late 1960s)

3.0 Historical Context of the Donald W. Douglas Laboratories and Mid-20th Century Commercial Modern Architectural Style

3.1 Establishment of the Hanford Site

In early 1943, the Manhattan Engineer District (MED) of the U.S. Army Corps of Engineers selected Hanford, Washington in southeast Washington as the site for the United States' secret World War II plutonium production facilities. E. I. du Pont de Nemours & Company in Wilmington, Delaware was hired to construct and operate the industrial facilities, identified as the Hanford Engineer Works, as well as to create a new village in Richland to house their operational employees. Hanford's primary mission was to manufacture nuclear material (plutonium) for the nation's first atomic bombs that essentially ended World War II. The Hanford Site produced approximately two-thirds of the nation's plutonium for its nuclear arsenal during the Cold War era.

The MED had established three plutonium production areas at Hanford. The 300 Area manufactured the fuel rods that were shipped to one or more of Hanford's nine nuclear reactors in the 100 Area along the Columbia River to be irradiated. Once irradiated, the fuel rods were then transported to one of the site's chemical separation plants in the 200 Area, where the plutonium was separated from the fuel rods. After 1949, the plutonium was shaped into "buttons" at Hanford's Plutonium Finishing Plant before shipment to the AEC's/DOE's Pantex Plant in Texas or the Los Alamos National Laboratory in New Mexico to be inserted into nuclear weapons.

3.2 Hanford Site, North Richland, and the Donald W. Douglas Laboratories

During the Manhattan Project and the early years of the Cold War period, the AEC's/DOE's 1100 and 3000 Areas of the Hanford Site were located in North Richland. The 1100 Area consisted of site support services such as shipping, receiving, transportation, maintenance, and contractor offices. The 3000 Area, established during the Manhattan Project, was originally the site of the 3000 Area Camp that temporarily housed Hanford Site construction personnel and military police. From 1944 through 1955, the 3000 Area Camp expanded into a semi-permanent town, known as the North Richland Construction Camp, which housed the growing work force that supported the postwar construction boom at Hanford (Nowokowski 1955).

By the mid-1950s, most the post-war expansion construction at Hanford had been completed. The surplus land and facilities of the North Richland Construction Camp were transferred to the U.S. Army and converted into their headquarters/command center for the military and civilian personnel who operated the Army's 19 anti-aircraft artillery (AAA) sites and four Nike Bases on the Hanford Site that provided air defense of Hanford's nuclear reactor complex. Known as Camp Hanford, with its administrative and command center in North Richland and the air defense forward systems on the Hanford Site, the Army base lasted a mere decade, from 1951 to 1961, as rapidly changing missile technologies and defense systems made the AAA sites and Nike Bases obsolete. In 1960, Camp Hanford and its defense systems were deactivated, and officially closed in March 1961 (Harvey 2000).

After Camp Hanford closed in 1961, the U.S. Army demolished most of its North Richland buildings and transferred the land back to the AEC. The AEC declared the land to be surplus property, and gave the property to the City of Richland to be used for economic development. In 1966, under a contract awarded

by the AEC, the Douglas Aircraft Company constructed the Donald W. Douglas Laboratories in this area of North Richland.

During this period, the AEC also awarded a contract to Battelle to operate the newly-established Pacific National Laboratory (PNL), which since 1995 has been known as the PNNL. Battelle constructed its original 230 acre core PNL campus in Richland north of the RTL complex.

3.3 AEC Buildings and Commercial Modern Architecture

As a national defense installation with a 40-plus year legacy of producing plutonium for the nation's nuclear arsenal, the Hanford Site's built environment reflected both standardized and customized architectural designs prevalent at the nation's military sites during the Mid-20th Century (Moore et al. 2010). Overall, the approach to the design of these buildings varied based on property type. While designs for utilitarian property types like storage and support facilities were typically standardized, custom designs were used for property types that were highly technical, such as research laboratories, medical facilities, and complex national defense and aerospace facilities.

During the Cold War era, the Department of Defense (DOD) contracted with architectural and engineering (A&E) firms to design and develop both standardized and specialized plans for their buildings and structures. President Truman's postwar emphasis on reducing defense expenditures influenced the DOD's decision to use standardized building plans for designs of their utilitarian facilities, as they could be replicated nationwide (Moore et al 2010). The same held true for the AEC, the civilian agency in charge of the nation's nuclear weapons program. The AEC relied on A&E firms to provide standardized plans for their utilitarian property types, mainly storage and secondary support facilities. Scientific and highly technical structures, however, required specialized, one-of-a-kind, custom designs (Moore et al 2010).

The designs of both standard and customized military buildings during the Cold War era used Modern Movement-inspired designs, specifically from the International Style. This style is characterized by large rectangular forms, smooth wall surfaces devoid of exterior ornamentation, expansive banded windows, flat roofs, and reinforced concrete or steel construction with an emphasis on horizontality (Moore et al 2010).

The DOD and the AEC generally preferred buildings with flat roofs and minimally applied exterior ornamentation, for both economic and aesthetic reasons. Military projects were typically constrained by cost controls, resulting in designs focusing on function over aesthetics. As a result, the military and the AEC, as well as the A&E firms they hired, often used Commercial Modern architectural designs, such as the International Style, which emphasized function over ornamentation (Moore et al 2010).

Critics of the Modern Movement saw Modern style buildings as a blight on the urban landscape and by-products of ill-fated urban renewal projects that often destroyed viable urban neighborhoods. Commercial Modern buildings were generally located in strip malls and corporate campuses/office parks that were components of urban and suburban sprawl isolated from mass transit options. These areas were generally auto-dependent, surrounded by over-sized parking lots, and a good distance from central business districts. Supporters of suburban strip malls and corporate campuses saw the advantages of the lower land costs, floor plans that were more efficient because labs and offices could be located on a single floor, and more open space available for growth and expansion.

The RTL Building 520 is a good example of the Commercial Modern and International architectural style; a design commonly used for research labs and administrative buildings at DOD and AEC sites,

corporate campuses, and office parks throughout the country. Architects who worked in the International style designed simple, unornamented buildings. The floor plans were functional and logical, based on linear, symmetrical designs with the most commonly used materials as glass for facades (i.e., curtain walls), steel for structural supports, and concrete for the floors and roofs.

In summary, the approach to the design of AEC and DOD buildings varied based on property type. Standardized designs were typically used for utilitarian property types, such as storage facilities and housing, while custom designs were often used for facilities that were highly technical or that served as a community focal point on AEC/DOE or DOD installations. The one similarity between the designs for both standard and customized-designed AEC/DOE and DOD buildings was the use of the Commercial Modern style, for both economic and aesthetic reasons, with its emphasis on linear, symmetrical designs; crisp, straight lines; and minimally applied exterior ornamentation (Moore et al 2010).

3.4 S. Kenneth Johnson and Daniel, Mann, Johnson, and Mendenhall

In 1965, the AEC and Douglas Aircraft Company selected Los Angeles architect S. Kenneth Johnson, a partner in the Southern California A&E firm of Daniel, Mann, Johnson, and Mendenhall (DMJM), to design the Donald W. Douglas Laboratories. Johnson and DMJM had designed a wide variety of commercial and military-industrial structures for a variety of government agencies, such as the DOD and the National Aeronautics and Space Administration (NASA) during the Cold War era. The firm's pioneering expertise in the aerospace industry enabled them to secure numerous contracts with NASA and other military departments (ASCE and Scott 2014). The Donald W. Douglas Laboratories is noted in the 1970 American Institute of Architects (AIA) Directory as one of S. Kenneth Johnson's principal works (AIA 1970).

Organized in 1945-1946, DMJM was one of the first combined A&E firms in the western United States and the largest in Southern California (Moore et al 2010). DMJM was established in Santa Maria, California in 1945 as a partnership between architects Philip J. Daniel, Irvan F. Mendenhall, S. Kenneth Johnson, and Arthur E. Mann. As Southern California experienced considerable economic and population growth during the post-World War II period, DMJM recognized the enormous business potential in the greater Los Angeles area and moved from Santa Maria to Los Angeles. In their new location, DMJM was poised to take advantage of the postwar construction boom throughout Southern California.

Initially, the firm specialized in the engineering and structural design of public schools, large industrial facilities, transportation infrastructure, and sewer systems (ASCE and Scott 2014). That soon changed as the firm sought to capitalize on the emerging business opportunities with the growth of military bases in California and the Pacific Rim as well as other DOD-funded projects. Irvan Mendenhall, co-founder and Chairman of the Board of DMJM, served in World War II as an engineer assigned to the Navy's Civil engineering corps, better known as the Seabees (Scott 2014). Mendenhall assisted in the construction of military installations throughout Western Europe. His work during the war and his later involvement as a Navy reservist enabled DMJM to secure several lucrative military contracts, most notably for the construction of Navy airfields in southern California. DMJM also gained considerable experience designing facilities for the DOD and other national security agencies, developing a close working relationship with industrial clients that designed and supplied military-related hardware during the Cold War era. Eventually the firm grew internationally due to their military connections and ability to secure contracts with the U. S. Air Force, especially with the growth of American bases in the South Pacific and East Asia.

DMJM reportedly "changed the face of corporate architecture in the late 20th Century" (L. A. Conservancy n. d., p. 1). By the late 1960s, DMJM had pioneered the glass membrane (skin) design system, mainly used in skyscrapers. "By reversing the mullions inward rather than outward, the system enabled completing new ways of 'wrapping' buildings in glass, creating smooth curtain walls" (L. A. Conservancy n. d., p. 2). The look DMJM pioneered "was both daring and inspiring, yet it became ubiquitous within a few short years. The designers and engineers at DMJM distinguished the firm by challenging the conventions of building exteriors often found in office and industrial buildings" (L. A. Conservancy n. d., p. 2). One architecture critic summarized the work of DMJM by stating that DMJM was "designing some of the best office-architecture in the United States" (L. A. Conservancy n. d., p. 2).

Along with a number of large corporate and industrial projects, a close working relationship with the military sustained DMJM throughout the Cold War period. For instance, DMJM was the first A&E firm to participate in the "Education with Industry" program that was sponsored by the U. S. Air Force in the early 1960s. Under the program, a representative from the U. S. Air Force worked in the DMJM offices for a nine-month tour of duty to learn about the most up-to-date management and technological practices used in the civilian construction industry (Moore et al 2010).

By 1970, DMJM had 14 offices across the United States (Pacific Coast Architecture Database 2015). A decade later, DMJM had become one of the largest A&E firms in the United States, with more than 1,700 employees. By 2009, the firm had scaled back to 12 branch offices and had active projects in 32 nations ranging from residential apartment towers to space and missile centers, commercial facilities, and massive industrial complexes. AECOM acquired DMJM in 2009 (Moore et al 2010).

3.5 Design and Construction of the Donald W. Douglas Laboratories-Description of Physical Appearance

Constructed in 1966, the Donald W. Douglas Laboratories (RTL/Building 520) (Figure 7) was a highly technical research laboratory with specialized scientific missions, consisting of 57 scientists' offices, 33 dry and wet research labs, two hot labs, administrative offices, and storage and utility areas. Excavation and construction of Building 520 began in January 1966 and was completed in December of 1966, along with the adjacent utility building, Building 560, that houses the boiler and refrigeration/chiller equipment for Building 520 (Halvorson 1967). Located adjacent (and east and west) of Building 520 are the other secondary support structures and storage facilities that were constructed during the next 10 to 15 years.

H. Halvorson, Inc. of Spokane, Washington was the general contractor for the RTL complex. The Douglas Aircraft Company staff conducted the internal engineering, while the Vitrol Engineering Company of Richland provided overall engineering support services (Douglas Aircraft Company n.d.).

Figure 7. RTL 520, North and East Elevations (circa late 1960s)

For both economic and aesthetic reasons, DMJM used the Commercial Modern style in their design of the Donald W. Douglas Laboratories. Single-story, commercial modern style facilities were commonly built at national defense installations, corporate office parks/campuses, and AEC/DOE sites across the country during the Cold War era.

The Laboratory's exterior design incorporates Commercial Modern/International style features, with its emphasis on horizontal, linear features, and its generous application of glass bands or strips of aluminum framed windows and exterior curtain walls of concrete block with red brick facing below the windows. The brick facing and planters add an aesthetic touch to the building's exterior façade. The building's design is devoid of nonessential exterior decorations or ornamentation, with an emphasis on symmetrical, repetitive architectural features (Figure 8).

Figure 8. RTL 520 Northeast Corner (David Harvey 2015)

Building 520 is a single story facility over a partial basement, measuring 56,158 square feet in size (CH2M Hill 2014). The building has a modified "H" or "T" footprint, with minimal surface ornamentation and a smooth horizontal exterior and large expanses of glass. It is constructed of reinforced concrete (including a steel reinforced, concrete roof) with a concrete basement and foundation. The basement measures 7,846 square feet in size with a ceiling height of 17 feet, 6 inches. The flat roof is covered in tar and gravel with heating, ventilation and air conditioning (HVAC) vents. The concrete roof overhang consists of deep, projecting boxed eaves that extend over the windows, with a wide concrete fascia and metal cornice. The symmetrically placed, heavy double-pane windows are single-light, fixed, aluminum-framed, and primarily in groups of four situated between narrow concrete bands. The windows essentially form the upper half of the wall on the primary elevation, with the red brick cladding below. The window glass is double pane "Twindow Glass" used for added insulation (Douglas Aircraft Company 1967). The building has several large, vegetation-filled planters that are integrated in the building and faced with red brickand concrete coping (CH2M Hill 2014). The primary entry, located on the south, or front, elevation is a pair of aluminum doors set in a glass storefront system that appears to be a replacement. The original entry, now closed, is located on the east elevation. This former entranceway, with its aluminum framed, glass door and multi-window reception area, has been converted into separate cubicle offices and a small reception area.

The building's labs and some offices are located in the south end of the building and are serviced by two East–West corridors. These hallways are perpendicular to the central North–South corridor that runs the entire length of the building and connects the front entry with the administrative wing in the rear, north end of the building. The partial, irregular-shaped basement contains a telephone equipment room, HVAC equipment, an electrical switchgear room, a transformer room, and a fan and pump room that houses all of the supply fans for the building, circulation pumps for the hot and chilled water systems, and air compressor areas for air supply to the building (DOE-PNSO 2012). The labs are situated back to back, with two utility tunnels supplying water, compressed gases and special electrical units (Douglas Aircraft Company n.d.). The labs are serviced by a 15-foot wide utility corridor, which runs the full length of the

building. This corridor allows for easy access to utility piping and maintenance areas. The corridor is utilized for placement of experimental support equipment that would normally be located in the lab space. The design of the interior laboratories provided for a second laboratory area of the same size to be added at a later date to the south elevation (Douglas Aircraft Company 1967).

The main laboratory wing is 106 feet 2 inches wide (North–South) and 341 feet 10 inches long (East–West), covering an area of 36,293 square feet. The administrative area is 101 feet 10 inches square measuring 10,369 square feet in size. The connecting link between the administrative offices to the north and the scientist's labs and offices to the south measures 38 feet 2 inches by 40 feet 6 inches, covering 1,546 square feet in size. The building consists of 57 offices, 33 labs (including two hot (radiological) labs), miscellaneous shops, administrative support offices, a reception lobby, main conference room, chart room, library, and kitchen (Figure 9). A 3-ton jib crane outside the building adjacent to the south (main) elevation provides hoisting service to the basement for equipment removal and maintenance (CH2M Hill 2014).

The building's interior is typical of single story, scientific research facilities built in the 1960s, with its numerous laboratories, and administrative and scientist's offices. The walls are constructed of sheet rock or gypsum board, the ceilings consist of suspended, acoustic tiles and florescent lighting, and the concrete floors are covered with either tile or linoleum. Except for the basement, the entire building is air conditioned. Distinctive interior features in the building include the original wooden office, laboratory, and hallway cabinets and doors (Figure 10). Significant Commercial Modern style interior features include the decorative vertical wooden screens that separate the reception/secretary offices from the adjacent hallways (Figure 11). There are six former reception/secretary offices, which are flanked by scientist's /administrator's offices on each side. While the offices and hallways are intact, the numerous research labs have been considerably modified over the years to accommodate technological changes and upgrades to equipment and the continuously changing research and experimental needs in the individual labs.

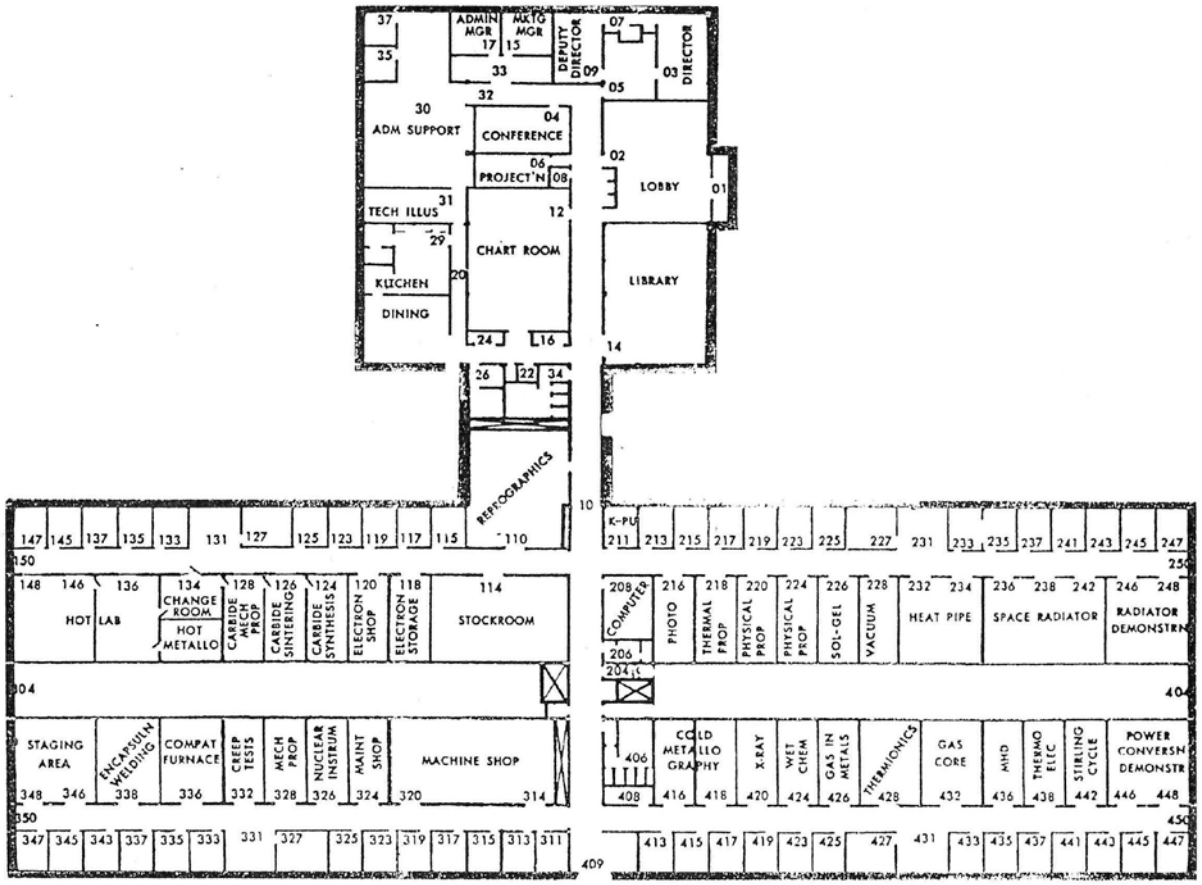

Figure 9. Layout of Donald W. Douglas Laboratories

Figure 10. Original Hallway Cabinets and Doors in Building 520

Figure 11. Decorative Vertical Wooden Screens Separate the Reception/Secretary Offices from Hallways in Building 520

3.6 Donald W. Douglas Laboratories Landscape

W. G. Teufel, Seattle landscape architect, designed the landscape of the RTL complex in 1966 (Douglas Aircraft Company n.d.; Halvorson 1967; WEWA DOCOMOMO 2018) Mr. Teufel was considered by his peers to be one of the most accomplished landscape and golf-course architects in the nation during the second half of the 20th Century (Whitely 2007). He designed over a dozen golf courses, most of them in the Seattle area (Whitely 2007). In 1953 Teufel opened a private landscape-architecture firm in Seattle, and for over 40 years collaborated with many of the best architects in the Pacific Northwest (Whitely 2007). It was Teufel's design for the master landscaping plan for the 1962 Seattle World's Fair that was his signature accomplishment. Following the fair, Teufel provided landscaping designs for countless housing developments, office parks, and commercial buildings (Whitely 2007). In 1995, Teufel was inducted as a fellow into the American Society of Golf Course Architects (Whitely 2007).

The RTL complex exhibits Commercial Modern landscape features, with brick-faced planters, large asphalt parking lots, linear sidewalks and walkways, and manicured lawns that surround the complex. The property boundary is delineated by symmetrically-placed sycamore trees (Halvorson 1967).

3.7 RTL 530

RTL 530, constructed at an unknown date, is the Radioactive Storage Building. To limit the potential of radioactive accidents, this small, rectangular, one story building was constructed to temporarily store radioactive materials in sealed containers for RTL Building 520 (Smith 1969). The building is constructed of reinforced concrete with exterior curtain walls of concrete block faced with red brick, and it sits on a poured concrete foundation. The interior has a concrete floor used for storage, and contains a pit with a lead cover for storage of highly radioactive materials (DOE-PNSO 2012). The building has a flat, concrete roof covered with built-up layers of felt, asphalt, and gravel, with projecting boxed eaves and a wide metal cornice. A red brick wall extends between the building's rear elevation and the western end of RTL 520. The only opening in the building is a single, metal door on the west elevation (CH2M Hill 2014).

3.8 Commercial Modern Style

The Donald W. Douglas Building (Building 520/RTL) is a good example of the Mid-20th Century Commercial Modern architectural style found in suburban office parks/strip malls and corporate campuses constructed during the post-World War II era throughout the United States. Commercial Modern style buildings borrowed significantly from the International style that originated in Europe during the 1920s and remained popular into the 1970s. The design of the Donald W. Douglas Laboratories incorporates a number of International style elements, with its symmetrical form, absence of exterior ornamentation, smooth wall surfaces, ribbon windows/horizontal window bands, and a flat roof. The building's steel skeletal frame, reinforced concrete, and horizontal, linear design are also typical of this style.

The accelerated growth of suburbanization and highway construction during the post-World War II era led to the growth of shopping centers/strip malls and corporate campuses and office parks throughout the United States. It was during the early years of World War II that the concept of corporate campuses began. "Starting in 1941, companies such as AT&T pioneered the concept of corporate campuses, which were modeled after universities in order to attract PhDs and other top flight brains" (Zak 2015, p. 3). The rise of corporate campuses and office parks was due to several factors associated with the post-World War II era. The end of the war saw the repeal of gas rationing, wage/price controls, and the emergence of the United States as a political and economic superpower. Post-War affluence and highway construction along with cheap gas accelerated urban sprawl and suburban growth. "White" flight to the suburbs in many areas around the country also contributed to the establishment of corporate campuses and office parks. "The first office park opened in Mountain Brook, Alabama, an upper class white suburb of Birmingham, in the early 1950s as commuters became uneasy with simmering racial tension in city centers" (Zak 2015, p. 3). Similar to the post-War phenomenon of fast food chain restaurants and tract subdivisions, office parks and corporate campuses were designed to be "…utterly predictable, familiar, disconnected and unchanging, both socially and aesthetically…" (Zak 2015, p. 3).

Modern-style office buildings tended to be the dominant building type in office parks. Business centers/campuses often housed scientific and research facilities/medical laboratories and corporate headquarters. Strip malls, urban office parks, and shopping centers tended to have one to three story buildings surrounded by ample parking (or parking garages) and asphalt walkways. Many corporate headquarters/office parks were "leafy campuses," consisting of manicured, symmetrically designed

landscapes and lawns, vegetation planters, ornamental shrubbery, and generous use of trees that often served as property boundaries. Suburban office parks and business campuses were usually auto-dependent with oversized parking lots, isolated from mass transit options and traditional downtown/central business districts.

The architects who designed in the International style wanted to break with architectural tradition and design simple, unornamented buildings, uncluttered with minimalist features. The most commonly used materials were glass facades (usually curtain walls), steel for exterior support, and concrete for the floors and interior supports; floor plans were functional and logical.

While the International style was used often in the design of skyscrapers, this design was also used for simple, one story, scientific research laboratories, like Building 520. In many ways the RTL Building 520 is an anomaly, as it is not located in a traditional office park or corporate campus setting. Buildings like RTL 520 were usually constructed in suburban office parks/strip malls during the post-World War II era throughout the United States. The RTL 520 was constructed in 1966 in an isolated area in north Richland, built during the same period that Battelle established their Modern style campus to the north of the RTL.

DMJM had a wide variety of clients and projects throughout the world, but usually designed more complex, cutting-edge facilities than RTL 520 such as large, industrial facilities located in major urban areas and/or in military installations and NASA space centers. A review of the projects undertaken by S. Kenneth Johnson and DMJM found very few like their design of RTL Building 520. There does not seem to be any other buildings designed by DMJM in the Tri-Cities or in greater eastern Washington.

References Cited

American Institute of Architects (AIA)
1970 *American Architects Directory,* edited by R. R. Bowker, LLC.

American Society of Civil Engineers (ASCE) and Doug Scott
2014 "Irvan F. Mendenhall, Past ASCE President and Co-Founder of DMJM, Dies at Age 96."

CH2M Hill
2014 Draft, *Historic Properties Evaluation for the Pacific Northwest National Laboratory, Richland, Washington,* in Partial Fulfillment of Section 110 of the National Historic Preservation Act. April 2014.

DOE-PNSO
2012 *Research Technology Laboratory (RTL-520) Building, RCHN Area (Including RTL-510, 524, 530, & 560),* Facility Use Agreement, FUA-RTL-520-R7. Pacific Northwest National Laboratory, Richland, Washington.

DOE-PNSO
2017 "Memorandum of Agreement Between the Department of Energy and the Washington State Historic Preservation Officer Regarding the Research Technology Laboratory Complex Deactivation, Decontamination, Decommissioning and Demolition"

Douglas Aircraft Company
n.d. "Completion Report of the Donald W. Douglas Laboratories, performed by H. Halvorson, Inc. under Contract Number MSSD-700-84-A55, Richland, Washington," *Under Cognizance of the Superintendent of Facilities Construction, Missile and Space Systems Division, Space Systems Center*, Huntington Beach, California.

Douglas Aircraft Company
1966 "Donald W. Douglas Laboratories, Richland, Washington," *Background Information.* Santa Monica, California, Page 1.

Griffith, Gregory
2015 "Remediation of Radiological Contamination at the Research Technology Laboratory - Determined Eligible," *Letter to Department of Energy, Pacific Northwest Site Office, Richland, Washington*. From the Department of Archaeology and Historic Preservation, Olympia, Washington, September 29, 2015.

Halvorson, H., Inc.
1967 *Completion of the Donald W. Douglas Laboratories*. Facilities Construction, Missile & Space Systems Division, Space Systems Center, Huntington Beach, California.

Harvey D. W.
2000 *History of the Hanford Site 1943-1990.* Edited by Georganne O'Connor. Prepared for Pacific Northwest National Laboratory, Richland, Washington.

Harvey, David, Doug McFarland, Joy Ferry
2015 *Cultural Resources Review of the Remediation of Radiological Contamination at the Research Technology Laboratory (RTL) Complex at the Pacific Northwest National Laboratory (PNNL), Benton County, Washington (HCRC#2015-PNSO-003).* Pacific Northwest National Laboratory, Richland, Washington.

L.A. Conservancy
n.d. “DMJM,” Available at http://www.laconservancy.org/architects/dmjmMoore, David W, Justin Edgington, Emily Payne
2010 *A Guide to Architecture and Engineering Firms of the Cold War Era.* Department of Defense Legacy Resource Management Program. Project Number 09-434, Austin, Texas.

Nowokowski, R. F.
1955 “'I Hate Too Leave' Is Theme Song In North Richland As Trailers Pull Out.” *Tri-City Herald*, February 20, 1955. Available at http://news.google.com/newspapers?nid=1951&dat=19550220&id=8BwqAAAAIBAJ&sjid=yoYFAAAAIBAJ&pg=4212,3010274. Retrieved September 27, 2012.

Pacific Coast Architecture Database
2015 “Partnership - DMJM.”Smith, M. L. and C. A. Willis
1969 “Radiological Control Program at Donald W. Douglas Laboratories,” *SciTech*. Page 1.

Tri-City Herald
1966 “Four Phase Program Scheduled.” *Tri-City Herald*, Richland, Washington.

WEWA DOCOMOMO - Western Washington Documentation and Conservation of the Modern Movement
2018 “Teufel, William G.” Obituary, partially taken from the Seattle Times, Obituary, by Peyton Whitely, November 24, 2007.

Whitely, Peyton.
2007 “William Teufel, 82, was known as Master with greens and greenery,” Seattle Times, Obituary, November 24, 2007.

Zak, Dan
2015 “The old suburban office park is the new American ghost town,” The Washington Post, July 20, 2015, Page 3.

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