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Title: From Protection and Prevention to Research and Discovery: Eligibility Assessment of the Health Research Laboratory (TA-43) and Historic Documentation for TA-43-0001

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From Protection and Prevention to Research and Discovery: Eligibility Assessment of the Health Research Laboratory (TA-43) and Historic Documentation for TA-43-0001

Volume 1

Los Alamos National Laboratory

LANL Fiscal Year 2027 Footprint Reduction

Historic Building Survey Report No. 400

Survey No. 1226

NMCRIS Activity No. 151144

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Executive Summary

The U.S. Department of Energy National Nuclear Security Administration Los Alamos Field Office (NA-LA) requests the New Mexico State Historic Preservation Officer (SHPO) to concur with the National Register of Historic Places (NRHP)–eligibility determinations detailed in this report for the Health Research Laboratory (HRL) complex in Technical Area 43 (TA-43) at the Los Alamos National Laboratory (LANL).

As part of the LANL Footprint Reduction Program's Decommissioning and Demolition (D&D) process, all facilities of the HRL complex are scheduled for characterization and future demolition:

- TA-43-0001 HRL
- TA-43-0010 Sewage Lift Station
- TA-43-0012 Warehouse
- TA-43-0022 Shed
- TA-43-0028 Shed
- TA-43-0044 Cooling Tower
- TA-43-0047 Safety Storage Shed
- TA-43-0049 Safety Storage Shed
- TA-43-0061 Safety Storage Shed

In compliance with Section 106 of the National Historic Preservation Act of 1966, as amended; the Code of Federal Regulations (36 CFR 800); and the *Programmatic Agreement* (PA) *among the U.S. Department of Energy, National Nuclear Security Administration, Los Alamos Field Office, the New Mexico State Historic Preservation Office, and the Advisory Council on Historic Preservation Concerning Management of the Historic Properties at Los Alamos National Laboratory, Los Alamos, New Mexico*, an evaluation of the HRL complex for inclusion in the NRHP was conducted. Of the nine assessed properties, TA-43-0001 was determined eligible for listing in the NRHP, and TA-43-0012 was determined not eligible. The remaining seven properties—TA-43-0010, TA-43-0022, TA-43-0028, TA-43-0044, TA-43-0047, TA-43-0049, and TA-43-0061—were exempted from NRHP evaluation because of their age or property type.

In addition to these determinations of eligibility, Volumes 1 and 2 of this report meet the level of standard historic documentation that will be required to mitigate future adverse effects to TA-43-0001 pursuant to requirements outlined in Part II, Section 10, of *A Plan for the Management of the Cultural Heritage at Los Alamos National Laboratory, New Mexico* (Purtzer et al. 2019; LANL's Cultural Resources Management Plan), and Section 2.B of Appendix D of the PA itself. This two-volume report reflects an effort to document past and present functions and to characterize the complex while it is still in use and funding is available. It includes a comprehensive historic context, appendices with detailed information about associated people and activities, and interior and exterior archival photographs. To support the D&D characterization process, the standard historic documentation package for TA-43-0001 has been prepared and is being submitted to the SHPO at this time. Any changes to TA-43-0001 between now and the official Notice of D&D will be documented appropriately and provided as a supplement to this report.

Acronyms, Abbreviations, and Terms

Acronym, Abbreviation, or Term	Definition
A	Administrative (Division)
AEC	Atomic Energy Commission
AFB	Air Force Base
AIA	American Institute of Architects
AIDS	acquired immunodeficiency syndrome
B	Bioscience (Division)
C	Computing Sciences and Services (Division)
CFR	Code of Federal Regulations
CHM	Chemistry (Division)
CHO	Chinese hamster ovary
CLS	Chemistry and Laser Sciences (Division)
CMB	Chemistry-Metallurgy (Division)
CMF	Chemistry-Metallurgy (Division)
CMR	Chemistry and Metallurgy (Division)
CMU	concrete masonry unit
CNC	Chemistry-Nuclear Chemistry (Division)
CRMP	Cultural Resources Management Plan
DNA	deoxyribonucleic acid
DO	Division Office
DoD	Department of Defense
DOE	U.S. Department of Energy
DOT	New Mexico Department of Transportation
E	Electronics and Instrumentation (Division)
ENG	Engineering (Division)
ERDA	Energy Research and Development Administration
FMBF	Flatow, Moore, Bryan, and Fairburn
H	Health (Division)
HRL	Health Research Laboratory
HSE	Health, Safety, and Environment (Division)
HUMCO	Los Alamos Human Counter
ICBM	Intercontinental Ballistic Missile
J	Field Testing (Division)
JGI	Joint Genome Institute
Laboratory	Los Alamos Laboratory, Los Alamos Scientific Laboratory, or Los Alamos National Laboratory
LACEL	Los Alamos Cell Analysis
LAMPRE	Los Alamos Molten Plutonium Reactor Experiment
LANL	Los Alamos National Laboratory
LAPRE	Los Alamos Power Reactor Experiment
LASAC	Los Alamos Small Animal Counter
LASL	Los Alamos Scientific Laboratory

Acronym, Abbreviation, or Term	Definition
LRL	Lawrence Radiation Laboratory
LS	Life Sciences (Division)
M	Dynamic Testing (Division)
MP	Medium Energy Physics (Division)
MST	Materials Science and Technology (Division)
MW	megawatt
N	Nuclear Rocket Propulsion (Division)
NA-LA	National Nuclear Security Administration, Los Alamos Field Office
NASA	National Aeronautics and Space Administration
NERVA	Nuclear Engine for Rocket Vehicle Application
NFCR	National Flow Cytometry Resource
NHPA	1966 National Historic Preservation Act, as amended
NIH	National Institutes of Health
NMR	nuclear magnetic resonance
NNSS	Nevada National Security Site
NRHP	National Register of Historic Places
NRX	Nuclear Reactor Experiment
OHER	Office of Health and Environmental Research
P	Physics (Division) or Experimental Physics (Division)
PA	Programmatic Agreement
PNM	Public Service Company of New Mexico
RIFT	Reactor In-Flight Test
RLL	University of California Radiation Laboratory at Livermore
S	Analysis and Assessment (Division)
SHPO	(New Mexico) State Historic Preservation Officer
SP	Supply and Property Department
SRCP	New Mexico State Register of Cultural Properties
T	Theoretical (Division)
TA	Technical Area
TNT	trinitrotoluene
UHTREX	Ultra-High Temperature Reactor Experiment
USACE	U.S. Army Corps of Engineers
W	Weapon Nuclear Engineering (Division)
WPA	Works Progress Administration
WX	Design Engineering (Division)
YAC	yeast artificial chromosomes

Chapter 1: Introduction

Project Description

The U.S. Department of Energy (DOE) National Nuclear Security Administration Los Alamos Field Office (NA-LA) evaluated the Health Research Laboratory (HRL) complex in Technical Area 43 (TA-43) at the Los Alamos National Laboratory (LANL or the Laboratory) (Figure 1-1 and Figure 1-2).

As part of the LANL Footprint Reduction Program's Decommissioning and Demolition (D&D) process, all facilities of the HRL complex are scheduled for characterization and future demolition:

- TA-43-0001 HRL
- TA-43-0010 Sewage Lift Station
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In compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA); the Code of Federal Regulations (36 CFR 800); and the *Programmatic Agreement* (PA) *among the U.S. Department of Energy, National Nuclear Security Administration, Los Alamos Field Office, the New Mexico State Historic Preservation Office, and the Advisory Council on Historic Preservation Concerning Management of the Historic Properties at Los Alamos National Laboratory, Los Alamos, New Mexico*, an evaluation of the HRL complex for inclusion in the National Register of Historic Places (NRHP) was conducted. Of the nine assessed properties, TA-43-0001 was determined eligible for listing in the NRHP under Criteria (a) and (b), and TA-43-0012 was determined not eligible. The remaining seven properties—TA-43-0010, TA-43-0022, TA-43-0028, TA-43-0044, TA-43-0047, TA-43-0049, and TA-43-0061—were exempted from NRHP evaluation because of their age or property type.

In addition to these determinations of eligibility, Volumes 1 and 2 of this report meet the level of standard historic documentation that will be required to mitigate future adverse effects to TA-43-0001 pursuant to requirements outlined in Part II, Section 10, of *A Plan for the Management of the Cultural Heritage at Los Alamos National Laboratory, New Mexico* (Purtzer et al. 2019; LANL's Cultural Resources Management Plan), and Section 2.B of Appendix D of the PA itself. This two-volume report reflects an effort to document past and present functions and to characterize the complex while it is still in use and funding is available. It includes a comprehensive historic context, appendices with detailed information about associated people and activities, and interior and exterior archival photographs. To support the D&D characterization process, the standard historic documentation package for TA-43-0001 has been prepared and is being submitted to the New Mexico State Historic Preservation Officer at this time. Any changes to TA-43-0001 between now and the official Notice of D&D will be documented appropriately and provided as a supplement to this report.

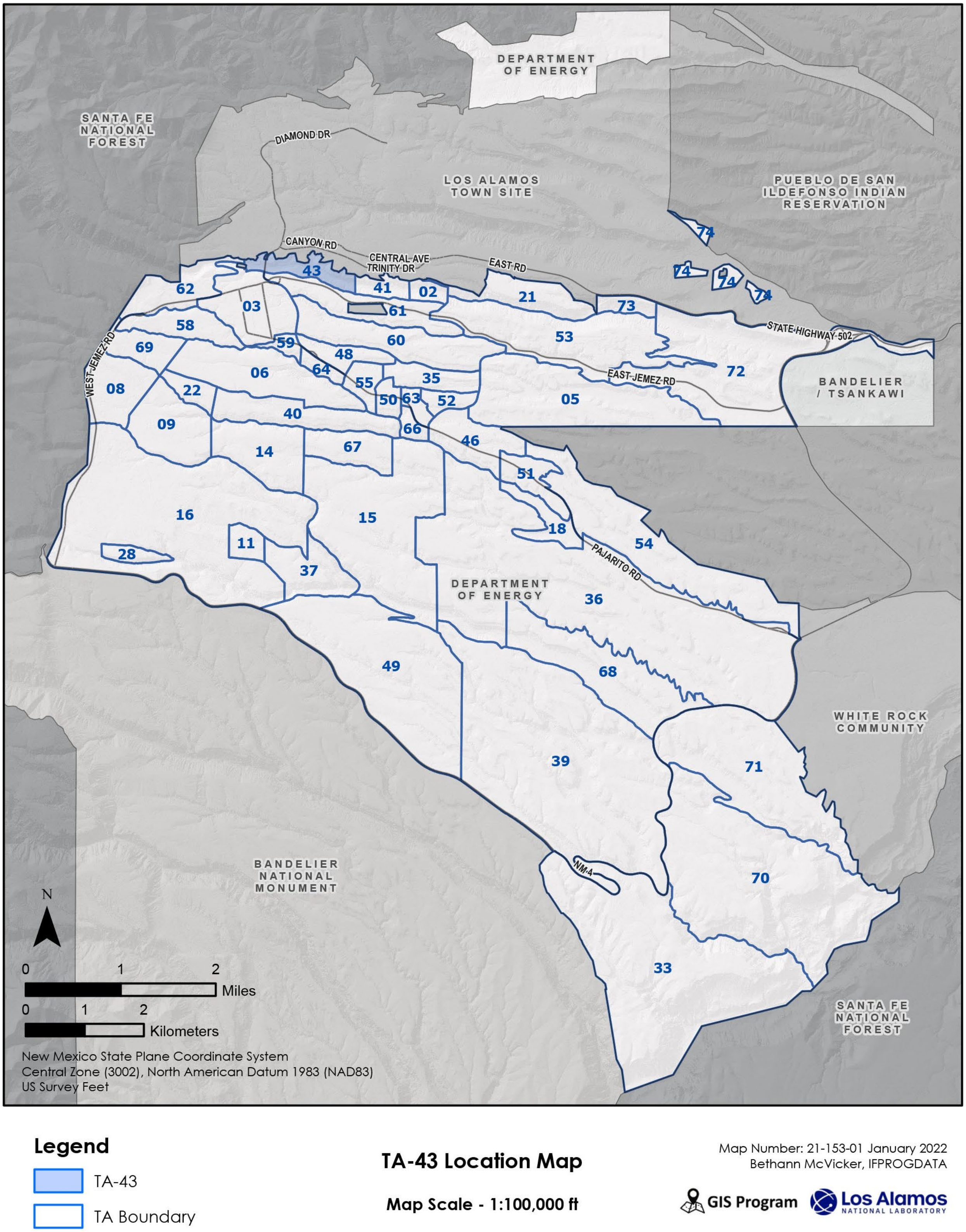

Figure 1-1. TA-43 location map.

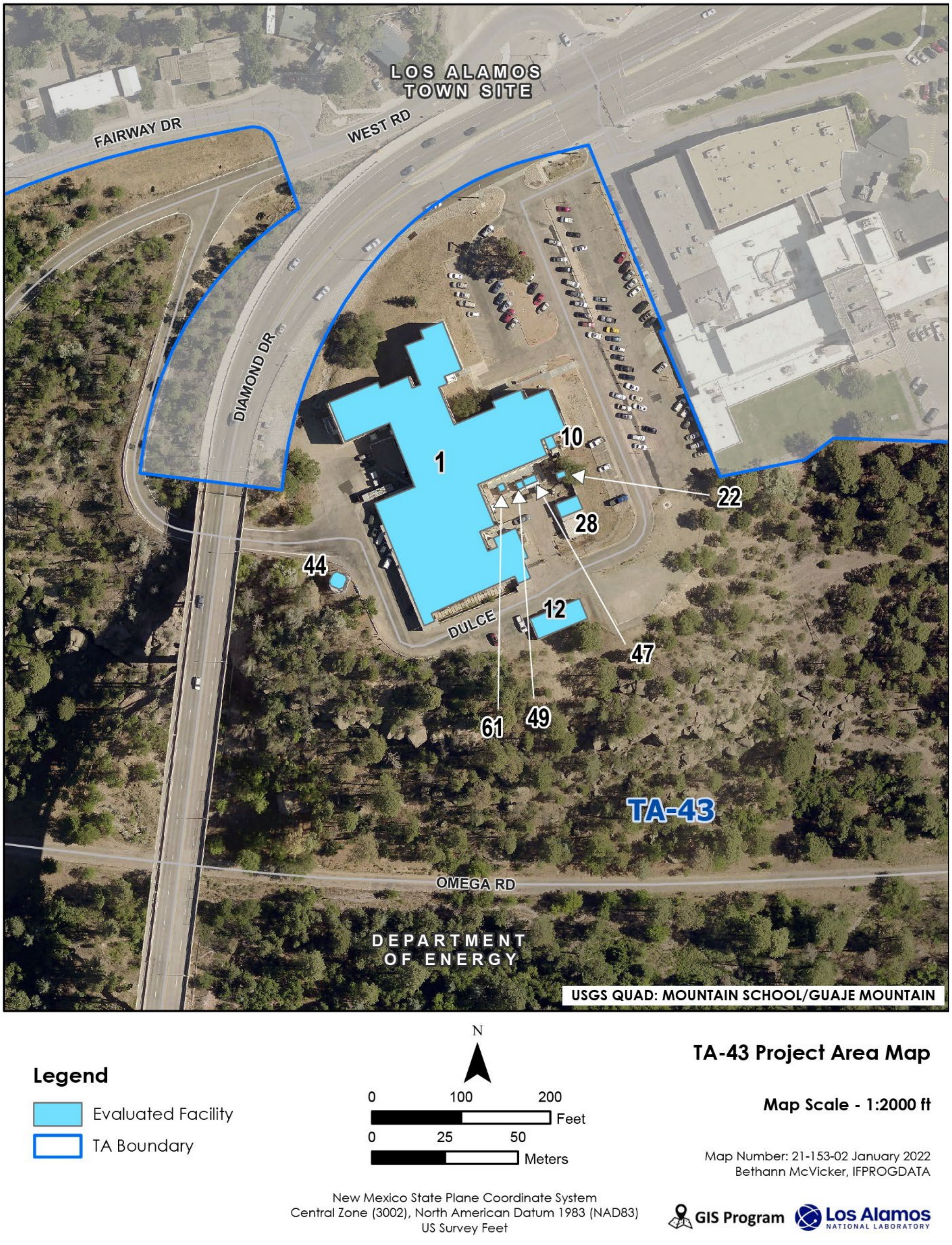

Figure 1-2. Project area map.

Environmental and Cultural Setting

The Laboratory is located in north-central New Mexico on approximately 93 km^2 (36 mi^2) of land approximately 100 km (62 mi) northeast of Albuquerque and 40 km (25 mi) northwest of Santa Fe. The Laboratory is situated on the eastern flank of the Jemez Mountains along the Pajarito Plateau, which consists of a series of narrow mesas and deep canyons that trend east-southeast from the Jemez Mountains to the Rio Grande. Located at elevations ranging from 1,620 m (5,400 ft) to approximately 2,340 m (7,800 ft), the Laboratory includes several distinct environmental zones. The Bandelier National Monument, Santa Fe National Forest, Pueblo de San Ildefonso, and communities of White Rock and Los Alamos border the Laboratory. TA-43 is located atop a mesa along the northern edge of Los Alamos Canyon (Figure 1-3).

Figure 1-3. Oblique aerial photograph of the HRL complex in TA-43. HRL (TA-43-0001) is in the center foreground, TA-43-0012 is in the left foreground, and the Los Alamos Canyon/Omega Bridge is in the background, September 28, 2019 (LANL image, negative no. UI-20191019-LANL-003).

Archaeological and ethnohistoric documentation of the Pajarito Plateau indicates a cultural record of more than 10,000 years. The cultural historical chronology comprises Paleoindian (9500–5500 B.C.) hunter-gatherers; Archaic (5500 B.C.–A.D. 600) hunter-gatherer groups; Ancestral Pueblo (A.D. 600–1600) forager-farmers; and historical Pueblo, Hispanic, and Euro-American peoples (A.D. 1600–present). Formal homesteading on the Pajarito Plateau began in the late 1880s, with the first homestead application filed in 1887 (McGehee et al. 2006:132; Vierra and Hoagland 2000:3.1).

Methods

Investigations for this project included extensive archival research, intensive field surveys of the HRL complex, and an analysis of findings. Archival research was conducted to develop the historical themes; outline the historic context; and collect information related to the design, construction, and modification of the facilities under study. Field surveys were conducted to record, photograph, and assess properties within the HRL complex. An analysis was performed to fully develop the architectural and historic context, identify appropriate themes and property types, and assess the significance of the inventoried properties.

Report Organization

Volume 1 consists of six chapters and seven appendices.

Following this Volume 1 introductory chapter, Chapter 2 provides a historical overview of the Laboratory, from its inception to 2006. An architectural and historic context of TA-43 is presented in Chapter 3, which presents pertinent historical events and themes. Chapter 4 provides a discussion of the evaluation methods and the eligibility criteria for listing in the NRHP. The results of the current investigation, including resource descriptions and NRHP-eligibility assessments, are discussed in Chapter 5. Chapter 6 summarizes the NRHP-eligibility determinations.

Appendix A provides a list of properties designed by architect Willard C. Kruger, the original designer of HRL. Appendix B provides an overview of HRL tenants and leadership personnel from 1953 to 1990. Appendix C provides a list of investigations led by HRL staff from 1953 to 1986. Appendix D contains the Los Alamos National Laboratory Historic Building Survey forms. Appendix E provides construction history maps for TA-43. Appendices F and G provide a list of available drawings for TA-43-0001 and presents selected elevations, floor plans, and other representative depictions of the building. Appendix H lists and maps potential artifacts to salvage from TA-43-0001, and Appendix I details oral-history information used in this report.

Volume 2 consists of exterior and interior photographs of TA-43-0001, along with a photograph index.

Chapter 2: Historical Overview

In the time leading up to the Manhattan Project, physics was making great strides, and world politics were changing.

- 1932: Sir James Chadwick discovered the neutron.
- 1933: Leo Szilard conceived the nuclear chain reaction.
- 1935: Frédéric and Irène Joliot-Curie discovered artificial radioactivity.
- 1938: Otto Hahn and Fritz Strassmann discovered fission.
- 1938: Enrico Fermi won the Nobel Prize for physics for his work with new radioactive elements.
- 1939: Albert Einstein sent a letter to President Franklin D. Roosevelt advising him that Germany may have started developing a bomb of immense destructive powers.
- 1939: Niels Bohr made a worldwide announcement about the discovery of fission.
- 1939: President Roosevelt appointed the Advisory Committee on Uranium.
- 1941: President Roosevelt gave approval to pursue the development of an atomic bomb.
- December 7, 1941, Japan bombed Pearl Harbor in Hawaii, and the United States entered into World War II.
- 1942: The first self-sustaining nuclear chain reaction was produced under Stagg Field at the University of Chicago in Illinois (LANL 2001).

In 1942, University of California physicist J. Robert Oppenheimer organized a study conference that concluded that a fission bomb was feasible; however, problems still existed regarding the development of a nuclear weapon. Research efforts by universities and industry were not coordinated, and a process to produce sufficient fissionable material had not been developed. Colonel (soon to be Brigadier General) Leslie Groves was appointed commanding officer of the U.S. Army Corps of Engineers (USACE) Manhattan Engineer District. Subsequently known as the Manhattan Project, the weapons development effort was placed under the purview of this District. Groves chose Oppenheimer to coordinate weapons design (Benegas 1995a:6–7; LANL 2001; Machen et al. 2010:7; Rothman 1992:214–216).

Manhattan Project Period (1942–1946)

In addition to other Manhattan Project sites, Groves wanted a single, secure research facility to coordinate scientific development. His criteria included security, isolation, a good water supply, an adequate transportation network, a suitable climate, an available labor force. He wanted a locale that was west of the Mississippi River and more than 200 miles away from any international border or the West Coast. In 1942, Oppenheimer, who had visited the Pajarito Plateau on a horseback trip, suggested the Los Alamos Ranch School. The school had been in operation since 1918, and the existing school buildings could very easily support the small-scale facility Oppenheimer had in mind. The University of California agreed to operate the site, code-named Project Y (or Manhattan Project Site Y), under contract with the government. In 1943, staff members of the Los Alamos Ranch School evacuated, and Oppenheimer and his staff moved to Los Alamos to run the newly established weapons laboratory, or Los Alamos Laboratory. The school's setting was indeed remote and afforded natural physical barriers for security (i.e., numerous canyons and cliffs) (Carr 2020a; Hewlett and Duncan 1972:4; LANL 1984:8–10, 2001; Machen et al. 2010:7; Rothman 1992:215–216). From these beginnings, recruitment of the country's "best scientific talent" and the construction of technical buildings were top priorities (Benegas 1995a:8).

Although the fission bomb was conceptually attainable, many difficulties stood in the way of producing a usable weapon. Technical problems included how to time the release of energy from fissionable material and how to overcome engineering challenges related to producing a deliverable weapon. Nuclear material and high-explosive studies were of immediate importance. Two bomb designs appeared to be the most promising: a uranium "gun" device and a plutonium "implosion" device. The gun device involved shooting one subcritical mass of uranium-235 into another at sufficient speed to avoid pre-detonation. Together, the two subcritical masses would form a supercritical mass, which would release a tremendous amount of nuclear energy. This method led to the development of the Little Boy device. Scientists were less confident about the plutonium implosion design, which used shaped high explosives to compress a subcritical mass of plutonium-239. The symmetrical compression would increase the density of the fissionable material and cause a critical reaction. The uncertainties surrounding the plutonium-implosion Fat Man device necessitated testing (Benegas 1995a:9–10; Hoddeson et al. 1993; Machen et al. 2010:9–10).

In 1944, Manhattan Project personnel chose the Alamogordo Bombing Range in south-central New Mexico for the location of the test. They first conducted a trial run that involved 100 tons of trinitrotoluene (TNT) at the test site (Trinity Site). This dress rehearsal provided measurement data and simulated the dispersal of radioactive products (Benegas 1995a:10; Machen et al. 2010:10). Planned for July 1945, the objectives of the Trinity test were "to characterize the nature of the implosion, measure the release of nuclear energy, and assess the damage" (Benegas 1995a:11). The world's first atomic device, Trinity, was successfully detonated in the early morning of July 16, 1945. Little Boy, the untested uranium gun device, was detonated on August 6 over the Japanese city of Hiroshima. Then on August 9, Fat Man (an implosion device like Trinity) was detonated over Nagasaki. These bombings helped end the war with Japan, who surrendered on August 14, 1945 (Benegas 1995a:11–12; LANL 2001; Machen et al. 2010:11).

The future of the early Laboratory was in question at the end of World War II. Many scientists and workers left the Laboratory and went back to their pre-war livelihoods. Groves appointed wartime Group Leader Norris E. Bradbury as Laboratory director in 1945 following Oppenheimer's departure. Bradbury's mission was to conceive of a postwar mission for the Laboratory that included feasibility studies on the hydrogen bomb and peaceful applications of nuclear energy. During this period, Los Alamos Laboratory became the Los Alamos Scientific Laboratory (LASL). In late 1945, Groves directed the Laboratory to begin stockpiling and developing additional atomic weapons, while he tasked the Laboratory's Z Division (present-day Sandia National Laboratories) with weapons assembly work. Z Division had been relocated to Sandia Base at Kirtland Army Air Field (present-day Kirtland Air Force Base) in nearby Albuquerque (Gosling 2010:99; Hewlett and Duncan 1972:32; Hoddeson et al. 1993:399–400; Machen et al. 2010:11, 68; Rothman 1992:236–237; Whitacre 2020:26).

Early Cold War Era (1946–1956)

Actual weapons testing continued during the tail end of the Manhattan Project period. In 1946, the Laboratory hosted the "Super Conference," where the feasibility of developing a hydrogen bomb was explored. Later that year, the Operation Crossroads test series in the Pacific saw the detonation of two plutonium bombs of the Fat Man type. These tests inaugurated the nuclear testing program by the United States and were the first of many tests directed by the Laboratory. During this same year, the Laboratory's Clementine, the world's first plutonium-fueled reactor, achieved criticality. For all practical purposes, the termination of Manhattan Project activities in Los Alamos came in late 1946, when President Harry S. Truman signed the Atomic Energy Act. The legislation confirmed the civilian control of atomic technology and transferred all atomic energy activities in January 1947 from the USACE Manhattan Engineer District to the newly created Atomic Energy Commission (AEC). The AEC formally took over the Laboratory and made a commitment to retain it as a permanent weapons facility. The Laboratory became one of the AEC's centers of research (AEC 1948:66–67; Buck 1983:1; LANL 2001; Machen et al. 2010:12; Mitchell 2003:62).

The term "Cold War" was first used during a congressional debate by a presidential advisor. During the early part of this era, weapons research was a national priority. At the Laboratory, Edward Teller and Stanislaw Ulam spearheaded the effort and focused on the development of the hydrogen bomb. The simmering Cold War came to a full boil in late 1949 with the successful test of Joe I, the Soviet Union's first atomic bomb. In January 1950, President Truman ordered the AEC to develop the hydrogen bomb, a decision that led to the remobilization of the country's weapons laboratories and production plants. This year also marked the initial meeting of the Laboratory's "Family Committee," who was tasked with developing the first two thermonuclear devices in response to President Truman's directives (LANL 2001; Machen et al. 2010:12).

In December 1950, President Truman approved of a test site in Nevada. Subsequently established as the Nevada Proving Ground (present-day Nevada National Security Site [NNSS]) for nuclear testing, development of the site proceeded quickly. The detonation of the Able device on January 27, 1951, during Operation Ranger was the first atmospheric test conducted in the continental United States since 1945. That same year, the Laboratory directed Operation Greenhouse in the Pacific and successfully conducted the first test of the thermonuclear principle with the George device. The Item device was the first detonation of a fission weapon boosted by a fusion reaction. In 1952, the United States detonated the first full-scale thermonuclear device (Mike) at Eniwetok (now spelled Enewetak) Atoll in the Pacific. The Soviet Union responded with a successful fusion demonstration in August 1953, followed by a test of a hydrogen bomb in 1955. Both signaled an acceleration in the arms race between the United States and the Soviet Union (DOE 2015; Fehner and Gosling 2006; LANL 2001).

In 1955, the Laboratory began participating in a demonstration program to incorporate a nuclear-powered reactor into a rocket engine. Subsequently named Project Rover, the program would become a collaboration with the National Aeronautics and Space Administration (NASA) and continue until 1972. Although weapons research and development had always played a major role in the history of the Laboratory, other key themes for the years 1942 to 1956 included supercomputing advancements, fundamental biomedical and health physics research, high-explosives and reactor research and development, pioneering physics research, and the development of the field of high-speed photography. The early Cold War era at the Laboratory ended in 1956, a date that marked the completion of all basic nuclear weapons design—later research focused on the engineering of nuclear weapons to fit specific delivery systems (Benegas 1995b:29; Machen et al. 2010:13; McGehee and Garcia 1999:43–46).

Late Cold War Era (1956–1990)

The beginning of the late Cold War era marked the last year that the Laboratory was a closed facility; access controls into the Los Alamos townsite were removed in 1957. During this era, the Laboratory experienced a great diversification in scientific pursuits, even as staff continued to direct and support nuclear testing in the Pacific and in Nevada and testing for Project Rover. In 1956, the Laboratory successfully tested a new generation of high (plastic-bonded) explosives and began to make improvements to the primary stage of a nuclear weapon. Additionally, Laboratory scientists Frederick Reines (later Nobel Prize winner) and Clyde Cowan definitively detected the free neutrino, a subatomic particle. This discovery was critical to the development of the whole-body radiation counters pioneered at the Laboratory. In 1957, the Laboratory, along with the U.S. Department of Defense (DoD), conducted the first of many underground tests in Nevada. The end of the decade saw another defense mission with the initiation of treaty and test ban verification programs (Benegas 1995b:29–31; DOE 2015:2–3; LANL 2001; Machen et al. 2010:13; McGehee and Garcia 1999:15–16).

In the 1960s, the Laboratory expanded its research endeavors. Key activities included the completion of a diagnostic tool to study the process of implosion and the development of the heat pipe; the latter was a passive heat transfer device that would have numerous future applications (Benegas 1995b:31; Machen et al. 2010:13). In 1963, Laboratory scientists developed Vela satellite sensors, or international “eyes in the sky” (Benegas 1995b:32). These sensors detected nuclear explosions and were part of an effort to monitor international compliance with the recently signed Limited Test Ban Treaty. Also in this decade, the Laboratory completed the world’s highest-voltage Van de Graaff accelerator and initiated research on radioisotope thermoelectric generators to provide electrical energy to NASA spacecraft (Benegas 1995b:31–32; LANL 2001; Machen et al. 2010:13, 69–70; McGehee and Garcia 1999:36).

New capabilities and organizational reforms dominated activities at the Laboratory during the 1970s. The Los Alamos Meson Physics Facility (present-day Clinton P. Anderson Meson Physics Facility) achieved a full energy beam, and scientists shipped out the first medical radioisotope. The Laboratory also established both a Technology Transfer Office and the National Stable Isotope Resource. In 1974, the U.S. Congress passed the Energy Reorganization Act. The legislation abolished the AEC and established the Energy Research and Development Administration (ERDA) and the Nuclear Regulatory Commission. ERDA became the federal government’s hub for energy research and development and took over the former AEC centers and laboratories. Notably, the Laboratory was designated a National Historic Landmark in 1975 and a National Environmental Research Park in 1976. The latter was an ERDA designation and provided opportunities to conduct environmental research at the Laboratory. The Department of Energy Organization Act of 1977 abolished ERDA and established the DOE, which provided a framework for a national energy plan. The later part of the 1970s also saw the Laboratory’s Weapons Neutron Facility and Plutonium Processing Facility become operational (Benegas 1995b:33–37; Buck 1982:1–2; DOE 2020; Greenwood 1974; LANL 2001; Machen et al. 2010:71–73; Petersen and Sullivan 1977:91).

There was a resurgence of groundbreaking research and development in the 1980s, in addition to a name change; in 1981, LASL became LANL. In this decade, the Laboratory established a branch of the Institute of Geophysics and Planetary Physics, a Center for Materials Science, the National Flow Cytometry Resource (NFCR), an acquired immunodeficiency syndrome (or AIDS) database, a Center for Nonlinear Studies, an Advanced Computing Laboratory, and a Superconductivity Technology Center. Also during this decade, the Los Alamos Neutron Scattering Center was dedicated; the Antares laser fusion facility became operational; and the Hot Dry Rock Project, started in the early 1970s, finally produced electricity. The Laboratory’s establishment in the early 1980s of GenBank, a national repository for genetic sequence information, and the National Laboratory Gene Library Project, led to the establishment of the first Center for Human Genome Studies at the Laboratory in 1988. That same year, the Laboratory discovered the human telomere (Benegas 1995b:36–41; LANL 2001; Machen et al. 2010:73–74; Whitacre 2020:26).

End of the Cold War to Recent Times (1990–2006)

The transition from the Cold War era to the post-Cold War era, initiated by the collapse of the Soviet Union at the end of 1991, prompted a period of profound change throughout the Laboratory. Because international treaties restricted and then halted the testing of nuclear weapons, Laboratory scientists had to devise new methods of ensuring the safety and reliability of the nation’s nuclear stockpile. The last underground nuclear test conducted by the United States occurred in 1992. In the years following, the Laboratory developed sophisticated methods of analyzing the viability of weapons as part of the Stockpile Stewardship Program. In 1999, staff conducted the first hydrodynamic test at the newly completed Dual-Axis Radiographic Hydrodynamic Test facility (DOE 2015; LANL 2001; Machen et al. 2010:13, 19; Mitchell 2003:61; Walker 1994).

While weapons research remained the Laboratory's prime mission, scientists continued to conduct research in a wide variety of disciplines. The Laboratory made major advances in human-health research, culminating in increased bioforensic research aimed at thwarting biological terrorism. The Laboratory continued to make huge advances in computing capacity and capabilities, spurred by the need to solve the increasingly complex codes required for weapon certification. Multiple Laboratory experiments flew on satellites to conduct research in the space sciences, and Laboratory scientists began a formal program to provide scientific and technical expertise in support of homeland security issues (Machen et al. 2010:14).

In response to the nation's need for alternative sources of energy, Laboratory staff initiated studies aimed at investigating the hydrogen economy and broadening the use of fuel cells. Materials science research resulted in advances in understanding and manipulating the world of the very small—the nanosciences—and in developing energy-saving superconducting devices. By the end of this era, in research that underlined the environmental concerns of the times, Laboratory scientists were collaborating with others to improve evacuation planning and to model the effects of natural phenomena such as hurricanes, storm surges, floods, and wildfires (Machen et al. 2010:14).

Chapter 3: Architectural and Historic Context of TA-43

Architectural Context

The USACE Albuquerque District began planning for the establishment of an installation in northern New Mexico as early as December 1942. Taking over the Los Alamos Ranch School property as a site to develop an atomic bomb, the U.S. Army closed off Los Alamos to the public and established access controls. The townsite, which began in 54 school buildings, was fenced. The Manhattan Project and the Albuquerque District developed the Main Technical Area, later identified as TA-01, around the Ashley Pond pond. Also fenced, it was adjacent to but separate from the townsite, and guards required special passes for entry. Standard U.S. Army construction prevailed, with the first priority being the construction of both technical and administrative buildings. The AEC took over the management of the Laboratory in 1947, and due to safety and security concerns, began to transition the Main Technical Area across Los Alamos Canyon to South Mesa, where it is located today in TA-03. Temporary technical facilities around the Ashley Pond pond were demolished, including some of the original school buildings (Greenwood 1974:7.1; Jones 1985:466–467; Machen et al. 2010:8, 69; McGehee et al. 2003:7).

Historical Background of TA-43

The AEC Office of Engineering let the construction contract for TA-43 on January 20, 1952. Although plans for a medical research laboratory had been in the works since January 1947, the establishment of a new TA to house it was not under construction until 1952. As designed, TA-43 measured 1.38 acres and comprised two buildings (HRL [TA-43-0001] and an adjacent sewage lift station [TA-43-0010]), a driveway, and parking areas (see Appendices E and G). W. C. Kruger and Associates finalized drawings in August 1951, and by August 1953, the HRL campus was in use. Purposefully sited adjacent to the existing Los Alamos Hospital (Figure 3-1)—designed by W. C. Kruger and Associates in 1949—south of Diamond Drive, TA-43 was notably located on the north side of Los Alamos Canyon next to the townsite (*Albuquerque Journal*, 16 October 1949:2; Langham and Storer 1953:4–5; LANL drawings on file; LASL 1954:8; LASL Engineering Department 1952: Structure Location Plan, TA-43, Medical Research Laboratory, Drawing No. ENG-R166; Shipman 1954:5).

Outside of alterations to HRL, no notable changes occurred within TA-43 until after 1969, at which time, change regularly occurred within the TA. Between 1969 and 1977, a metal lawn building (TA-43-0011) was installed behind (southeast of) HRL. In 1978, the Laboratory constructed a warehouse (TA-43-0012) behind HRL along the Los Alamos Canyon escarpment. The Laboratory constructed five new facilities on the HRL campus between 1983 and 1986: an office transportable (TA-43-0020) and an office trailer (TA-43-0024) behind HRL along the Los Alamos Canyon escarpment; a storage shed (TA-43-0028) in 1984 behind HRL; an emergency access portal (TA-43-0022) in 1985 at the northwest corner of the building; and a storage shed (TA-43-0030) adjacent to the sewage lift station. The Laboratory removed the metal lawn building (TA-43-0011) in 1985, and between 1986 and 1989, staff constructed three new facilities behind HRL: two storage sheds (TA-43-0029 and TA-43-0036) and an office trailer (TA-43-0037) (LANL drawings on file; LANL Facilities Engineering Division 1983: Structure Location Plans, TA-43, Health Research Laboratory, Drawing No. ENG-R5123 revised; LANL Facilities Engineering Division 1986: Structure Location Plans, TA-43, Health Research Laboratory, Drawing No. ENG-R5123 revised; LANL Facilities Engineering Division 1989: Structure Location Map, TA-43, Health Research Laboratory, Drawing No. ENG-R5123 revised; LANL Space Management System–Archibus; LASL Engineering Department 1969: Structure Location Plans, TA-43, Health Research Laboratory, Drawing No. ENG-

Figure 3-1. HRL (TA-43-0001) under construction on the right, with the Los Alamos Hospital (present-day Los Alamos Medical Center) on the left, June 15, 1953 (DOE image, file no. 1517057, accession no. AECDC-B02F24P001).

R2477; LASL Engineering Department 1977: Structure Location Plan, TA-43, Health Research Laboratory, Drawing No. ENG-R5123).

Between 1986 and 1989, the Laboratory extended TA-43 approximately 0.85 mile to the east along Los Alamos Canyon. This expansion placed the then DOE headquarters area, which comprised a headquarters building (TA-43-0039), pump house (TA-43-0040), and steam plant (TA-43-0041), within TA-43. The W. C. Kruger Company originally designed these facilities as a police (or security force) barracks, steam generating plant, and sewage lift station, with finalized drawings dated to February 1948. In 1955, the barracks building became an administration building, serving as the headquarters building for AEC, ERDA, and DOE (LANL drawings on file; LANL Facilities Engineering Division 1986: Structure Location Plans, TA-43, Health Research Laboratory, Drawing No. ENG-R5123 revised; LANL Facilities Engineering Division 1989: Structure Location Map, TA-43, Health Research Laboratory, Drawing No. ENG-R5123 revised; McGehee et al. 2010:29–31).

The Laboratory made additional changes to the HRL campus within TA-43 during the 1990s. Between 1989 and 1991, the Laboratory removed two sheds (TA-43-0029 and TA-43-0030) and installed four additional facilities behind HRL: a lunch conference room/trailer (TA-43-0045), a storage shed (TA-43-0046) in 1990, and two chemical sheds (TA-43-0047 and TA-43-0049) in 1990 on the loading dock. The Laboratory constructed two new facilities between 1991 and 1995: a cooling tower (TA-43-0044) west of HRL and a safety storage shed (TA-43-0061) in 1992 behind HRL. Interestingly, an addition to HRL in 1995 demolished the emergency access portal (TA-43-0022), and the building number was reused for a shed placed behind HRL by 2001 (Johnson Controls 2001: As-built Structures Location Maps, TA-43, Health Research Lab and DOE Hdqrs, Drawing No. AB33 revised; Johnson Controls, Inc., 1995: LANL

As-built Program, TA-43 Facility Management Ownership Map; LANL Facilities Engineering Division 1989: Structure Location Map, TA-43, Health Research Laboratory, Drawing No. ENG-R5123 revised; LANL Facilities Engineering Division 1991: Structure Location Map, TA-43, Health Research Laboratory, Drawing No. ENG-R5123 revised; LANL Space Management System–Archibus).

Subsequent modifications to TA-43 were both within the DOE headquarters area and the HRL complex. In the DOE headquarters area between 1995 and 2001, the pump house (TA-43-0040) was demolished, and a safety storage shed (TA-43-0048) was installed. In October 2002, the DOE conveyed 4.5 acres of the former DOE headquarters area in TA-43 to Los Alamos County as part of land conveyance activities. The steam plant (TA-43-0041) and safety storage shed (TA-43-0048) in the DOE headquarters area were demolished between 2008 and 2009, and the DOE headquarters building (TA-43-0039) was demolished between 2009 and 2010. The DOE conveyed another 8.8 acres in the DOE headquarters area to Los Alamos County in June 2010. Between 1995 and 2001 within the HRL campus, a storage shed (TA-43-0036) was removed. Between 2012 and 2014, the following facilities were also removed from the HRL campus: an office transportable (TA-43-0020), an office trailer (TA-43-0024), and the lunch conference room/trailer (TA-43-0045). Lastly, an office trailer (TA-43-0047) was removed from the HRL campus between 2014 and 2017 (Google Earth; Johnson Controls 2001: As-built Structures Location Maps, TA-43, Health Research Lab and DOE Hdqrs, Drawing No. AB33 revised; Johnson Controls, Inc., 1995: LANL As-built Program, TA-43 Facility Management Ownership Map; LANL Space Management System–Archibus; Los Alamos County Quitclaim Deed for Parcel A-12; Los Alamos County Quitclaim Deed for Parcel A-13). Table 3-1 provides a summary of TA-43 facilities, including 15 facilities listed in the LANL Space Management System Archibus database that had no construction histories.

Table 3-1. Construction History of TA-43 Facilities

Complex	Property	Description	Completion Year	Removal Year	Comments
DOE	TA-43-0039	Headquarters	ca. 1948	ca. 2009–2010	
DOE	TA-43-0040	Pump House	ca. 1948	ca. 1995–2001	
DOE	TA-43-0041	Steam Plant	ca. 1948	ca. 2008–2009	
DOE	TA-43-0048	Safety Storage Shed	ca. 1995–2001	ca. 2008–2009	
DOE	TA-43-0073	Shed	unknown	unknown	
DOE	TA-43-0074	Morgan Shed	unknown	unknown	
HRL	TA-43-0001	Health Research Lab	1953	n/a (extant)	
HRL	TA-43-0010	Sewage Lift Station	1953	n/a (extant)	Oversight transferred to Zia Company in 1970
HRL	TA-43-0011	Metal Lawn Building	ca. 1969–1977	1985	
HRL	TA-43-0012	Warehouse	1978	n/a (extant)	
HRL	TA-43-0020	Office Transportable	ca. 1983–1986	ca. 2012–2013	
HRL	TA-43-0021	Trailer (Leased)	unknown	unknown	
HRL	TA-43-0022	Shed	ca. 1995–2001	n/a (extant)	Facility number was previously associated with an emergency access portal (1985–1995)
HRL	TA-43-0024	Office Trailer	ca. 1983–1986	ca. 2012–2014	

Complex	Property	Description	Completion Year	Removal Year	Comments
HRL	TA-43-0026	Transportable (Leased)	unknown	unknown	
HRL	TA-43-0028	Storage Shed	1984	n/a (extant)	
HRL	TA-43-0029	Storage Shed	ca. 1986–1989	ca. 1989–1991	
HRL	TA-43-0030	Storage Shed	ca. 1983–1986	ca. 1989–1991	
HRL	TA-43-0036	Storage Shed	ca. 1986–1989	ca. 1995–2001	
HRL	TA-43-0037	Office Trailer	ca. 1986–1989	ca. 2014–2017	Re-labeled as a Storage Building ca. 1991–2001
HRL	TA-43-0038	Trailer (Experimental)	unknown	unknown	
HRL	TA-43-0042	Transportable Office Building	unknown	unknown	
HRL	TA-43-0043	Transportable Office Building	unknown	unknown	
HRL	TA-43-0044	Cooling Tower	ca. 1991–1995	n/a (extant)	
HRL	TA-43-0045	Lunch Conference Room/Trailer	ca. 1989–1991	ca. 2012–2014	
HRL	TA-43-0046	Storage Shed	1990	ca. 2017–2021	
HRL	TA-43-0047	Chemical Shed	1990	n/a (extant)	
HRL	TA-43-0049	Chemical Shed	1990	n/a (extant)	
HRL	TA-43-0061	Safety Storage Shed	1992	n/a (extant)	
HRL	TA-43-0076	Greenhouse	unknown	unknown	
HRL	TA-43-0077	High-Pressure Steam Boiler	unknown	unknown	
Unknown	TA-43-0017	Construction Shack Trailer	unknown	unknown	
Unknown	TA-43-0023	Trailer (Leased)	unknown	unknown	Re-labeled as a Garage Shed ca. 1991–2001
Unknown	TA-43-0031	Transportable	unknown	unknown	
Unknown	TA-43-0033	Mobile Behavioral Testing Laboratory	unknown	unknown	
Unknown	TA-43-0220	Storage Shed	unknown	unknown	
Unknown	TA-43-0433	Transportainer	unknown	unknown	

History of TA-43-0001 (HRL)

Wright H. Langham, PhD, alternate Health (H) Division leader and alternate group leader of the H-4 Biomedical Research Group, penned a 1948 letter to the AEC Operations Office (W. H. Langham to Theodore B. Jenson, 27 August 1948, DOE OpenNet [online]). In the letter, Langham justified an integrated Los Alamos community hospital and Laboratory biomedical building because they could

- protect the health of all Laboratory workers from occupational hazards;
- conduct classified research locally;
- continue concentrated research on acute radiation effects;
- meet AEC commitments to the public, such as cancer treatments;

- train civilian and military personnel in medical aspects of atomic energy;
- take advantage of the Laboratory's specialized staff, facilities, and equipment;
- retain high-caliber medical personnel; and
- protect AEC from lawsuits related to malignancies associated with atomic energy .

As Langham's widow and coworker, Julie Langham Grilly (1995), recalled,

> I can remember Wright fighting to get this new building. They [Langham and his research colleagues] wanted to put it next to the hospital so the biomedical research would be next to the hospital. I can remember Norris Bradbury [Director of Los Alamos Laboratory,] saying, "Good luck, Wright." He [Langham] was planning, and he went to Washington, and he got the building built. He did.

W. C. Kruger and Associates completed drawings for the Los Alamos Medical Center in July 1949 and for the HRL campus in August 1951 (Figure 3-2 and Figure 3-3; see Appendix F: and Appendix G:). The hospital was dedicated in January 1952, and Laboratory staff moved into HRL—briefly called the Medical Research Laboratory (or MRL)—in August 1953 (Figure 3-4 through Figure 3-7). HRL cost $2.2 million and included laboratories, administrative offices, a medical library, a seminar room, animal quarters, workshops, photographic darkrooms, an X-ray exposure room, a cobalt-source exposure room, a special counting room, supply and storage space, a lobby, and a repository for classified material. Providing almost 56,000 square feet of floor space, HRL was designed for the Health Division's Biomedical Research Group (H-4), Industrial Hygiene Group (H-5), Division Shop, and Property Section (LANL drawings on file; LASL 1954:8; Meade 2017:12; Shipman 1954:5; University of New Mexico 2010).

In October 1953, HRL officially opened. Before the end of the year, the H-4 Biomedical Research Group developed the first Los Alamos Small Animal Counter (LASAC I) to measure radioactivity, and the H-5 Industrial Hygiene Group acquired its first flame photometer and three Parsons automatic air samplers. In 1954, the H-4 Biophysics Section completed the design of its first large-volume, liquid-scintillator, human counter to measure radioactivity. The Health Division allocated $45,000 in a special budget for fabrication and installation. The Laboratory modified Room SB16 in the subbasement, and the Shops Department fabricated the counter. Also in 1954, the Laboratory converted an animal room into a monkey housing facility for $4,000, installed a Hilger intermediate quartz spectrograph, installed a new 250-kilovoltage peak General Electric X-ray machine, and obtained two additional liquid scintillation beta counters. In July 1955, the first model of the Los Alamos large-volume, liquid-scintillation detector (Los Alamos Human Counter or HUMCO I) was in operation (Figure 3-8) (Langham and Shipman 1960:170, 179; Langham and Storer 1955:8, 10–11; LANL drawings on file; LASL 1954:8; Shipman 1954:6, 46).

The late 1950s saw the addition of much-needed equipment in HRL, especially in 1957. The Health Division installed and began using a crystal spectrometer—similar to the one at the Argonne National Laboratory designed by Marinelli and Miller—in Room SB14 in the subbasement (Figure 3-9). This counter complemented the findings of HUMCO I and was used to study radioactivity in soils from Nevada and Utah, air filter samples, and cow rumens from Nevada. With space for a second counter in this room, plans were underway to install a greatly improved spectrometer. The Laboratory also installed a dust and vapor test chamber for the H-5 Industrial Hygiene Group in Room 127. Building occupants acquired a gas chromatograph, reduced the number of counting instruments, and converted one of the unneeded counting rooms into an additional laboratory (LANL drawings on file; Shipman 1958:48–49, 66, 76–77, 81).

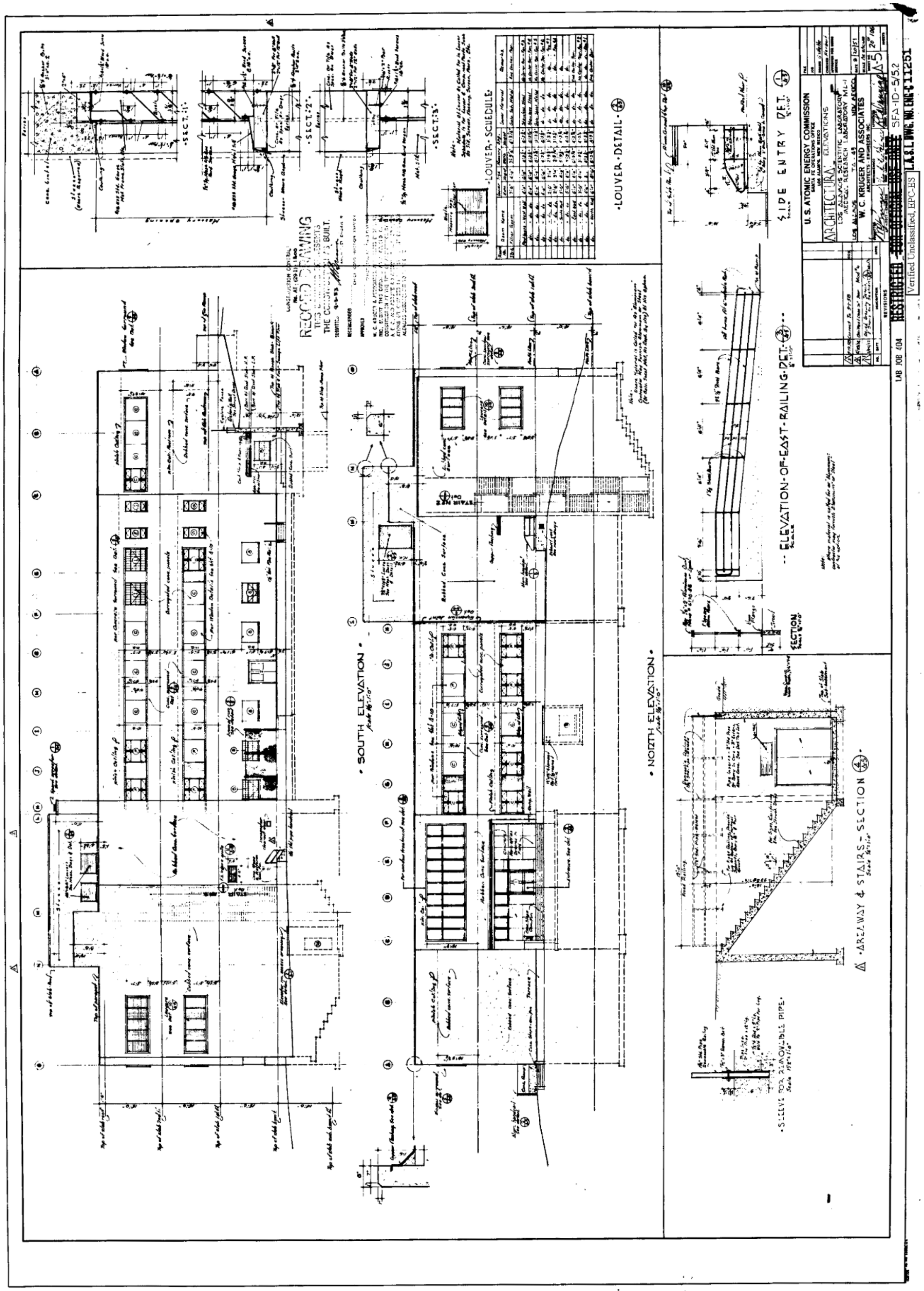

Figure 3-2. Architectural elevations for the LASL Medical Research Laboratory ML-1 (present-day HRL, TA-43-0001), by W. C. Kruger and Associates, August 20, 1951 (LANL drawing, file no. ENG-C11251).

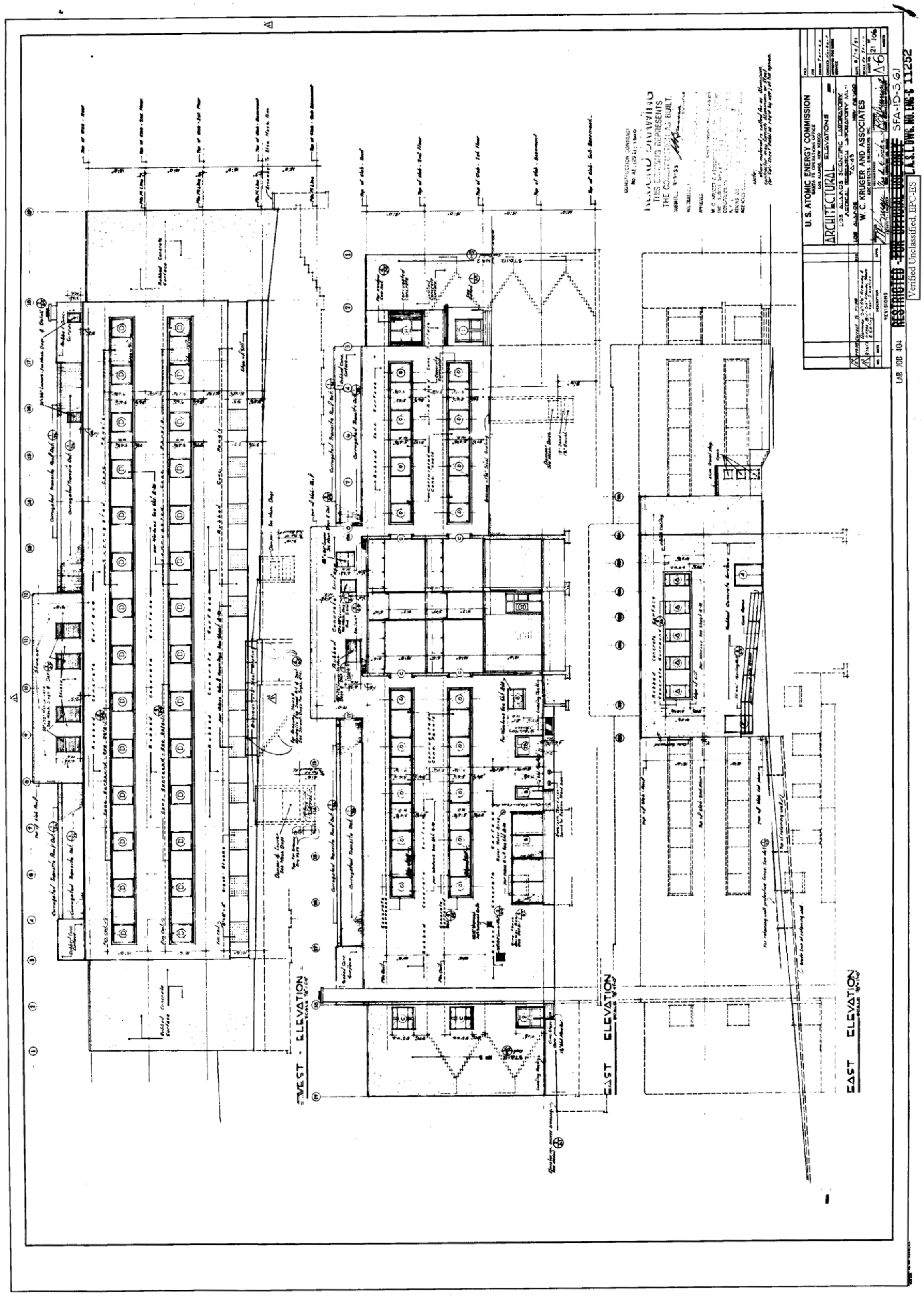

Figure 3-3. Architectural elevations for the LASL Medical Research Laboratory ML-1 (present-day HRL, TA-43-0001), by W. C. Kruger and Associates, August 20, 1951 (LANL drawing, file no. ENG-C11252).

Figure 3-4. Southwest view of HRL (TA-43-0001) during construction, November 18, 1952 (DOE image, file no. 1517061, accession no. AECDC-B02F24P005).

Figure 3-5. Southeast view of HRL (TA-43-0001) during construction, December 17, 1951 (DOE image, file no. 1517060, accession no. AECDC-B02F24P004).

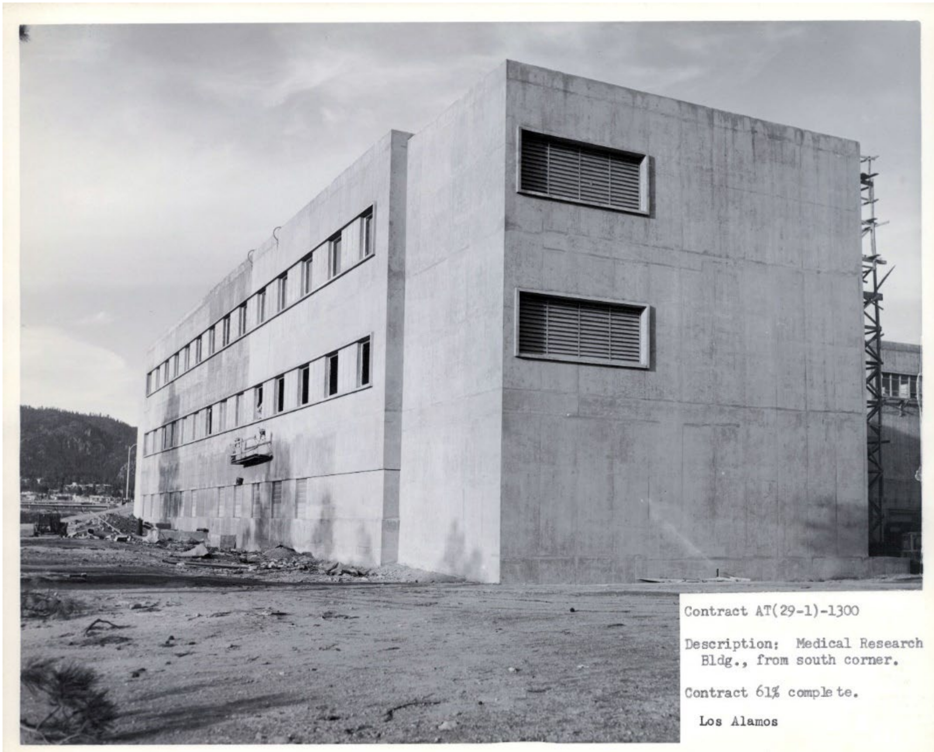

Figure 3-6. Northeast view of HRL (TA-43-0001) during construction, December 17, 1951 (DOE image, file no. 1517059, accession no. AECDC-B02F24P003).

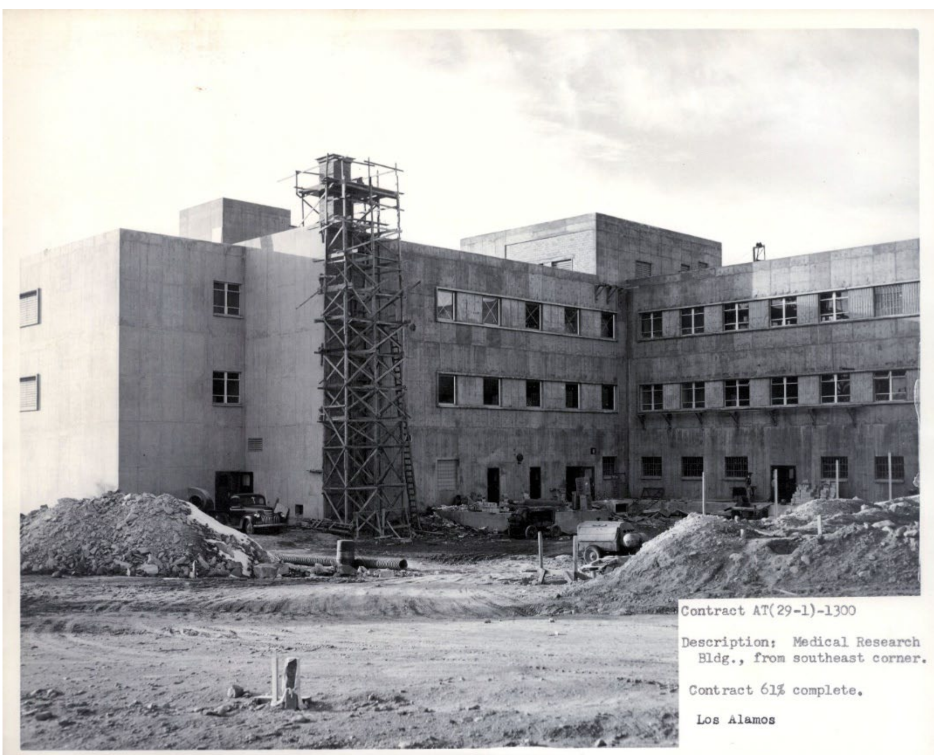

Figure 3-7. Northwest view of HRL (TA-43-0001) during construction, December 17, 1951 (DOE image, file no. 1517058, accession no. AECDC-B02F24P002).

Figure 3-8. Billie Clinton with "Plastic Man" (a clear-plastic mannequin of a standard man that could be filled with tissue-equivalent matter and used for dose studies) in HUMCO I, June 1959 (LANL image, negative no. CN59-221).

By 1957, HUMCO I, still in use, was deemed obsolete, and plans were underway to develop a new model. HUMCO II was operational by August 1959, and circuits developed by the Laboratory's Electronics Group transferred data directly to IBM punch cards. Also in 1959, the Laboratory installed a human gamma-ray (sodium iodide crystal) spectrometer in Room SB14 in the subbasement, developed a more efficient and compact counter (LASAC II), and constructed a preparative-scale gas chromatographic assembly. By the end of the year, the instrument laboratory also included a Beckman DK-1 recording spectrophotometer, Baird recording infrared spectrophotometer, Aminco-Bowman spectrophotofluorometer, and Sadtler standard spectra (Langham and Shipman 1960:167, 173, 178, 180, 224, 226; LANL drawings on file; Shipman 1958:49).

W. C. Kruger and Associates designed additional animal quarters for HRL in March 1959. L-shaped in plan, the addition was one story with a small penthouse and measured approximately 154 by 181 feet (Figure 3-10). The Laboratory constructed this basement-level addition at the southern end of the building. Completed in 1960 at a cost of approximately $325,000, the new space included pens, kennels, outside exercise areas, feeding rooms, lodging rooms, breeding rooms, quarantine rooms, cage-cleaning rooms, necropsy and treatment areas, storage areas, a veterinary office, and a locker room (Langham and Shipman 1960:404–405; LANL drawings on file).

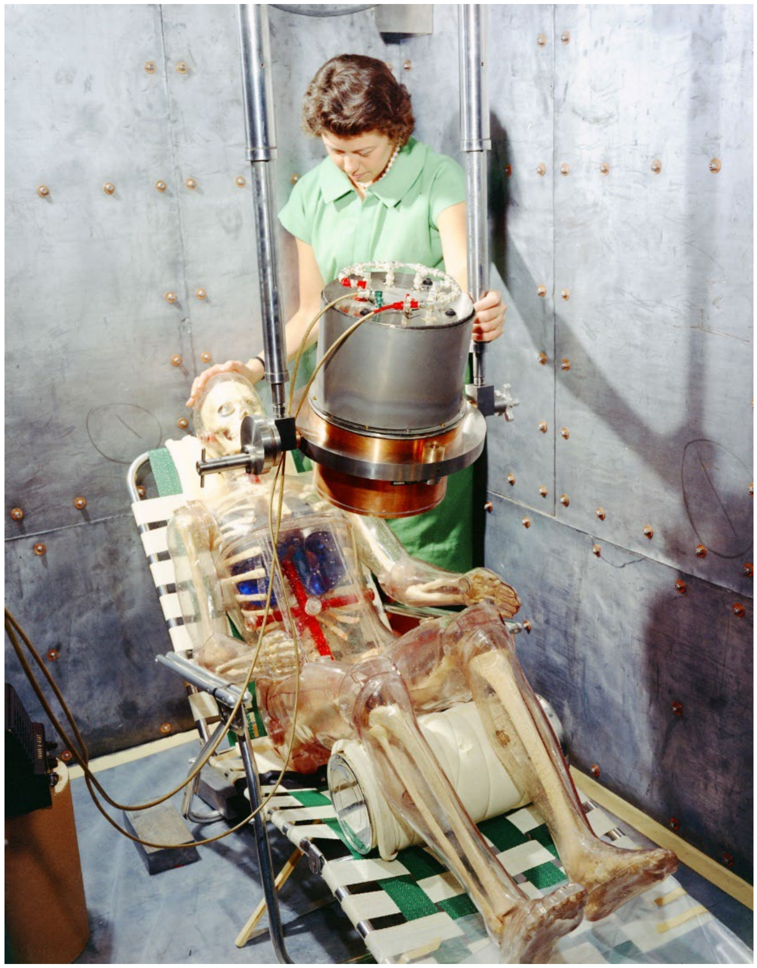

Figure 3-9. Plastic Man under crystal spectrometer, June 1959 (LANL image, negative no. CN59-222).

During the first half of the 1960s, significant changes at HRL were confined to facilities, equipment, and supplies (Figure 3-11). Under construction in 1959, LASAC III was in operation by 1960. For dosimetry purposes, the Health Division acquired and modified a Bausch and Lomb microphotofluorometer reader for gamma rays and developed a fission gamma-ray counter called Jumbo No. 1. Also in 1960, the H-4 Biological and Medical Research Group started a cell farm of Chinese hamster ovary (CHO) cells to ensure a reliable cell supply for experiments. Staff appreciated the mechanical bottle washer and filler that was developed and installed in 1961. By 1962, HUMCO II was in routine use (Figure 3-12), and the division dismantled and removed HUMCO I. Significantly this year, the H-4 Molecular Radiobiology Section developed a positive-displacement, gradient-elution device, for conducting chromatography of deoxyribonucleic acid (DNA), and the H-4 Low-Level Counting Section staff began development of a thermoluminescent dosimeter (the kind most used at the Laboratory today). Notably, in 1962, the Laboratory constructed a satellite radiation-exposure facility in TA-51 (present-day TA-54) for the H-4 Biological and Medical Research Group. Located approximately 10 miles southeast of HRL, it provided equipment for delivering radiation to animals in different total doses, dose rates, or fractionations. Also in 1962, the Laboratory modified the subbasement for use as a fallout shelter. In 1965, HRL occupants developed a large-volume proportional counter for *in vivo* measurement of plutonium-239 in human lungs (Figure 3-13) and a cell separator (Langham and Shipman 1960:180, 1961a:105, 1961b:315, 346, 1961c:303–304, 1962:248, 257, 1964a:143, 205, 358, 1965:114, 119; LANL drawings on file; Marrone and Cram 1988:77; Richmond and Voelz 1972:12).

Figure 3-10. Northwest view of HRL (TA-43-0001) exhibiting new animal quarters, September 13, 1960 (LANL image, negative no. CN60-270).

Figure 3-11. South view of HRL (TA-43-0001), September 13, 1960 (LANL image, negative no. CN60-268).

Figure 3-12. HUMCO II in use, April 10, 1962 (LANL image, negative no. 5408-14).

Figure 3-13. Plutonium lung counter in use, October 1, 1970 (LANL image, negative no. PUB-70222-7).

Major changes in staffing and minor improvements in the facility occurred in the latter half of the 1960s. In April 1966, the H-5 Industrial Hygiene Group and the H-8 Field Studies Group moved out of HRL, providing room for the H-4 Biological and Medical Research Group to expand. Interestingly, in December 1967, the Los Alamos Civil Defense conducted a 16-hour training for shelter managers that included an 8-hour exercise in a fallout shelter. They used Shelter 43-001 in the subbasement of HRL for the training, and Langham acted as shelter manager. In 1968, Langham and Jasper A. Jackson notably constructed the first whole-body, low-frequency, nuclear magnetic resonance (NMR) spectrometer (Figure 3-14). The Laboratory constructed a basement-level, one-story addition to HRL in 1969. Located on the southwest façade, they constructed it adjacent to the 1959 addition. Rectangular in plan and measuring approximately 25 by 55 feet, it included a small penthouse. The addition provided more space for offices, animal quarantine, and necropsy (Brashear 1968:9–10; Jackson and Langham 1968:3; LANL drawings on file; Ott 1968:107; *The Atom* 1966:7).

Impactful changes occurred at HRL during the 1970s, both with the addition of new facilities and advancements in science. An acute shortage of space for animals noted in 1971 was resolved in March 1974 with the opening of a new animal holding and isolation facility at TA-51. In 1974 and 1975, HRL underwent modification. In May 1974, architect Philippe de M. Register designed a one-story, basement-level addition on the backside of HRL. Located on the southeast façade, it was rectangular in plan and measured approximately 35 by 96 feet. The addition provided for seven new office-laboratory rooms in 1975. In that year, the Laboratory constructed a basement-level, one-story addition that measured approximately 12 by 30 feet. Rectangular in plan, the addition was located on the northeast façade and expanded the cage-washing facilities. In September 1977, Clark, Arrison, Germanas, Architects designed a first floor–level addition that was located atop the Philippe Register–designed space. It provide room for one very large office and a computer room. Incidentally, the Division first acknowledged the Medical Branch Library housed at HRL in 1971 and installed the first computers in HRL by 1973 (LANL drawings on file; Richmond and Sullivan 1974:xii, xvi; Richmond and Voelz 1972:13,131).

By 1971, the *in vivo* lung counter was in routine use and was even used to assess the skulls of uranium miners for lead. That same year, the H-4 Biophysics Section developed a dual-parameter microphotometer to identify cell characteristics. Notably, 1976 was the last year that Health Division reports mentioned that HUMCO II was in use. In 1978, the Division started an athymic (nude) mouse colony in a renovated gamma-exposure suite. Without a fully working thymus, these mice were useful for experiments because their immune systems were inhibited. Also in 1978, the H-10 Biophysics and Instrumentation Group developed a Los Alamos Cell Analysis (LACEL) data acquisition system in support of flow cytometry applications (Petersen and Sullivan 1977:6, 1979:36, 100; Richmond and Voelz 1972:88, 95).

The 1980s saw an expansion of biomedical research collaboration. In 1982, the Laboratory established NFCR at HRL. By 1987, it provided any researcher access to a multiparameter flow cytometer, a chromosome high-resolution imaging sorter, a high-speed sorter, an EPICS V dual laser-based flow sorter, and a Becton-Dickinson FACS II dual-laser excitation apparatus. In 1983, the Laboratory established the National Laboratory Gene Library at HRL. A joint project between the Laboratory and the Lawrence Livermore National Laboratory, it aimed to provide researchers around the world with chromosome-specific DNA libraries of the entire human genome (Enger and Stafford 1983:xi; Enger et al. 1984:93; Marrone and Cram 1988:74–75).

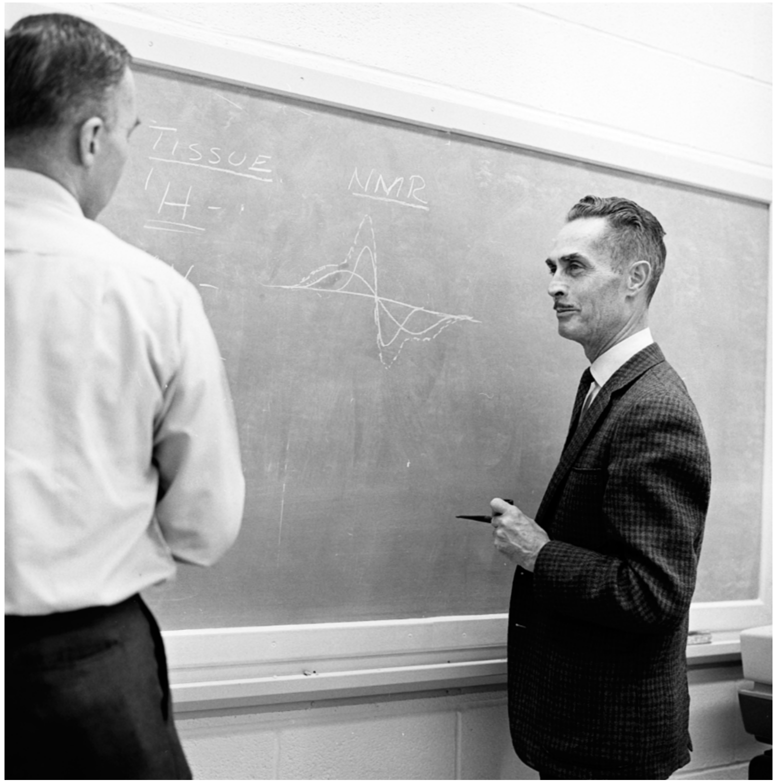

Figure 3-14. Jackson and Langham discussing NMR tissue counter, January 1, 1969 (LANL image, negative no. PUB-69107-10).

Group leaders thoroughly recorded changes and program statuses of the 1980s specific to HRL in 1987. That same year, the radiation source room was renovated and upgraded to accommodate two gamma-ray sources: high-dose rate cobalt-60 (a reconditioned Picker Cyclops Radiotherapy unit) and low-dose rate cesium-137 (J. L. Shepherd and Associates Model 81-12 unit) gamma irradiators. Located in the basement, Room B138 held the source, and Room B142 served as the radiation exposure room. By this time, the Health Division had installed a Biomedical NMR Facility in Room 244/246 and a MicroVAX computer system that connected five to six HRL computers through an Ethernet. The animal care facility occupied 8,000 square feet in HRL, and the CHO cell farm had grown to a Health Division–wide service facility. Additionally, HRL underwent numerous interior-space modifications in the 1980s (LANL drawings on file; Marrone and Cram 1988:76–78).

HRL experienced substantial upgrades in the 1990s. The Laboratory constructed a two-story addition at the first-floor level on the northwest end of the building in 1991. Irregular in plan, it measured approximately 58 by 63 feet. Designed by Holmes and Narver with plans dated to October 1990, the addition provided space for a utility room, a cold room, an isotope lab, wet labs, and instrument labs. Discussed as early as 1987, the Laboratory upgraded the animal care facilities ca. 1993. In 1997, the Laboratory completed another two-story addition on the northwest end of the building. Located at the basement level, it was rectangular in plan and measured nearly 49 by 69 feet. Designed by Flatow Moore Shaffer McCabe, it served as a biophysics laboratory addition. Additionally, HRL underwent numerous interior-space modifications in the 1990s. Today, HRL stands as the last vestige of the early Cold War permanent laboratory facilities still on the north side of Los Alamos Canyon adjacent to the Los Alamos townsite (LANL drawings on file; Marrone and Cram 1988:78).

History of TA-43-0012 (Warehouse)

The Laboratory approved drawings by the Engineering Department for a Warehouse Facility in the HRL complex at TA-43 in January 1978. Located southeast of HRL along the Los Alamos Canyon escarpment, the one-story building measured 60 by 24 feet. No subsequent modifications are reflected in the architectural record (LANL drawings on file).

Associated Architects

W. C. Kruger and Associates, Santa Fe, New Mexico

W. C. Kruger and Associates designed the original HRL building in August 1951 and additional animal quarters in March 1959. Kruger helped institute the Territorial Revival style in New Mexico, became the state's de facto architect, was an active community member, and designed much of Los Alamos. Born on July 28, 1910, Kruger was raised in Raton, New Mexico. In 1934, he received a Bachelor of Architecture from Oklahoma A&M College (present-day Oklahoma State University). He married in 1934, and by 1955, he had three children. After graduation, he returned to New Mexico and joined the New Mexico State Planning Board (1934–1936) (Figure 3-15). Notably, the Board was actively involved in the architectural design of state buildings and hired the two leading architectural proponents of a New Mexican regional style, John Gaw Meem and Gordon Street. The Board and Meem worked closely to develop a regional style. Next, Kruger served as the New Mexico State Architect or the New Mexico State Planning Board Architect for 2 years (1936–1937); the state's organizational structure for this period is a bit unclear. In this role, he directed the New Deal–era Works Progress Administration (WPA) projects in the state. In 1937, he established his own firm, W. C. Kruger Company, in Santa Fe, (Kammer 2007:8.11; Koyl 1955:313, 1962:120, 396; Moore et al. 2010:85; New Mexico Society of Architects, American Institute of Architects [AIA] 1985:5; Raymond and McCullough 2009:E.7, E.9; University of New Mexico 2010; Wallace 2011:14).

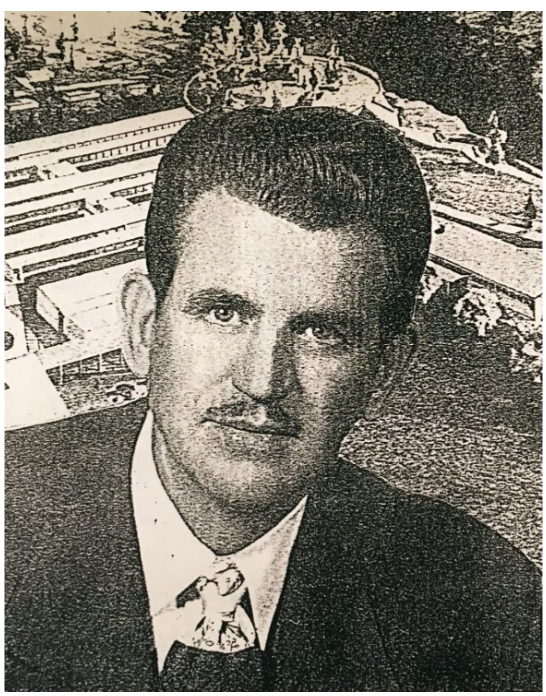

Figure 3-15. Willard C. Kruger (courtesy of the University of New Mexico, Center for Southwest Research, Boyd C. Pratt Papers pertaining to the "Directory of Historic New Mexico Architects," MSS 736, Box 1, Folder 46).

In 1937, Kruger and Kenneth S. Clark (New Mexico Assistant State Architect) resigned from their government jobs and started their own firm, Kruger and Clark. They brought their experience in designing public buildings, familiarity with regional architectural expressions, and proficiency with New Deal–era grant programs to the new firm. Securing numerous commissions funded by the WPA or the Public Works Administration, Kruger and Clark designed many New Mexico public buildings. From 1938 to 1941, they were awarded commissions for 31 projects that included schools, courthouses, city halls, an armory, a prison farm, an office building, a department store, and an apartment building. Kruger and Clark's primary architectural design style was Territorial Revival. This style blended regional building materials from New Mexico's Territorial Period (the Territorial style) with imported elements from other styles, such as Greek Revival. The Territorial Revival style was a continuation of a regional idiom that emerged during the early 1930s in Meem's work. Kruger and Clark dissolved upon Clark's departure in 1942 to serve in U.S. Army Air Corps (Kammer 1995:8.3, 2000:E.19–E.20, 2007:3, 8.11; Koyl 1955:313; Pratt 1989:12; Raymond and McCullough 2009:E.11–E.13; Sze 2020; University of New Mexico 2010; Van Citters et al. 2009:34; Wilson 1997:281–282, 284). As remarked by architectural and landscape historian Chris Wilson (1997:282), "The formulation of the Territorial Revival quickly became the unofficial style of the state of New Mexico, not under the direction of Meem or Street, but rather in the hands of a new Santa Fe firm, Kruger and Clark."

The Manhattan Project's first construction contractor for the Laboratory, the M. M. Sundt Company, hired the W. C. Kruger Company in 1942 to design the original Project Y facilities and prepare the townsite's master plan. A committee, comprising Kruger, Samuel Allison (Chicago Metallurgical Laboratory), Oppenheimer, Groves, and Elmo Morgan (U.S. Army Albuquerque Engineer District), designed the Main Technical Area. With a contract approved on December 23, 1942, Kruger's first tasks were to complete the design drawings of the metallurgical buildings, adapt standard military plans for other buildings—originally developed by the U.S. Army's agent for managing the atomic energy project Stone and Webster—and prepare plans for utilities and streets and for rehabilitating the Los Alamos Ranch School buildings. The firm was to complete this first set of tasks in just a few weeks, by January 15, 1943. The U.S. Army extended the short deadline by two weeks until the end of January through a contract modification signed on January 14 (Carr 2020b; Chambers 1974; Hawkins 1961:68; Hoddeson et al. 1993:62; Jones 1985:56, 466–467; Machen et al. 2010:8; Martin 2000:8; McGehee et al. 2003:7, 2009:20, 2010:55–56; Mead 2020; Paxton, n.d.; Truslow 1973:10; Wirth and Aldrich 2003:160–161). Laboratory historian Ellen D. McGehee and others (Paxton n.d. in 2010:56) related, "The story is told that Kruger would pick up Oppenheimer early in the morning, buy him cigarettes, and then find General Groves camped on his office doorstep, irate because they were five minutes late. This was after having worked until two or three a.m. the previous night."

This first contract between Kruger and the Manhattan Project was only the beginning of what would become Kruger's long involvement in creating the physical structure of the town of Los Alamos. The rate of construction accelerated over the next 3 years, as the Laboratory's population grew from 200 in July 1943 to nearly 6,000 in August 1945. Nonetheless, 1943 was surely the most intensely active year of the relationship, characterized by the urgency of the race to build an atomic bomb. In June, the U.S. Army tasked Kruger with designing dormitories, apartments, and more technical buildings. In July, he was asked to

- design more dormitories, seven buildings for the Anchor Ranch site, a school building, and an expansion for D Building (the Laboratory's first plutonium-processing building);
- remodel the Los Alamos Ranch School's Arts and Crafts Building for the new Commanding Officer, the commissary, Spruce Cottage, and the guard house;
- enlarge the boiler house and the mess hall; and
- prepare plans for a detector and floodlighting system.

In December, the U.S. Army tasked Kruger with designing additional high-explosives facilities at S-Site. Kruger would continue to work in the Los Alamos townsite and Laboratory with subsequent construction contractors, including J. E. Morgan Company and R. E. McKee (Hawkins 1961:68; Machen et al. 2010:8; McGehee et al. 2003:7, 2010:56–57; Mead 2020; Paxton, n.d.; Truslow 1973:10).

Drawings on file at the Laboratory indicate that the W. C. Kruger Company and subsequently W. C. Kruger and Associates designed numerous Manhattan Project buildings and structures, including facilities at the following locations:

- Omega Site (TA-02)
- Two Mile Mesa Laboratory (TA-06) (including the Concrete Bowl)
- Gun Site (Anchor Ranch West or TA-08)
- Anchor Ranch East or Anchor HE Site (TA-09)
- Bayo Canyon Site (TA-10)
- K Site (TA-11)
- L Site (TA-12)
- P Site (TA-13)
- Q Site (TA-14)
- R Site (TA-15)
- S Site (Sawmill Site or TA-16)
- Pajarito Laboratory (TA-18)
- East Gate Laboratory (TA-19)
- Sandia Canyon Site (TA-20)
- DP Site (TA-21)
- Trap Door Site (TA-22) (including the Quonset Hut)
- V-Site (TA-25)
- Magazine Area A (TA-28)
- Magazine Area B (TA-29)

Kruger, as the director of Associated Architects–Engineers, also submitted an interim report to the AEC in December 1947 on the reconstruction of TA-01. Describing the construction of new buildings on South Mesa and the decommissioning of existing TA-01 buildings around the Ashley Pond pond, Kruger provided a campus plan that included a general site plan, a discussion of access roads, a study of building types, and a 5-year budget.

Kruger's notable townsite designs included the Community Center (shopping mall) and the Fuller Lodge expansion, both completed in 1948. Other designs included new housing (including the Western Area), recreation facilities, a telephone building, the post office, a trailer camp, the high school, the civic auditorium, and the hospital (and subsequent remodels), churches, and additional school facilities (see Appendix A; Kruger 1947; McGehee et al. 2010:59; Mead 2020; Spears Architects 2013:9; Storms 1966:22).

It is worth noting that Kruger and Meem had emerged as rivals in the late 1930s. The Manhattan Project initially offered Meem, architect and designer of the Los Alamos Ranch School, the work at the Los Alamos townsite and Laboratory. Told that it was a "little job," Meem chose the larger job of a U.S. Army Air Corps flight academy in Roswell, New Mexico, instead (Wilson 1997:282; Wirth and Aldrich 2003:160–161). Los Alamos historians John D. Wirth and Linda Harvey Aldrich (2003:161) noted, "And so this top-secret work at the ranch went instead to Willard Kruger, a politically astute young architect who in subsequent years designed much of the new Los Alamos."

Kruger organized W. C. Kruger and Associates in 1946 and served as the company's first president. Note that some 1947 plans are still attributed to W. C. Kruger Company. Using Kruger's political savvy and state government experience, the firm would employ the Territorial Revival style in new designs and renovations for numerous state government buildings (see Appendix A). Notably, W. C. Kruger and Associates completed a Territorial Revival–style remodel in 1954 of the ca. 1900 Neoclassical-style state capitol and was awarded the contract to design the new state capitol in 1963. For the latter, it is important to note that the newly elected governor threw out the capitol master plan by Architects Associated—a collaborative partnership of Santa Fe architects that comprised John P. Conron, David de R. Lent, and Robert Pletttenberg—and hired W. C. Kruger and Associates. The firm departed from their usual Territorial Revival style and initially designed a low, flat, round building that was inspired by both the New Formalism style and a *kiva* (a ceremonial building of the local Pueblo peoples). Upon the release of the design, there was a large public outcry. Responding to the criticism, Kruger brought Meem on board for a redesign; the final design was Territorial Revival in style (Kammer 2007:8.11; Koyl 1955:313, 1962:120, 396; LANL drawings on file; Pratt 1989:12; Price 2000:368–370; Raymond and McCullough 2009:E.3; Wilson 1997:283–284, 288–290). The New Mexico Society of Architects, AIA (1986:9), reported 20 years later, "By ignoring the plan, its recommendations and guidelines we have the much loved Roundhouse."

Historian Boyd C. Pratt (1989:12) explains that Kruger's firm was awarded many government commissions because they had proven they could design and supervise the completion of large, complex projects on schedule. Regarding assertions of favoritism, historians Gerry Raymond and Kirsten McCullough (2009:E.21) shared, "So while Kruger may have gained favor through his personal relationships with state officials, campaign contributions, and hunting and fishing trips to his cabin in the Pecos, he also proved his value as a successful architect and businessman who provided quality work to his clients." W. C. Kruger and Associates hired several distinguished architects throughout its history, including (in alphabetical order) Rembert C. Alley, Robert Graef, J. W. Keeran, Robert H. Krueger, Norman Meckliem, J. W. Savage, Marion C. Smith, and D. W. Tinkham. In 1953, 1957, and 1961, W. C. Kruger and Associates was listed as a principal architect-engineer on AEC projects, and from 1967 to 1969, the firm was listed in the National Directory of Architectural, Engineering and Consulting Firms with Certified Fallout Shelter Analysts. At its peak, the firm had offices in Santa Fe and Albuquerque, New Mexico; Phoenix, Arizona; and Los Angeles, California. W. C. Kruger and Associates would continue designing properties in the Los Alamos townsite and Laboratory at least through 1970 (see Appendix A) (AEC 1953:Appendix B:3; DoD 1967:88, 1968:92, 1969:95; Legacy 2020; Raymond and McCullough 2009:E.21; U.S. Bureau of National Affairs 1962:59; U.S. Congress, House 1957:528; University of New Mexico 2010).

Kruger supported the AIA throughout his lifetime. He joined the New Mexico Chapter in 1945, served as its president in 1955, and worked on the Chapter Objectives Committee in 1960 with other well-known New Mexico Architects, including his former partner Clark, and Maxwell Flatow and Meem. Kruger was a corporate member of the AIA New Mexico Chapter (1960–1963), a corporate member of the New Mexico Society of Architects, Santa Fe AIA Chapter (1965–1977), and a member of the New Mexico Society of Architects, Santa Fe AIA Chapter (1980–1983). He held a National Council of Architectural Registration Board Certificate and was registered to practice in New Mexico, Arizona, Colorado, Texas, and Washington (Koyl 1955:313, 1962:120, 396; New Mexico Chapter, AIA 1960a:11, 14, 1961a:5, 1963a:5; New Mexico Society of Architects, AIA 1965:8, 1966a:9, 1967:11, 1968a:11, 1969a:17, 1970a:11, 1971:9, 1973:15, 1974:15, 1976:13, 1977:13, 1980, 1982, 1983).

Kruger was both community minded and civically engaged during his career. His government appointments included the following:

- New Mexico State Planning Board (1934–1936, 1943–1944, 1948; secretary in 1948)
- New Mexico State Housing Authority Board (1941–1944; secretary in 1941–1942)
- New Mexico State Board of Examiners of Architects (secretary in 1936–1950)
- National Council of Architectural Registration Boards (New Mexico secretary in 1939–1942)

His other civic and community engagements included the following:

- Santa Fe National Bank (chairman of the board ca. 1949–1955)

- Santa Fe Sheriff's Posse (president in 1955)
- St. Vincent's Hospital Advisory Board (chairman in 1954–1955)
- Santa Fe Rodeo Association (charter member and director in 1955)
- Santa Fe Country Club (member in 1955)
- First New Mexico Small Business Investment Company (president in 1963)
- New Mexico State Racing Commission (member in 1971)
- St. Joseph Hospital (board member, date unknown)
- Sandia School (trustee member, date unknown)
- Devereux Foundation for Retarded and Disturbed Children in Santa Barbara, California (board member, date unknown)

Kruger was a prolific investor and served on numerous boards associated with banks, realty, insurance, hotels, and racetracks. He also ran a philanthropic foundation, the W. C. Kruger Foundation, from 1974 to 1985. Kruger died on June 5, 1984 at the age of 73, after a lengthy battle with cancer (American Society of Planning Officials 1943:21; Kammer 2007:8.11; Kelley 1963:101; Koyl 1955:313, 1962:396; New Mexico Society of Architects, AIA 1985:5; Raymond and McCullough 2009:E.22–E.23; State of Arizona 1939:36, 1940:37, 1941:35, 1947:34, 1948:34; State of New Mexico 1938:22, 1942:39–41, 1944:115–118, 1948:124–125; U.S. Congress, House 1954:739; U.S. Internal Revenue Service 1974:441, 1976:986, 1981:555, 1982:558, 1983:528, 1984:609, 1985:635; University of New Mexico 2010).

Kruger and his firms would receive four awards/honors for designs during his career. The first came before 1955 and consisted of an honor from the USACE Manhattan Engineer District for his work in 1945 and 1946 on the "Atomic Bomb Project" at the Laboratory (Koyl 1955:313). In 1969, the Alumni and Friends of the Department of Architecture at the University of New Mexico presented W. C. Kruger and Associates an award of merit for the Indian Memorial Park in Gallup, New Mexico. The jurors appreciated the firm's appropriate, yet imaginative, architectural expression and the "skillful resolution of complex problems in site planning, the visual interest of massive building shapes and the use of compacted earth as a building material suitable to the site" (New Mexico Society of Architects, AIA 1969b:15). In 1970, the Albuquerque Chapter of the AIA bestowed W. C. Kruger and Associates a merit award for the Public Service Company of New Mexico (or PNM) building in Albuquerque. The judges lauded it for its simplicity, functionality, and clearly expressed structural system (New Mexico Society of Architects, AIA 1970b:9). In 1978, the AIA bestowed the firm with a merit award for the Humanities Building at the University of New Mexico in Albuquerque. Judges criticized the design for its interior, "With each floor a different color, the interior is early 'Holiday Inn,'" but complimented it for its siting and functionality (New Mexico Society of Architects, AIA 1978:11).

According to the AIA, Kruger's works included residential, commercial, religious, educational, health, penal, public, military, scientific, and mortuary. In 1955, the AIA listed HRL as a principal work. Of the more than 100 known constructed works of W. C. Kruger Company and W. C. Kruger and Associates, 10 are listed in the NRHP and/or the State Register of Cultural Properties (see Appendix A). Raymond and McCullough (2009) and the University of New Mexico (2010) provide the most complete lists of all designs; however, it is unclear which designs were actually constructed. In 1987, W. C. Kruger and Associates donated 50 years (1937–1987) of architectural drawings, photographs, and other records from approximately 1,000 projects to the University of New Mexico in Albuquerque (held in today's Center for Southwest Research) (Koyl 1955:313, 1962:120, 396; New Mexico Society of Architects, AIA 1987:6). As noted by the University of New Mexico (2010), "He [Kruger] left an impressive legacy by directing one of the largest and most successful architectural/engineering firms ever assembled in New Mexico."

Philippe de Montauzan Register, Santa Fe, New Mexico

Philippe Register designed the 1975 laboratory-office addition to HRL. An acknowledged proponent of regional architecture in New Mexico, Register (1960:10) wrote,

> To my way of thinking, the elements of climate, sun, and wind should be the determining factors in the design of our structure. Good regional designing is cognizant of these elements. The fact that these buildings may or may not resemble the architectural styles of the past has relatively little to do with their regional characteristics.

Born in in Haverford, Pennsylvania, on December 13, 1921, he spent his youth in both Philadelphia and France. Register received a Bachelor of Engineering, in which he specialized in mechanical engineering, from Yale University in 1943. After graduation, he joined the U.S. Army Air Forces and served through 1945. That same year, he married Marcia Jean Morgan, and by 1955, they had two children. In 1950, Register received a Bachelor of Architecture from the University of Pennsylvania, started as a drafter with Louis G. Hesselden (1950–1953), and received a medal for Excellence in Architecture from the AIA Philadelphia Chapter. By the early 1950s, Register had settled in New Mexico and received his second and third awards, a first prize and honorary mention in the Small Homes Competition sponsored by the New Mexico Concrete Products Association (Gane 1970:751; Garcia 2006; Koyl 1955:455, 1962:578; Weidman 2018).

In New Mexico, Register worked as an architect for Flatow and Moore (1953–1955) and then for Clark in 1955. He then partnered with Clark, and they designed as Clark and Register from 1956 to 1960. Like Kruger, Register was also very active in the AIA. He was vice president of the New Mexico Chapter and chair of the editorial board of *New Mexico Architect* in 1959 and then served as president of the New Mexico Chapter and worked on the magazine committee from 1960 to 1961. Register opened his own architectural firm in Santa Fe in 1960. Subsequently, he joined Architects Associated and won first award from the New Mexico Chapter of the AIA in 1962 for their Proposed Plan for the New Mexico State Capitol. Unfortunately, the succeeding governor disregarded their award-winning plan and hired W. C. Kruger and Associates to build the new state capitol (Gane 1970:751; Koyl 1955:455, 1962:578; Moore et al. 2010:85; New Mexico Chapter, AIA 1959:4, 1960b:3, 1960c:6, 1961b:3, 1963b:20; Wilson 1997:287–288).

From 1968 to 1970, Register teamed with Terence W. Ross and James A. Brunet to design as Register, Ross and Brunet. Subsequently, Register served on the New Mexico State Board of Examiners of Architects (1969–1971) and as the honorary French consul for New Mexico (1976–1990). Register was a licensed engineer; a registered architect in New Mexico and Arizona; and was known for his residential, religious, and educational designs. His principal works included the master plan and design of most of the buildings on the St. Michael's College (College of Santa Fe, and then the Santa Fe University of Art and Design) campus in Santa Fe (1961–1968), Fairview Elementary School in Espanola (1965), the Spencer Residence in Santa Fe (1968), and the Highlands University High-Rise Dorm in Las Vegas (1969). He remarried in 1995 to Santa Fe artist Jody Le Cher and died in 2006 at the age of 84 (Gane 1970:751; Garcia 2006; Koyl 1955:455, 1962:578; New Mexico Chapter, AIA 1960c:6, 1964:11; Weidman 2018). Noted by journalist Brandon Garcia (2006), "Beverley Spears, an architect who knew Register for three decades, said his work was respectful of traditional Santa Fe architecture, but simultaneously modern."

Clark, Arrison, Germanas, Architects, Santa Fe, New Mexico

Clark, Arrison, Germanas, Architects designed the 1977 office and computer room addition. Comprising Clark, John B. Arrison III, and Kestutis Germanas, the firm originated in October 1975 and operated through approximately 1978. Clark was born in Lamont, Oklahoma, on January 21, 1909. He received a Bachelor of Architecture and Structural Engineering and a Master of Architecture and Architectural

Engineering and Master of English from Oklahoma A&M College (present-day Oklahoma State University) in 1932 and 1933, respectively. Clark married in 1936 and had three children by 1955. He worked as the Assistant State Architect for the WPA from 1935 to 1938 and served in the U.S. Army Reserve from 1936 to 1942. His partnership with Kruger (as Kruger and Clark) from 1937 to 1942 was extremely successful, as discussed above. Clark left the firm to join the U.S. Army Air Forces, where he stayed until 1946. He established his own firm in 1950 in Santa Fe, partnered with Register from 1956 to 1960, and re-established his own firm in 1960 (Gane 1970:159; Koyl 1955:97, 1962:120; Moore et al. 2010:85; New Mexico Society of Architects, AIA 1966b:20; *The New Mexican*, 12 October 1975:20, 19 February 1978:8).

Clark had a distinguished independent career. As holder of a National Council of Architectural Registration Board Certificate, he was registered to practice in New Mexico, Arizona, and California, and he was a licensed engineer. The AIA reported that his designs included residential, commercial, industrial, educational, health facilities, penal institutions, public buildings, military structures, transportation facilities, scientific structures, and city planning. Clark's principle works included the Dendahl residence in Santa Fe (1952); buildings at Sandia Base in Albuquerque (1954–1960); the New Mexico School for Deaf campus in Santa Fe master plan and several buildings (1954–1965); and hospitals and guided-missile and aircraft technical and instrumentation facilities at White Sands Missile Range (formerly White Sands Proving Ground) and Holloman Air Force Base (1951–1965). Notably, Clark also designed the satellite radiation exposure facility in TA-51 (1962) used by the H-4 Biological and Medical Research Group. Clark's professional honors included an Alpha Rho Chi Medal for Professional Achievement in 1933 from the National Professional Fraternity for Architecture and the Allied Arts, an AEC Los Alamos Achievement award, and a Department of the Army Certificate of Civilian Service in 1960 (Gane 1970:159; Garcia et al. 2015a:Appendix A; Koyl 1955:97, 1962:120; New Mexico Society of Architects, AIA 1966b:20).

Like Kruger and Register, Clark was also civically minded. He too served on the New Mexico State Board of Examiners of Architects (secretary in 1952–1961). Exercising his planning skills, he served for more than 15 years on the Santa Fe City Planning Commission (chair in 1952–1969). Other engagements included the following:

- St. Johns Methodist Church (chairman of the board of trustees in 1953–1955)
- Santa Fe Kiwanis Club (member ca. 1950–1966; president in 1954)
- Kiwanis International (lieutenant governor of Southwest district in 1958)
- Santa Fe Chamber of Commerce (board member in 1954–1956; treasurer in 1954–1955)
- Santa Fe United Fund (chairman in 1959)
- House of St. Luke (board member, date unknown)
- Mayor's Special Committee for Juvenile Detention Facilities (secretary, date unknown)
- United Fund of Santa Fe County (chairman, date unknown)

Clark, a lifetime member of the AIA, supported the organization at the local, regional, and national levels. He began as a charter member of the New Mexico Chapter in 1945. Locally, he served as chapter secretary (1947–1950), vice president (1951), president (1952 and 1956), a member of the Chapter Objectives Committee (1960), and a member of the Associated General Contractors Committee. For the Santa Fe Chapter, he served on the Institute Memorial Commission (member in 1950–1952; chair in 1951), on a research committee (1954–1955), on the board (1967–1969), and as the secretary-treasurer (1976). Clark served as the Regional Convention treasurer in 1954 and at some point on the Regional Judiciary Committee. He worked at the national level on the Membership Committee (1953 and 1956), on the Member Specifications Committee (1965–1967), and for the Architectural Building Information Services. The AIA bestowed their highest honor on him in 1966, naming him to the College of Fellows.

He served as the president of the New Mexico Society of Architects in 1968 and as a board member in 1969. Clark died in 1990 (Gane 1970:159; Koyl 1955:97, 1962:120; New Mexico Society of Architects, AIA 1966b:20; 1976:13).

There is little published information about Arrison, Germanas, or the firm. Arrison was a member of the AIA from 1966 to 1973 and in 1975. He served with Clark in the New Mexico Society of Architects in 1968, when Clark was president, and he worked as a member of the magazine commission. Arrison then served as president of the New Mexico Society of Architects in 1972. Germanas has been a member of the AIA since 1974. He served on the board of the New Mexico Society of Architects in 1979 and as president in 1980. He still practices architecture today (Hadley 2018, 2019; New Mexico Society of Architects, AIA 1968b, 1972:9, 1979:3, 1980).

Holmes and Narver, Albuquerque, New Mexico

Holmes and Narver designed the 1990 laboratory addition that the Laboratory completed in 1991. Originated in Los Angeles, California, in 1933, James T. Holmes and David Lee Narver established the firm. During World War II, the U.S. Army commissioned them to construct U.S. military installations around the world. Subsequently, they designed and constructed numerous facilities at Naval Air Weapons Station China Lake in California; designed Air Force Plant 42 in Palmdale, California, for the SR-71 aircraft; and master planned U.S. bases in Okinawa, Japan, during the Cold War. Notably, they designed the testing facilities at Enewetak Atoll and constructed testing facilities in Nevada for the AEC. Although Holmes died in 1977 and Narver passed away in 1984, the firm continued to operate as Holmes and Narver through the 1990s. The firm was subsequently acquired by DMJM and then AECOM (Moore et al. 2010:189–190).

Flatow Moore Shaffer McCabe, Albuquerque, New Mexico

Flatow Moore Shaffer McCabe designed the 1997 biophysics laboratory addition. Flatow arrived in New Mexico in 1945 as a Lieutenant in the USACE. Serving as the architectural superintendent of construction, he managed the Manhattan Project construction activities in Los Alamos. Flatow moved to Albuquerque in 1947 and started his own firm, Max Flatow, after leaving the service. His first projects included Federal Housing Authority–financed houses and small commercial buildings. Garlan D. Bryan, Jr., joined the firm in 1947; Jason P. Moore joined in 1948; and Robert M. Fairburn joined in 1949. One of Flatow's early achievements was setting up an ownership corporation and designing Medical Arts Square in Albuquerque in 1949. The first of its kind, it consisted of a medical office complex owned by physicians. In 1952, the firm began operating as Flatow and Moore and then as Flatow, Moore, Bryan, and Fairburn (FMBF) in 1954. By this time, the firm had completed more than 100 projects, including several at the Laboratory and Sandia Base. They were best known for the Simms Building in Albuquerque. Listed in the NRHP, it was unique for its façade of aluminum and glass, its heat-exchange system using two water wells, its raft-slab and pile foundation system, and being the tallest building in New Mexico upon its completion in 1954 (Hooker 1988:11–12).

The firm grew swiftly in the 1950s, designing facilities or developing master plans at more than 30 military bases and scientific facilities. This work included master planning for Sandia Laboratory (formerly Sandia Base; present-day Sandia National Laboratories) and designing laboratory testing facilities at the Laboratory. They also designed hospitals in Farmington, Las Vegas, and Gallup. During the 1960s, they developed a long-lasting relationship with the Del Webb Corporation, building commercial buildings in Phoenix, Arizona; Denver, Colorado; Houston, Texas; and Fresno, California. One of their most influential designs of this decade was the College of Education complex at the University of New Mexico, where they continued to design facilities through the 1970s. In 1964, the firm incorporated and established a second office in Phoenix; in 1971, the firm operated as two corporations with one in Albuquerque and one in Phoenix; and in 1974, the firms separated, leaving Flatow, Moore, Bryan, and Associates in Albuquerque (Hooker 1988:12–14).

The firm continued to design new hospitals and additions to existing ones in New Mexico, Arizona, and Texas. They also designed hotels, motels, and resorts. For the firm, the 1980s brought diversification. They developed one of their most complex designs, the Intel microchip manufacturing plant in Rio Rancho, New Mexico; one of their best designs, the Middle School at Albuquerque Academy; and the largest church in New Mexico, Hoffmantown Baptist Church in Albuquerque. Along with other partners, sons Tobias Flatow and Jon Moore purchased the firm in 1984 from their fathers and changed its name in 1985 to Flatow, Moore, Bryan, Shaffer, McCabe, Inc. Son of a general contractor, Rusty Shaffer had joined the firm in 1965 and focused on management and quality assurance and control. Robert R. McCabe had joined the firm in 1973 with a strong background in planning. He established the architectural "studio" concept of management within the firm. Bryan retired from the firm in 1991. Throughout the firm's history, employees actively participated in professional and civic organizations, including the AIA. Jason Moore passed away in 2000, the firm closed in 2002, and Maxwell Flatow died in 2003 (Chavez 2003; Hooker 1988:14–17; Jojola 2010).

Architectural Styles

The U.S. Army and its contractors designed the Laboratory during and immediately after World War II. Succeeding federal agencies (AEC, ERDA, and DOE) and their contractors fashioned the Laboratory throughout the Cold War. The Laboratory is a government institution; as such, observations from military architecture studies are applicable to the architectural context of the Laboratory. Military-architecture researchers Heather McDonald and Michelle Michael (2008:59) divided military architecture into "military acquired" or "military constructed." The former is an excellent descriptor for the U.S. Army's acquisition and reuse of the Los Alamos Ranch School buildings to initiate the Laboratory.

Historian Stephen D. Mikesell best described military-constructed facilities. He observed that during the Cold War, the military followed two opposing trends regarding the design and construction of the built environment. They both relied on temporary and semipermanent facilities for most purposes, and for other purposes, "built some of the most permanent structures imaginable" (Mikesell 2000:8.53–8.54). For the former, one of the most common building types from the 1950s is a prefabricated metal shed, often called a Butler-type building—the Butler Manufacturing Company designed many of them. Although the design originated during World War II, the Cold War–era generation of these buildings was pre-engineered rather than prefabricated, could be used for almost any purpose, and could be built to any configuration. In contrast, the military built permanent facilities to very high standards, not because they necessarily encompassed important work but because the military intended to use them for a long time. Additionally, the military sacrificed ornament to save time and money. These facilities were designed by both military and contractor architects and engineers and reflected standardized plans or new designs for specific facility types (Hampton 2012:4–5, 36; McDonald and Michael 2008:61; Mikesell 2000:8.54, 8.57).

With respect to architectural style, military architectural designs reflect the popular planning and architectural trends of their day, accommodate the needs of the specific service, demonstrate a sense of uniformity, exhibit regional variations and character, and respond to the local climate conditions (Michael and Smith 2011:59–60). Aesthetic elements of architectural design can be difficult to interpret for military architecture, but McDonald and Michael (2008:57) maintained that most facilities usually exhibit a particular architectural influence that "is evident in its shape, materials, details and other features that distinguish one building from another." Regarding the temporary and Butler-type buildings, McDonald and Michael (2008:61) explained that these types of buildings are not represented by an architectural influence or style; "in these cases, the buildings still have character-defining features but those features are associated with the building type rather than an architectural influence." These facilities are utilitarian in character.

W. C. Kruger and Associates designed and constructed the HRL complex after World War II, when the United States' cultural tastes began to change. Emerging from the war as the political and economic leader of the Western world, the United States was setting trends in music, fashion, and architecture, rather than following European ideas. Architects abandoned architectural styles of the past and embraced the emerging style of postwar Modernism, or International Modernism. Symbolizing a break from the past, this architectural style featured the regularity of repeating elements, austerity and simplicity, and careful proportions. Predominant from 1945 to 1973, International Modernism was forward looking, conveyed an architectural expression for the new age, stressed rational and efficient building technologies, and rejected applied ornamentation. Dominating the landscape of the United States, International Modernism was pervasive and extended beyond our borders to the rest of the world. Stylistic influences from International Modernism were common in military and industrial architecture constructed into the twenty-first century. Character-defining architectural features of the International Modernist style include geometrical massing, design regularity, lack of ornament, a flat roof, exposed concrete or concrete masonry unit- (CMU-) walls, exposed siding, continuous surface planes, windowless walls, and unornamented doors and windows. The TA-43 facilities under study exhibit many of these features (Gelernter 2001:260–261; Hampton 2012:47; Hitchcock and Johnson 1966; McDonald and Michael 2008:84–86; Michael and Smith 2011:70–71).

Historic Context

Early Health Division and HRL Tenant History

Early Health Division History

The Health Division was borne of the Safety Committee established in November 1943, when Oppenheimer required administration assistance. Initially chaired by Louis H. Hempelmann, M.D., the Safety Committee would function through January 1946. In July 1944, administration activities were organized into numbered groups under the Administrative (A) Division. Administrative Division Group 6 (A-6) was established to oversee Health, Maintenance, and Patent Office Groups, and Hempelmann was its first and only Health group leader. In March 1945, the Laboratory established the Safety Office Group (A-12) under Group Leader Stanley H. Kershaw, formerly of the National Safety Council, to take over the functions of the Safety Committee. In December 1945, Health became its own group (A-10) and was the only one reporting directly to Oppenheimer. The U.S. Army established it to protect the health of the workers; develop safe working procedures; and establish tolerance levels for exposure to radioactive materials. Initially led by James F. Nolan, M.D., it was subsequently led by Harry O. Whipple, M.D., and then Hempelmann. The group absorbed a team that set exposure limits for plutonium authorized by Oppenheimer in 1944 and began the Laboratory's biomedical research program. Then called the Biochemistry Section, this team moved into its own building and established a urine assay procedure for plutonium workers in 1945 (Carr 2020a; Carr and Meade 2006; Richmond and Sullivan 1974:xvii; Truslow and Smith 1961:25–26, 39, 187).

The Laboratory gradually dissolved the Administrative Division between 1945 and 1950, as it established new divisions to carry out specific activities. The Atomic Energy Act transferred authority from the U.S. Army to the AEC on August 1, 1946. Notably, Eric Jette, division leader of the Chemistry and Metallurgy (CMR) Division, was an early advocate for a Health Division at the Laboratory, even sending Bradbury a memo in 1946 requesting its establishment and providing an organizational chart. In May 1947, the Laboratory established a Health Division, with Hempelmann as its division leader and Langham as its alternate division leader. Initial groups comprised the Administration Group (H-1), Industrial Health

Group (H-2), Trainee Program Group (H-3), and Radiobiology Group (H-4) (Carr 2020a; Carr and Meade 2006; Fehner and Gosling 2006:29; Shipman 1969:29–31).

In mid-1948, the Health Division underwent organizational change. The Administration Group was disbanded and replaced by the Radiological Safety Group (H-1). The name of the Industrial Health Group was changed to the Occupational Health Group (H-2). The Trainee Program was disbanded and replaced by the Safety Group (H-3). Thomas L. Shipman, M.D., PhD, came to the Laboratory in November 1948 as Health division leader. He changed the name of the Radiobiology Group to the Biomedical Research Group (H-4). Also in this year, Bradbury combined all of the electronics shops across the Laboratory into one division and transferred most of the Health Instruments Group (CMR-12) to the Health Division. Shipman subsequently created the Industrial Hygiene Group (H-5) that same year and the Special Monitoring Group (H-6) in 1951 (Carr 2020a; Carr and Meade 2006; Shipman 1969:29–30). Shipman (1950:3) described the philosophy of health at the Laboratory in 1949, shortly after his arrival:

> Health service at Los Alamos started out entirely as a means of protecting the workers and preventing injuries. Gradually and inevitably the concept of "health" broadened as it was realized that general matters of physical and mental well-being were matters of importance in the relationship between the worker and the work he was doing. The end of the war and the subsequent transition from Manhattan District to AEC left the health and medical services certainly in no less a turmoil than the rest of the Laboratory. Out of this turmoil, however, emerged an even broader concept of health service—the realization that it was not a static matter and that it was constantly undergoing change and development. Greater emphasis was placed on the research aspects of the work, first from a programmatic point of view and, later, with increasing interest in fundamentals.

Biomedical research was born out of necessity during the Manhattan Project period as an essential support group to the weapons program. However, by the late 1940s, the Health Division had made numerous contributions to the general body of biomedical knowledge and gained its independence as an important field of study, just like physics, chemistry, and metallurgy (Shipman 1950:7).

Early Visionaries

Louis H. Hempelmann, M.D.

A doctor's son, Hempelmann, received a medical degree in 1938 from Washington University in St. Louis, Missouri, and completed an internship in pathology. Subsequently, he joined the Mallinckrodt Institute of Radiology at his alma mater, where they were developing a cyclotron for medical uses. Hempelmann then spent 4 months at the University of California, Berkeley, as a Commonwealth Fellow to work with their cyclotron on radiotherapy under John H. Lawrence, M.D. Although Hempelmann and Oppenheimer had met at Berkeley, it was Lawrence who suggested Hempelmann to Oppenheimer during his recruiting efforts for Manhattan Project personnel. Hempelmann arrived in Los Alamos on March 24, 1943, and began at the Laboratory, where he was one of only two medical doctors (Figure 3-16). Radiobiology research was assigned to other Manhattan Project sites, but the Laboratory at Los Alamos was already handling plutonium. The U.S. Army hired Hempelmann to provide health protection, and he acted quickly to develop hazard-reduction procedures and tolerance standards. Hempelmann did not feel that the blood profiles currently used to measure plutonium inhalation exposures were effective, so he developed the nose swipe and subsequently oversaw the development of a more sensitive urinalysis method. In 1944, he convinced Oppenheimer to approve a very small group to study the problem of plutonium exposures. Hempelmann also participated in the extremely controversial human plutonium experiments—readers are directed to *Los Alamos Science* 23 (Cooper 1995) for additional information on this subject. Before Hempelmann left the Laboratory in 1948, he oversaw fallout research for the 1945 Trinity test and conducted safety planning and monitoring for Operation Crossroads in the Pacific. He left the Laboratory to return to academia, at Harvard University and at the University of Rochester. He remained at the forefront of radiobiology research, published a study about the danger of fluoroscopes, and continued to work with Langham on plutonium-exposure studies of 27 laboratory workers (Atomic Heritage Foundation 2019a; Grilly 1995; Hempelmann 1986; Hoddeson et al. 1993; 104–105; Moss 1995; Moss and Eckhardt 1995:182, 202; Shipman 1969:5; Truslow and Smith 1961:42).

Harry O. Whipple, M.D.

Whipple held a Bachelor of Arts degree from Amherst College and received an M.D. from the University of Vermont in 1943. He started as an intern at a Cleveland, Ohio, hospital and came to the Laboratory in October 1944 as a First Lieutenant in the U.S. Army's Special Engineer Detachment assigned to Los Alamos (Figure 3-17). He began by working half of his time in general practice for Nolan at the Los Alamos Hospital and the other half in occupational medicine for Hempelmann. By 1945, he was a Captain and accompanied Hempelmann and others to investigate alleged damage to livestock after the Trinity test in July 1945. As noted above, Whipple was the second Health group leader (A-10), a role in which he served from March to August 1946. In 1947, he became the new Health Division's group leader for the Administration Group (H-1) and the Trainee Program Group (H-3), both of which the U.S. Army dissolved in 1948. Whipple was designated the alternate Health division leader in 1949 and remained in the role through 1973. In 1949, Whipple helped with physical examinations of staff, and he and Langham served as advisors to the Field Testing (J) Division activities at Enewetak Atoll. By 1952, he was assisting with the long-term study of Laboratory workers who had been exposed to plutonium during the Manhattan Project period. Before 1969, Whipple served as president of the American Industrial Hygiene Association. In the 1970s, he was the first chair of the Human Studies Review Committee (present-day Human Subjects Research Review Board) at the Laboratory. He served as the acting Health division leader in 1948 and from 1969 to 1970; the latter duty occurred after Health Division Leader Shipman's death. Specializing in industrial medicine, Whipple also served as the alternate group leader for Industrial Medicine (H-2) in 1953 and as the group leader from 1954 to 1974 (Atomic Heritage Foundation 2019b; Carr 2020a; Hempelmann 1947:67; Langham and Storer 1953:9; LASL 1950:6, 15, 1953; Petersen 1995; Shipman 1969:8, 29; Truslow and Smith 1961:39; Voelz 1995).

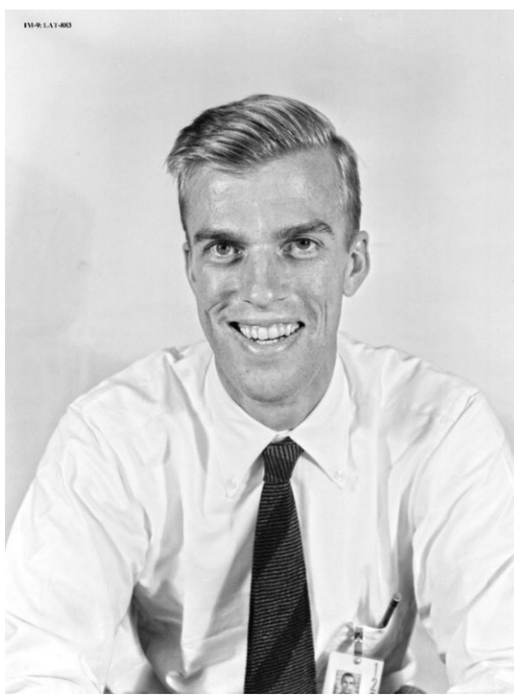

Figure 3-16. Louis H. Hempelmann, mid-to-late 1940s (LANL image, negative no. IM-9:LAT-0883).

Figure 3-17. Harry O. Whipple, June 25, 1969 (LANL image, negative no. LAT-7188).

Wright H. Langham, PhD

Langham was born in Winnsboro, Texas, on May 21, 1911, to a nonacademic and nonprofessional family. Putting himself through school, he attended Panhandle A&M College (present-day Oklahoma Panhandle State University) and received a Bachelor of Chemistry in 1934. He then attended Oklahoma A&M (present-day Oklahoma State University) and received a Master of Chemistry in 1935. After receiving a PhD in biochemistry from the University of Colorado in 1943, Langham spent a year at the University of Chicago Metallurgical Laboratory (present-day Argonne National Laboratory), working on the plutonium project. He came to the Laboratory at Los Alamos as a chemist in 1944 and worked with plutonium during the Manhattan Project period (*The Atom* 1971:20, 1972a:20; Moss and Eckhardt 1995:206). Coworker and biochemist William D. Moss (1995) told the story of Langham's jump to the Health Division:

> Hempelmann was giving lectures within the Laboratory about the risk of working with plutonium and the safety procedures to be followed in handling plutonium. During the course of one of these meetings, Hempelmann was giving the lecture, and Wright Langham, who had transferred to Los Alamos in August 1944, got up and made some comments to the effect that he didn't appreciate the biomedical research being done at Chicago. He thought it was misdirected. Hempelmann told me this story. He said [to Langham], 'Would you mind talking to me afterwards?' At this time, they were looking for somebody to head up the biomedical research program at Los Alamos. Hempelmann offered that job to Wright Langham at that time. Louis said [later], 'We had some heated discussion about which direction this should go, but we always kept ourselves on an even level of friendliness.' He persuaded Langham to join the medical group and to supervise the use of the plutonium [cupferron] procedure, including recognizing contamination problems, quality control measures, overspikes, blanks, and so on. Langham started his job in February of 1945. I have a copy of his notebook, and it says in there, the date is February 1945.

Langham began working with Hempelmann in the A Division, before the Health Division was established in 1947, and he became the alternate division leader and the H-4 Biomedical Research group leader. In

1953, Langham became the assistant division leader, and in 1971, he became the associate division leader (Figure 3-18). Langham tragically met a premature death with fellow Laboratory employees in a 1972 plane crash. He was a pioneer in the field of plutonium toxicology and an internationally recognized leader in radiobiology and radiation toxicology research. In his early years, he was one of a small group that developed the urine assay technique to measure plutonium exposures and examined samples from the human plutonium experiments. Called Mr. Plutonium, Langham developed the equation for describing the rate of plutonium excretion in humans through *in vitro* measurements after systemic uptake. Used at least through the 1990s, the equation provided very useful information for plutonium workers who might have gotten much more exposure than they realized. Langham also pioneered the first whole-body, radiation-counting equipment, or HUMCO, and participated in follow-up investigations on plutonium-exposure studies of 27 laboratory workers. Notably, he participated in nearly all of the toxicological work on plutonium and related elements for the Laboratory, Argonne National Laboratory, University of Rochester, and subsequently programs in Utah and at other laboratories (Anderson and Sullivan 1975:vii; Carr 2020a; Grilly 1995; Moss 1995; Moss and Eckhardt 1995:206; Shipman 1969:6; *The Atom* 1971:20, 1972a:20). Moss and science writer Roger Eckhardt (1995:206–207) stated,

> There is no major work in the field of plutonium toxicology that does not bear the hallmark of his work and ideas, either by direct contribution or by reference to his publications. No major incident involving plutonium contamination went without the benefit of his direct participation or consultation. He was in constant demand by both the military and the federal government in nearly every biomedical phase of the development of nuclear energy.

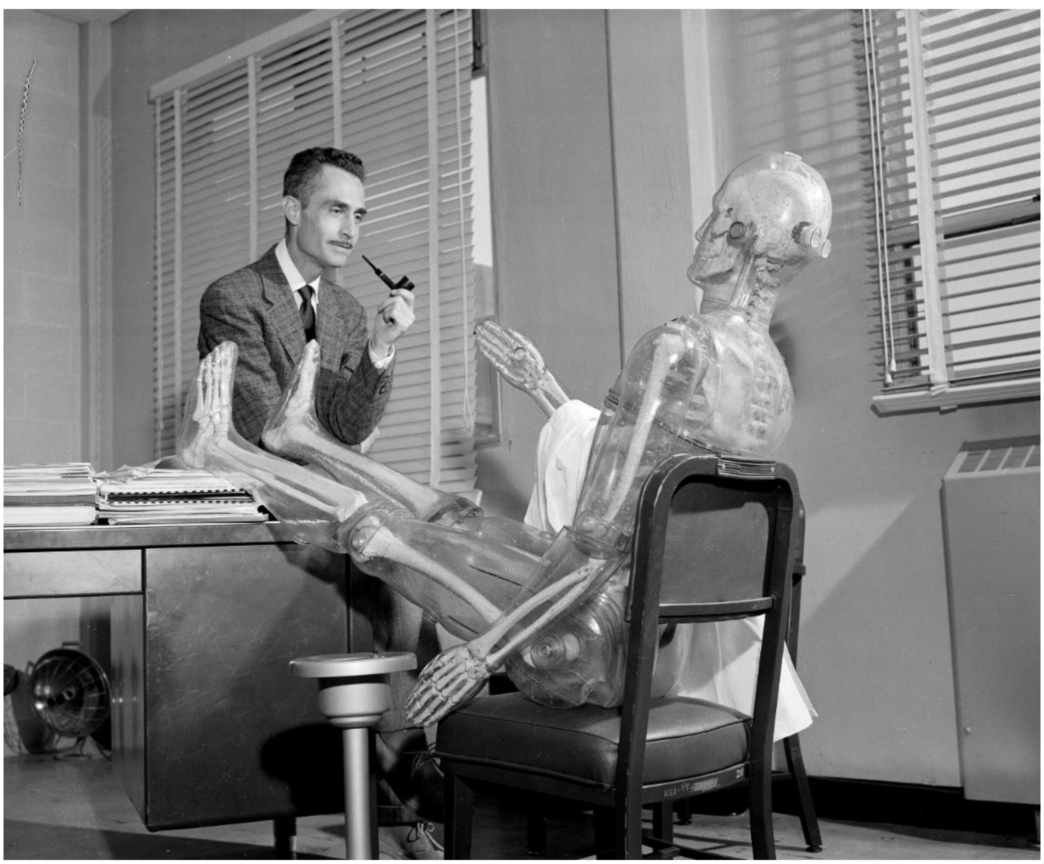

Figure 3-18. Wright H. Langham in HRL with Plastic Man, ca. 1959 (LANL image, negative no. P-59:LAT-03097).

In addition to all of his division management responsibilities, H-4 group leader duties, and principal investigator commitments, he conducted monitoring for Operation Crossroads in the Pacific and traveled to Palomares, Spain, in 1966 and to Greenland in 1968. These latter two trips were associated with the 1966 B-52G bomber and KC-135 tanker mid-air collision over Spain that released plutonium into the environment. To assist with the assessment, he had a whole-body counter shipped to Spain. Langham received a commendation from the DoD for his work on this incident. He was also a member of several advisory committees. He served as the chair of the National Council on Radiation Protection's Subcommittee on Relative Biological Effectiveness (1957–1960) and was a member of the Health Physics Society, serving on the board of directors (1958–1961) and as president (1968–1969). He also authored/coauthored numerous scientific papers and reviews. Langham was also directly associated with the nation's space program. He conducted investigations for NASA and the National Academy of Sciences Space Science Board and wrote the definitive volume on radiobiological factors in manned space flight (Grilly 1995; Moss and Eckhardt 1995:206–207; *The Atom* 1971:20, 1972a:20; Truslow and Smith 1961:42).

Langham was a driven and dedicated scientist. Politically astute and eloquent, he was good at getting funding for his team from the federal government (Grilly 1995). As remembered by former coworker and later Division Leader Donald F. Petersen (in Grilly 1995):

> . . . Wright was viewed as one of the chief problem-solvers. If you wanted a problem solved, you didn't go to Alex Hollaender, you went to Wright. And so, there was that fundamental difference between the Laboratories. Wright had the reputation of having not only the mindset, but the crew that would turn to on these special problems that the AEC had. And so, Wright was—Wright had that reputation that he would solve your problems, and they would turn to him time, and time, and time again. And they didn't turn to the other Laboratory Directors for those problems. They went to Wright.

Moss and Eckhardt (1995:207) shared, "As told by those who knew him, he would always champion the safety and health of the workers responsible for handling the new-age metal, plutonium." Assessing himself quite modestly, Langham wrote the following on a notepad during an interview: "As you can see, I have not made any great contributions to science. I have never been a scientific bride—so to speak—but I have been a bridesmaid at some of the biggest and most interesting scientific weddings in history." (Moss and Eckhardt 1995:206).

Thomas L. Shipman, M.D., PhD

With a 1928 doctorate from Yale University and a 1932 medical degree from Harvard Medical School, Shipman (Figure 3-19) began his career. After interning at the Boston Lying-In Hospital and at the Phillips House of the Massachusetts General Hospital, he spent 12 years overseeing the health and medical care of 35,000 employees at the General Electric Company in Lynn, Massachusetts. Shipman began at the Laboratory in November 1948 as a Health Division staff member and in 2 months, he became the division leader, a position he retained until his death in September 1969. At the time of his arrival, 75 people staffed the Health Division. During his tenure, Shipman supervised a wide variety of research programs, including those in health physics, industrial medicine, safety, biomedical research, industrial hygiene, radiological physics, and industrial waste disposal. He also directed numerous field studies at the Nevada Test Site (present-day NNSS). Shipman was a Fellow of the Industrial Medical Association and of the American Academy of Occupational Medicine and retained memberships and certifications from several other organizations (Carr 2020a; Shipman 1969:26–28; *The Atom* 1969:12).

Figure 3-19. Thomas L. Shipman, October 4, 1956 (LANL image, negative no. LAT-1646).

Harry F. Schulte

Schulte had a Bachelor of Science from Washington University and received a Master of Science from Harvard University in 1946. He came to the Laboratory in 1948 at the behest of Harriet Hardy, M.D., an occupational physician, and Professor Philip Drinker of the Harvard School of Public Health, who were assisting the Laboratory in improving its health and safety programs. The Laboratory brought Schulte onboard to start a program of industrial hygiene; to correct some of the ventilation concerns; and to assist Whipple, who had been a one-man group. Schulte became the H-2 alternate group leader and the CMR-12 acting group leader. He transitioned to the position of H-5 group leader in 1949. He retained the position until 1975, when he became an H-5 scientific advisor (1975–1977) and subsequently an H-5 consultant (1978–1979). Notably, Schulte and H-5 Alternate Group Leader Edwin C. Hyatt (Figure 3-20) were dissatisfied with the unspecialized respirators used by personnel working with plutonium. So they acted and brought about improved respirator design and testing. During Schulte's time at the Laboratory, he served as the president of the American Industrial Hygiene Association and received the Cummings Memorial Award for outstanding contributions to the knowledge and practice of the profession of industrial hygiene (Carr 2020a; LASL 1953; Petersen 1980:110; Petersen and Sullivan 1976a:15, 1977:37, 1978:41, 1979:37; Shipman 1969:23–24; *The Atom* 1965:3, 1972b:19).

Figure 3-20. Edwin C. Hyatt (left) and Harry F. Schulte (right) with respirator, November 1965 (LANL image, negative no. PUB-6150-36).

HRL Tenant History and Projects

Shipman recounted that the Health Division came of age in 1951, and "1952 should perhaps be regarded as a year of increasing maturity, of increasing realization of the responsibilities—and the limits of those responsibilities—of the Division to the Laboratory" (Shipman 1953:4). In 1953, one of Shipman's earliest desires came true with a new and permanent home for much of the Health Division staff (Shipman 1950:7). Conceived in 1947 and designed in close consult with Langham, the newly constructed HRL provided space for the following staff, who moved to the building in August 1953:

- H-4 Biomedical Research Group led by Langham,
  - Biochemistry Section
  - Radiobiology Section
  - Radiopathology Section
  - Organic Chemistry Section
- H-5 Industrial Hygiene Group led by Schulte,
  - Field Section
  - Laboratory Section
  - Test Operations Section
- Division Shop, and
- Division Property Section.

Intentionally sited next to the Los Alamos Medical Center, HRL provided a shared seminar room and a library for both hospital and Health Division staff (see Figure 3-1). Following earlier concerns about spheres of responsibility, Health Division physicians served as active or consulting members of the hospital staff, and hospital staff participated in Health Division research programs. HRL officially opened in October 1953, and Health Division staff hosted the Medical Advisory Committee of the AEC Division of Biology and Medicine and then held an open house for approximately 2,000 people (Shipman 1950:5; Shipman 1954:5–6).

The H-4 Group, established in 1947, focused its early efforts in the field of radiation protection. This work included conducting studies on the uptake, distribution, and excretion of radioisotopes by animals and humans. Established in 1949, the H-5 Group tackled the unique toxicological problems at the Laboratory at a time when the field of industrial hygiene was growing in nationwide importance. The H-5 Test Operations Section assisted with atmospheric testing in the Pacific. Soon after moving into HRL, the Health Division established the H-4 Biophysics Section to conduct diagnostic measurements of atomic detonations (LASL 1954:45, 51–52; Richmond and Sullivan 1974:xviii; Shipman 1954:11, 36–37).

It is important to note here that Bradbury (Laboratory Director, 1945–1970; Figure 3-21) strongly believed in encouraging scientific creativity and innovation. He provided an organizational environment where scientists focused on science, and managers contemplated budgets and regulations. This philosophy resulted in a freedom for scientists to initiate their own projects, an opportunity that Langham relished and seized. Bradbury noticeably lobbied Congress and the AEC to support the desired activities of the scientists. With this approach, the Laboratory chose many of its own priorities in its early years (Agnew and Schreiber 1998:7; Machen et al. 2010:70).

Figure 3-21. Norris E. Bradbury, ca. 1950s (LANL image, negative no. P-56:PUB-70220-1).

Achievements of HRL staff in the 1950s included

- continued radioisotope studies on mammals and humans;
- pioneered liquid scintillation counting and counting techniques;
- identified clinical applications of whole-body scintillometry;
- synthesized isotonically labeled organic compounds;
- used radioactive tracers in biology and medicine;
- monitored radionuclides from nuclear testing in food, mammals, and humans;
- administered fallout studies and off-site monitoring;
- measured space radiations;
- standardized analytical procedures for industrial hygiene laboratories; and
- critically evaluated all respiratory protective equipment used at the Laboratory (Figure 3-22).

Figure 3-22. Respirator testing by women of the H-5 Group in HRL, November 1965 (LANL image, negative no. PUB-6150-11).

Internal collaborators engaged by HRL staff during the 1950s included the Chemistry and Metallurgy Division's CMR-10 Bayo Laboratory Group, Chemistry-Metallurgy Division's CMB-6 Materials Technology Group, Engineering Department, Engineering Division's ENG-2 Design Group, Experimental Physics (P) Division's P-1 Electronics and P-9 Van de Graaff Construction Groups, GMX Division's GMX-4 Pin Techniques Group, Graphic Arts Group, H-1 Group, H-6 Group, J Division, Nuclear Rocket Propulsion (N) Division's N-2 Critical Assemblies–Weapons Neutronics Group, Supply and Property (SP) Department's SP-3 Stockrooms and Warehouse Group, and Weapon Nuclear Engineering (W) Division's W-1 Weapons Experimental Physics Group. External collaborators included

- other AEC organizations
  - Argonne National Laboratory, Lemont, Illinois
  - Oak Ridge National Laboratory, Tennessee
  - U.S. Atomic Energy Commission, Washington, D.C.
- DoD organizations
  - Armed Forces Institute of Pathology, Washington, D.C.
  - U.S. Air Force
  - U.S. Air Force Special Weapons Center, Kirtland Air Force Base, Albuquerque, New Mexico
- other government agencies
  - Department of Public Health and Preventive Medicine, Washington, D.C.
  - Forestry Service, Department of Agriculture, Berkeley, California
  - U.S. Public Health Service, North Bethesda, Maryland
- universities
  - Cornell University, Ithaca New York
  - University of California, La Jolla
  - University of Chicago, Illinois
  - University of Utah, Salt Lake City
- research institutions
  - Argonne Cancer Research Hospital, Chicago, Illinois
  - Lamont Geological Observatory, Columbia University, New York, New York
  - National Institute of Health, Bethesda, Maryland
  - Stanford Research Institute, Menlo Park, California
- hospitals
  - Argonne Cancer Hospital, Chicago, Illinois
  - Michael Reese Hospital, Chicago, Illinois
  - New York Hospital Medical Center, New York
  - Pathology Department, Los Alamos Medical Center, New Mexico
  - U.S. Public Health Service Hospital, Fort Defiance, Arizona
  - Veterans Hospital, Albuquerque, New Mexico
- medical schools
  - School of Aviation Medicine, Randolph Air Force Base, Texas
  - U.S. Air Force School of Aerospace Medicine, Dayton, Ohio

HRL staff also provided direct assistance to the following organizations:

- Bendix Company, Kansas City, Kansas
- Berkeley Laboratory, California
- Convair Company, Fort Worth, Texas
- Livermore Laboratory, California
- Sandia Corporation, Albuquerque, New Mexico
- University of Utah, Salt Lake City
- Westinghouse Company, Arco, Idaho (Langham and Shipman 1960; Langham and Storer 1955; LASL 1954; Richmond and Sullivan 1974:xviii; Shipman 1954, 1958).

By the end of the decade, the H-4 Group "had established itself in both national and international circles as an authority on the effects of radiation from nuclear weapons, worldwide fallout, and the physiology and toxicology of tritium and plutonium" (Richmond and Sullivan 1974:xvii). See Appendix C for a list of investigations led by HRL staff.

In the 1960s, Laboratory organization continued to fluctuate (as it continues to this day), including the separation, combination, disbandment, and formation of divisions, groups, and their internal sections to meet the Laboratory's missions, objectives, and goals. In 1961, the Health Division renamed H-4 as the Biological and Medical Research Group and reorganized its sections:

- Low-Level Counting Section
- Molecular Radiobiology Section
- Cellular Radiobiology Section
- Mammalian Radiobiology Section
- Mammalian Metabolism Section
- Clinical Investigations Section

In this year, the Health Division also created the H-8 Field Studies Group and placed them in HRL. The Laboratory established the group to study nuclear testing under Payne S. Harris, M.D., former H-4 alternate group leader, and subsequently by Harry S. Jordan. In 1963, several staff turnovers and another reorganization of sections within the H-4 Group occurred. The Low-Level Counting Section was disbanded, and a new Biophysics Section was formed. In March 1966, the Laboratory completed construction of a new Occupational Health Laboratory in TA-59, and the H-5 and H-8 Groups moved out of HRL, leaving an H-4 Group staff of 77 in the building (Langham and Shipman 1961c, 1964a, 1964b; Ott 1968; *The Atom* 1966:7). Although it is unclear if the Division Shop and Division Property Section moved too, it is quite likely that they did. The monthly Laboratory magazine, *The Atom* (1966:9), reported,

> Group leaders Harry Schulte of H-5 and Harry Jordan of H-8 said the new building makes possible additional research efforts that were impossible for both groups in their crowded quarters in the HRL building. Space vacated in HRL will be used to accommodate the rapidly expanding activities of the biomedical research group, H-4, according to H Division Leader Dr. Thomas Shipman.

Beginning in the early 1960s, fundamental biomedical research at the Laboratory had shifted. The Laboratory directed more emphasis toward the fields of molecular and cellular biology and less toward the response of mammals to ionizing radiation and radioactive materials (Richmond and Sullivan 1974:xviii). However, in the late 1960s, the H-4 Group established a research program into "biological effects resulting from non-uniform dose distribution of alpha-emitting particulates in the lung," an issue that had plagued the Laboratory since the mid-1940s (Richmond and Sullivan 1974:xviii). The topic gained a particular focus at this time because of the growing number of potential applications that used plutonium, including breeder reactors, nuclear power systems in space, medical applications, and national defense programs (Richmond and Sullivan 1974:xviii). Achievements of the HRL staff in the 1960s included the following:

- Determined beneficial applications of electronic and radiotracer techniques
- Developed the concept of effective residual dose of radiation injury
- Developed electronic means of separating living cells and monitoring the rate of cell growth
- Developed a whole-body NMR spectrometer
- Determined isotopic labeling and tracer methods of radiation effects at the molecular level
- Defined somatic and genetic effects of chronic radiation exposure

- Researched radiation hazards associated with space applications of nuclear power systems
- Identified appropriate shielding for radiation hazards in space applications
- Designed radiological and health physics instrumentation
- Identified chemical detectors for industrial hygiene applications
- Conducted particle studies on nuclear reactors for space applications

Also in 1960, the Laboratory was awarded a Wards' Citation for its stress-free research animal handling and housing. In 1966, the Animal Welfare Act was signed into law, and the Laboratory received its first accreditation by the American Association of Accreditation of Laboratory Animal Care. Subsequently, the Laboratory became an institutional member of the American Association for Laboratory Animal Science (Langham and Shipman 1961b:411; Richmond and Voelz 1972:133).

Internal collaborators engaged by HRL staff during the 1960s included the CMB-1 Analytical Chemistry Group, CMB-11 Plutonium Chemistry and Metallurgy Group, GMX Division and its GMX-1 Non-Destructive Testing Group, H-6 Group, H-8 Group, J-11 Radio Chemistry Group, N-1 Materials Evaluation Group, P Division and its P-1 Electronics Group, Shops Department, and Theoretical (T) Division and its T-1 IBM Computer Support and T-4 Diffusion Theory Groups. External collaborators included

- other AEC organizations
  - Nuclear Reactor Testing Station, Idaho Falls, Idaho
  - Oak Ridge National Laboratory, Tennessee
  - Roscoe B. Jackson Memorial Laboratory, Bar Harbor, Maine
  - U.S. Atomic Energy Commission, Washington, D.C.
    - Committee on Intercomparison of Human Cesium-137 Measurements, Division of Biology and Medicine
    - Division of Biology and Medicine
- DoD organizations
  - Radiological Physics Branch, U.S. Naval Radiological Defense Laboratory, San Francisco, California
  - USA Medical Research Unit, Europe
  - Wright-Patterson Air Force Base, Ohio
- other government agencies
  - Industrial Hygiene Section, New Mexico State Health Department, Santa Fe
  - National Aeronautics and Space Administration
  - Space Nuclear Propulsion Office, Washington, D.C.
- universities
  - Rocky Mountain Universities, Inc.
    - Colorado State University, Fort Collins
    - Idaho State University, Pocatello
  - University of California, La Jolla
- research institutions
  - California Institute of Technology, Jet Propulsion Laboratory, Pasadena, California
  - Lamont Geological Observatory, Columbia University, New York, New York
  - Lovelace Foundation, Albuquerque, New Mexico

  - Subcommittee on Low-Level Contamination of Materials and Reagents, National Research Council, National Academy of Sciences, Washington, D.C.
- corporations
  - Douglas Aircraft Company, Santa Monica, California
  - Reynolds Electric and Engineering Company, Nevada Test Site (Jackson and Langham 1968; Langham and Shipman 1961a, 1961b, 1961c, 1962, 1964a, 1964b, 1965, 1966; Ott 1968)

The 1970s brought a great deal of organizational changes to the Health Division and the occupants of HRL. In 1971, Chester (Chet) R. Richmond, PhD, took over as the H-4 group leader and reorganized it. He established a Veterinary Section and an Isotope Applications Section in 1971 and a Physical Radiobiology Section in 1972. In 1973—after Langham's unexpected death in 1972—the Health Division realigned its entire organization to correspond to both initiatives of and funding from the AEC's Division of Biomedical and Environmental Research RX Program. All group sections were abolished. The division changed its focus to health studies, environmental studies, biological studies, physical and analytical studies, and heart devices. The 111 occupants of HRL comprised the following groups of the Health Division's Biomedical and Environmental Research Group:

- H-4 Mammalian Radiobiology Group led by John F. Spalding, PhD;
- H-9 Cellular and Molecular Radiobiology Group led by Petersen;
- H-10 Biophysics and Instrumentation Group led by Paul F. Mullaney, PhD; and
- H-11 Organic and Biochemical Synthesis Group led by Donald G. Ott, PhD

In 1975, the H-4 Mammalian Radiobiology Group was transformed into the Mammalian Biology Group, and in 1978, the H-10 Biophysics and Instrumentation Group was renamed the Biophysics Group. Additional significant staff changes at HRL in the 1970s were as follows: Robert G. Thomas, PhD, took over as the H-4 group leader in 1974; Arthur G. Saponara, PhD, took over as the H-9 group leader in 1975; and Thomas W. Whaley, PhD, took over as the H-11 group leader in 1976. In 1978, Laurence M. Holland, DVM, became the acting H-4 group leader, and L. Scott Cram, PhD, became the acting H-10 group leader. During this decade, HRL supported an average of 123 staff, with a low of 84 in 1971 and a high of 149 in 1977 (Anderson and Sullivan 1975:xi, 1; Carr 2020a; Petersen and Sullivan 1976a:vi, 35, 1977:142, 1978:59, 1979:viii; Richmond and Sullivan 1974; *The Atom* 1971:20).

In 1973, the Laboratory directed approximately half of their efforts toward basic research in the physical and biological sciences. Many activities at both the national and local levels influenced HRL research of the late 1970s. When the AEC was disbanded in 1974, its research responsibilities were transferred to the newly established ERDA. By 1975, Laboratory research was being redirected away from the traditional nuclear-energy focus and toward the broader ERDA goals, which were being actively developed through workshops, conferences, and planning exercises. In 1976, the National Cancer Institute, through the University of New Mexico–funded pion[1] research at the Laboratory. In 1977, the DOE was established and consolidated ERDA, the Federal Energy Administration, the Federal Power Commission, and other federal energy programs. In 1977, the National Institutes of Health established a National Stable Isotopes Resource at the Laboratory, wherein staff synthesized or provided compounds for outside investigators. In 1978, the Health Division established a colony of athymic (nude) mice at HRL. These mice had no T cells and were therefore useful in research because they did not reject transplanted cells (Buck 1982; DOE 2020; Petersen and Sullivan 1976a:vi–viii, 1977:1–2, 1978:59, 174; Richmond and Sullivan 1974:xvi).

[1] A pion is a particle in physics that was proposed in 1970 to be "the ultimate radiation source for treatment of deep-seated, inoperable, localized malignancies" (Langham et al. 1970:1).

HRL staff conducted an enormous amount of work in the 1970s. Some of the more notable achievements included the following:

- Developed and improved electronic instrumentation for cell biology research
- Applied stable isotopes to biological, medical, and environmental research
- Developed biological and clinical applications of negative pions
- Developed radiation detectors for measuring transuranium elements in humans
- Researched regulatory mechanisms, interactions, and properties of genetic materials
- Studied the effects of external radiations on living organisms
- Developed methods for electronic sensing and sorting of biological cells
- Defined the toxicity of weapons-related materials
- Defined inhalation toxicology of manmade fibers for the insulation industry
- Developed specialized flow cytometric instrumentation
- Studied the biological effects of materials associated with the nuclear power industry
- Assessed health effects associated with the production of shale oil
- Delineated the role of internally deposited radiation in respiratory tract carcinogenesis
- Developed methods to assess damage from inhaled pollutants
- Increased fundamental knowledge of the radiobiology of ionizing particles
- Applied flow cytometry to effective treatment utilizing radiotherapy and/or chemotherapy

Internal collaborators engaged by HRL staff during the 1970s included the Chemistry-Nuclear Chemistry Division's CNC-4 Inorganic Chemistry Group, Computing Sciences and Services (C) Division's C-5 Statistical Services and Management Applications and C-8 Computer Engineering Support Groups, Dynamic Testing (M) Division's M-1 Nondestructive Testing and M-2 PHERMEX Groups, Electronics and Instrumentation (E) Division's E-5 Mini/Microcomputer Systems Group, H Division Office (DO), H-5 Group, Medium Energy Physics (MP) Division and their MP-3 Accelerator Structures Group, P-1 Electronics Group, and T Division. External collaborators included

- other AEC organizations
  - Lawrence Berkeley Laboratory, California
  - Sandia Laboratory, Albuquerque, New Mexico
- other government agencies
  - Colorado State Department of Public Health, Denver
  - New Mexico Department of Public Health, Santa Fe
  - Office of the U.S. Surgeon General, Medical Research, Development, and Acquisition Command, Falls Church, Virginia
  - U.S. Department of Agriculture, Washington, D.C.
  - U.S. Public Health Service, North Bethesda, Maryland
- universities
  - Colorado State University, Fort Collins
  - Dakota State University, Brookings
  - State University of New York, Stonybrook
  - University of New Mexico, Albuquerque

- research institutions
  - Abteilung Molekulare Biologie, Max-Planck-Institut fuer Biophysikalische Chemie, Goettingen, Federal Republic of Germany
  - National Cancer Institute, Bethesda, Maryland
    - Division of Cancer Biology and Diagnosis
    - Division of Cancer Treatment
- hospitals
  - St. Mary's Hospital, Grand Junction, Colorado
  - University of Colorado Medical Center, Denver
  - Veterans Administration Hospital, Northport, New York
- medical schools
  - Committee on Operating Room Environment, American College of Surgeons, Chicago, Illinois
  - Harvard Medical School, Boston, Massachusetts
  - University of Iowa School of Medicine, Iowa City
- corporate organizations
  - Thermal Insulation Manufacturers Association (Anderson and Sullivan 1975; Petersen 1980; Petersen and Sullivan 1976a, 1976b, 1977, 1978, 1979; Richmond and Sullivan 1974; Richmond and Voelz 1972, 1973)

A 1979 Laboratory reorganization established the Life Sciences (LS) Division from disbanded Health Division H-4, H-9, H-10, H-11, and H-12 Groups. The Laboratory redistributed research activities across six new groups to coincide with major programmatic activities of the newly established DOE and in support of specific information needs of developing energy technologies. It appears that five of the new groups, totaling 138 staff at the time of the transition, continued to occupy HRL:

- LS-1 Toxicology Group led by Robert A. Tobey, PhD;
- LS-2 Biophysics Group led by Mullaney;
- LS-3 Genetics Group led by Merlin D. Enger, PhD;
- LS-4 Experimental Pathology Group led by Paul M. Kraemer, PhD; and
- LS-5 Organic Chemistry Group led by Whaley.

During the first decade of the Life Sciences Division, several significant staff and organizational changes occurred. Dale M. Holm, PhD, took over as the acting LS-2 group leader in 1980, and Carleton C. Stewart, PhD, took over as the LS-4 group leader in 1981. Also in this year, the division disbanded the LS-2 Biophysics Group and the LS-5 Organic Chemistry Group, with most staff moving into remaining groups. During this transition, Holland took over as the LS-1 group leader, and Ronald A. Walters, PhD, took over as the LS-3 group leader. Robert K. Moyzis, PhD, took over as the LS-3 group leader in 1984; Whaley took over as the LS-1 group leader in 1985; and Walker R. Wharton, PhD, took over as the LS-4 group leader in 1986. In 1987, the division disbanded the LS-1 Toxicology Group and established the LS-1 Physiology Group led by Donal G. Sinex, PhD; established the LS-2 Biochemistry/Biophysics Group led by Whaley; disbanded the LS-4 Experimental Pathology Group; and established the LS-4 Cell Biology Group led by Wharton. In 1989, the division disbanded the LS-1 Physiology Group and renamed the LS-4 Cell Biology Group to the Cellular and Molecular Biology Group. Also in 1989, Carl E. Hildebrand, PhD, took over as the acting LS-3 group leader. During this decade, HRL supported an average of 154 staff, with a low of 117 in 1982 and a high of 194 in 1987 (Carr 2020a; Enger and Stafford 1983; Enger et al. 1984; Fink 1987; Holland and Stafford 1982; Holland et al. 1981; Marrone and Cram 1988, 1989; Spitzmiller et al. 1990; Stafford 1986, 1987).

In July 1982, the NFCR was established at HRL. Funded by the National Institutes of Health's Division of Research Resources, several DOE programs supported it. The focus of the NFCR was to develop applications of flow cytometry for the biomedical sciences and create additional measurement techniques and instrumentation (Enger et al. 1984:92). In 1983, the National Laboratory Gene Library Project Resource was established at HRL (Figure 3-23 and Figure 3-24). Conducted jointly by the Laboratory and Lawrence Livermore National Laboratory, the program aimed to

- isolate each of the human chromosomes by flow sorting,
- prepare large numbers of copies of the DNA in each of these chromosomes using recombinant DNA techniques, and
- make the genes or parts of genes from each human chromosome available for researchers throughout the world to analyze and characterize (Enger et al. 1984:93).

By 1983, direct and indirect funding was primarily flowing to the Life Sciences Division from the DOE's Office of Health and Environmental Research (OHER). The Life Science Division's mission at this time was

- to evolve and dynamically employ an advanced multidisciplinary capability to address health and environmental problems associated with the nation's energy, defense, and industrial functions;
- to apply innovative laboratory technologies in the physical sciences to problems within the biological sciences; and
- to perennially explore, within the life sciences program, opportunities for technology transfer to, and collaborative interactions with, industry and academia (Enger et al. 1984:2).

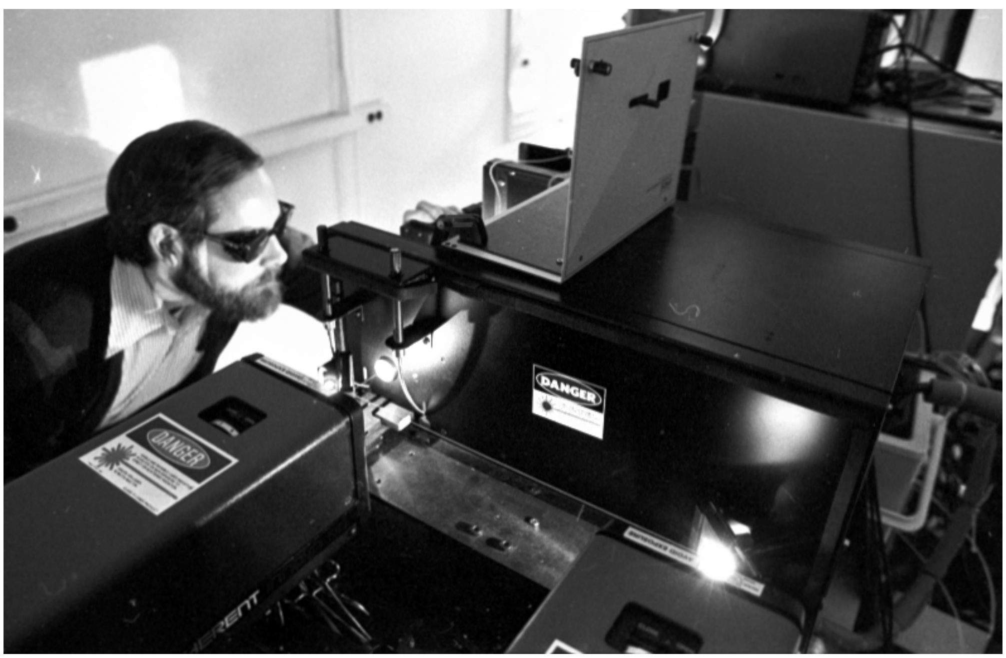

Figure 3-23. LS-3 Group preparing the gene library, March 7, 1985 (LANL image, negative no. PAO-85-131-5).

Figure 3-24. LS-3 Group preparing the gene library, March 7, 1985 (LANL image, negative no. PAO-85-131-30).

Internal collaborators engaged by HRL staff during this decade included the Analysis and Assessment (S) Division's S-1 Statistics Group, Chemistry and Laser Sciences (CLS) Division's CLS-2 Group, Chemistry (CHM) Division's CHM-1 Analytical Chemistry and CHM-2 Physical Chemistry Groups, CMB-1 Analytical Chemistry Group, Design Engineering (WX) Division, E-5 Computer Systems and Electronic Engineering Group, E-8 Computer Systems Engineering Group, H-5 Group, Health, Safety, and Environment (HSE) Division's HSE-5 Group, LS-6 Group, LS-DO, M Division, Materials Science and Technology (MST) Division's MST-11 Nuclear Fuel Development and Facilities Operation Group, MP-3 Practical Applications Group, P Division and its P-14 Reaction History Group, T-12 Theoretical Chemistry Molecular Physics Group, and T-5 Medium Energy Physics Theory Group, External collaborators engaged by HRL staff during the period from 1980 to 1986 included

- other AEC organizations
  - Lawrence Berkeley Laboratory, California
  - Lawrence Livermore National Laboratory, California
- universities
  - Associated Western Universities, Salt Lake City, Utah
  - Eastern New Mexico University, Portales
  - Oregon State University, Corvallis
  - Pennsylvania State University, State College
  - University of Colorado, Colorado Springs

    - University of New Mexico, Albuquerque
        - Department of Cell Biology
        - Department of Pathology
        - Department of Radiology
    - University of Texas, Austin
- research institutions
    - Eleanor Roosevelt Institute for Cancer Research, Colorado Health Science Center, Denver
    - Lindsley F. Kimball Research Institute, New York Blood Center, New York
    - Lovelace Foundation, Albuquerque, New Mexico
    - Mayo Clinic/Foundation, Rochester, New York
    - Medical Research Center, Harwell and Chilton, England
    - Radiobiological Institute, Netherlands
    - Roy Gordon Research Laboratory, Harvard University, Boston, Massachusetts (Inco Metals Company, Toronto, Canada)
    - Sloan-Kettering Institute for Cancer Research, New York
- hospitals
    - Cancer Research and Treatment Center, University of New Mexico, Albuquerque
    - Mayo Clinic, Rochester, New York
    - Sloan-Kettering Memorial Cancer Center, New York, New York
    - St. Jude Children's Research Hospital, Memphis, Tennessee
- medical schools
    - Baylor College of Medicine, Houston, Texas
    - School of Medicine, University of New Mexico, Albuquerque
- corporations
    - Mesa Diagnostics, Los Alamos, New Mexico
    - Mission Research Corporation
- corporate organizations
    - Thermal Insulation Manufacturers Association (Enger and Stafford 1983; Enger et al. 1984; Fink 1987; Holland and Stafford 1982; Holland et al. 1981; Marrone and Cram 1988, 1989; Spitzmiller et al. 1990; Stafford 1986, 1987)

Beginning in 1986, the DoD and the National Institutes of Health were also supporting projects at HRL, albeit to a slightly lesser degree, along with OHER. In 1989, the division introduced the Center for Human Genome Studies in HRL. In 1990, the Life Sciences Division staff in HRL totaled 176, representing three groups:

- LS-2 Biochemistry/Structural Biology Group led by Whaley,
- LS-3 Genetics Group led by Hildebrand (acting), and
- LS-4 Cellular and Molecular Biology Group led by Wharton (Fink 1987:2; Spitzmiller et al. 1990, 1991).

At this time, the Division's mission was "to serve the nation's needs in health, energy, and national security by addressing a broad range of biological problems at the molecular, cellular, physiological, and whole-organism levels" (Spitzmiller et al. 1991:2). To do this, they developed and utilized the most advanced biological technologies and used the unique physical science resources of the Laboratory

(Spitzmiller et al. 1991:2). Today, as part of the Bioscience (B) Division, HRL staff continue to conduct groundbreaking work in the field of biomedical research.

Reactor Technology Development at the Laboratory

A reactor, initially called an atomic pile, is an apparatus in which fissile material can be made to undergo a self-sustaining nuclear reaction. The Laboratory developed and used reactors for the Manhattan Project work and subsequently during the Cold War era. Reactor technology at the Laboratory has served a diverse range of purposes (Machen et al. 2010:100–105).

Research Reactors

Scientists used early research reactors to check calculations, make measurements, and perform experiments. At the Laboratory, scientists needed a nuclear reactor during World War II to verify theories, including those used for calculating the critical masses of uranium and plutonium, for determining the effects of various tamper materials on critical mass, for measuring fission cross sections, and for providing scientists with experience in assembling a supercritical system. Scientists also needed reactors for measuring neutron-capture and -scattering cross sections of other materials, particularly those under consideration as moderators and reflectors. Enrico Fermi strongly advocated for a research reactor to be built at the Laboratory. The resulting reactor at the Omega Site (TA-02) in Los Alamos Canyon was the third research reactor in the world—the first one was Fermi's pile at Staff Field at the University of Chicago, and the second one was the pile (or graphite reactor) at Site X at the Clinton Laboratories in Oak Ridge, Tennessee (present-day Oak Ridge National Laboratory) (Bunker 1983:124; Machen et al. 2010:100–101; Rosenthal 2010:7).

Code-named "Water Boiler" and assembled in 1943, the Laboratory reactor was the first homogeneous liquid-fuel reactor and the first reactor fueled by uranium enriched in uranium-235. Eventually, three versions of this reactor design were built, all based on the same concept. Achieving criticality in May 1944, the first reactor was nicknamed LOPO because it had a very low-power output. The Laboratory built LOPO to determine the critical mass of a simple fuel configuration and to test a new reactor concept. Subsequent to these accomplishments, the Laboratory dismantled LOPO and assembled HYPO (for high power) in its place. Operational in December 1944, HYPO supplied a strong source of neutrons used for measurements in early atomic bomb designs and other studies. By 1950, higher neutron fluxes were desired, so HYPO was modified into SUPO, a super-power reactor completed in March 1951 (Figure 3-25). Scientists used SUPO for measurements needed by the weapons program, such as weapon-yield calculations; for fundamental fission-process studies; and Health Division research. SUPO was in operation almost daily until it was deactivated in 1974 (Bunker 1983:124–126; Machen et al. 2010:101).

The Health Division saw great opportunities for biomedical research with the Laboratory's development of reactor technologies. The H-4 Radiobiology Section began using water boiler reactors for experiments as early as 1949. As part of their efforts to set radiation exposure limits for workers and to develop a method of radiation dosimetry, they assessed the biological effects of radiation on test animals, including mice, rats, rabbits, and monkeys. Scientists observed decreases in lifespans, deficiencies in reproductivity, development of cataracts, incidences of cancer, and occurrences of blood disorders. The H-4 Group continued these studies using the water boiler reactors through 1954, after their move into HRL in 1953 (Brennan et al. 1952; Bunker 1983:126; Langham and Storer 1953:65–66, 1955: 65–66; LASL 1950:26–27, 1954:6; Machen et al. 2010:101; Shipman 1953:15). In the division's third annual report, Shipman (1950:7) wrote,

Figure 3-25. The SUPO Water Boiler reactor at Omega Site (TA-02) (LANL image, negative no. P-55:19329).

> We now have here one of the world's greatest physics laboratories, destined to be even greater. Nowhere else exists such an array of reactors, accelerators, radiation-producing instruments, and radioactive sources. Nowhere else in the world has a mouse ever been placed inside a concentrated critical assembly!

Adjacent to the Water Boiler building at Omega Site, the Laboratory constructed the world's first fast plutonium reactor. Named Clementine, the reactor achieved criticality in late 1946. Even though it was not completed until November 1948, many experiments were conducted and measurements taken in the interim. Clementine achieved full power in March 1949 and remained operational until 1952. In December, a fuel rod ruptured, and Laboratory staff subsequently disassembled the reactor. Clementine was proposed, designed, and built during the latter half of the Manhattan Project period on the basis that it would provide a much-needed, high-intensity, fission-neutron source and be a means of exploring the adaptability of plutonium as a nuclear fuel. Remarkably, Clementine provided data of great utility to theorists engaged at that time in the design of both fission and fusion bombs, as well as invaluable experience in the design and control of fast reactors (Bunker 1983:127–128; Machen et al. 2010:101–102; Schultz et al. 2020:8).

Scientists modeled Clementine's replacement after the Materials Testing Reactor at the National Reactor Testing Station in Idaho Falls, Idaho (present-day Idaho National Laboratory). Construction began in mid-1954, and the Omega West reactor was operational by the end of 1956. A pure research reactor, it operated weekly at least through 1983, at which time it was the highest-power research reactor west of Missouri and the only reactor operating at the Laboratory. Research activities were numerous and included comparison fission counting for weapon-yield measurements; neutron radiography of weapon components; studies of condensed matter by neutron scattering; assessment of long-term behavior of weapon components; in-core testing of fuels, components, and plasma thermocouples; post-shutdown heat-evolution measurements from reactor fuels; nuclear cross-section and energy-level studies through neutron-capture, gamma-ray spectroscopy; nondestructive elemental materials assay by neutron-activation analysis; and radioisotope production. The Laboratory shut down the Omega West reactor in 1992 and decommissioned it over the next 11 years (Bunker 1983:128–129; Machen et al. 2010:102; Schultz et al. 2020:8).

HRL tenants used the Omega West reactor for several experiments. In 1960, the H-4 Radiobiology Section exposed clear-plastic mannequins with synthetic human systems to radiation at both the Omega West reactor and at the Godiva critical assembly, making comparisons between thermal-neutron and fast-neutron exposures. This same year, they also made neutron-flux, spectrum, and tissue-dose evaluations at the reactor in an effort to calibrate all available radiation sources at the Laboratory. The H-5 Laboratory Section used the reactor in their calibration of X-ray films in 1965, and the H-4 Group used the reactor in 1978 to measure iron content in hamster tissue (Campbell 1965:21; Langham and Shipman 1961a:216, 1961b:355; Petersen and Sullivan 1979:15).

With theoretical origins dating back to 1958, the Laboratory constructed the Ultra-High Temperature Reactor Experiment (UHTREX) from 1962 to 1966 in TA-52. As a technological demonstration of a high-temperature, gas-cooled reactor, low-power criticality was achieved in August 1967. UHTREX approached its peak operating temperature in June 1968 and was shut down in February 1970 because federal priorities shifted and funding was cut. The prime scientific objectives of UHTREX were threefold:

- to study the behavior of reactor components in extreme temperature environments;
- to determine if fuel reprocessing costs could be reduced by using unclad, uncoated, fuel rods; and
- to study the effects of heat transfer and thermal corrosion on unclad fuel by injecting helium gas directly into the reactor core.

Additionally, the Laboratory used UHTREX to study approaches in lowering costs associated with creating electricity and process heat compared with other contemporary gas-cooled nuclear reactor designs (Schultz et al. 2020:12–13, 18).

Critical Assemblies

When a mass of fissile material achieves criticality, or "goes critical," it has reached the stage where it can support a nuclear chain reaction. Such a chain reaction, when uncontrolled, is necessary for an explosion and, when controlled, for the production of nuclear power (Machen et al. 2010:105). Critical assemblies of fissile materials are actually small, versatile, research reactors and were used for health physics research.

Power Reactors

In a power reactor, energy is released by the fission process, and continuous fission—a chain reaction—is maintained in the reactor core. Beginning in the late 1930s, scientists realized that the tremendous heat produced by nuclear fission held unparalleled economic and military potential. Despite its theoretical potential, serious research in nuclear fission as a commercial power source was limited by the economic and strategic considerations of World War II. The United States revisited the application of nuclear energy—with its incredible power density—in the postwar era. In 1947, under the direction of the newly established AEC, the federal government was eager to promote nuclear reactor research for military and commercial purposes. These early initiatives produced many prominent milestones in the early 1950s. The first successful demonstration of creating electrical power from nuclear energy occurred in December 1951. By May 1955, the *USS Nautilus*—the world's first nuclear-powered naval vessel—underwent its first sea trials. The success of these two projects substantially influenced the direction of power reactor research in the United States (Buck 1983:2–3; Machen et al. 2010:102–103; Schultz et al. 2020:9).

Although the Laboratory's Water Boiler and Omega West reactors were capable of producing substantial amounts of heat, they were not constructed to yield useful electrical power. Reactor programs designed for military and commercial applications, such as electrical power and nuclear propulsion, did not take shape at the Laboratory until the late 1950s. Between 1955 and 1963, the Laboratory designed, constructed, and tested at Ten Site (TA-35) three small power reactors primarily focused on portable power sources for the military. The Laboratory's first power reactor series was LAPRE (Los Alamos Power Reactor Experiment), whose objective was to see if a reactor could be operated as an essentially constant-temperature energy source. Criticality experiments began with LAPRE I in February 1956, and the Laboratory completed LAPRE II in 1959. Although the overall experiment worked, corrosion and fuel containment problems terminated the project in 1960 (Bunker 1983:129; Machen et al. 2010:102–103; Schultz et al. 2020:9).

Another early project on power reactors was the development of a fast reactor fueled by molten plutonium and cooled by molten sodium. The initial design, LAMPRE I (Los Alamos Molten Plutonium Reactor Experiment I), called for a reactor that could produce an output of at least 20 megawatts of thermal energy. Achieving criticality in early 1961, the reactor operated successfully for several thousand hours. The Laboratory shut down the reactor in mid-1963 after it served its intended purpose. Significantly, its sodium cooling loop was the most extensive and successful test of a high-temperature, sodium-cooling system at this time. Although the Laboratory had planned to build a successor, LAMPRE II, the AEC chose to prioritize the development of reactors that used blended uranium fuel over pure plutonium, ending LAMPRE (Bunker 1983:130–131; Machen et al. 2010:103; Schultz et al. 2020:9–10). As noted by Merle E. Bunker (1983:131), who wrote a history of the Laboratory's early reactors, "Altogether, the efforts here, whether successful or disappointing at the time, have had a significant impact on reactor technology and nuclear science in general."

Propulsion Reactors

Robert H. Goddard, inventor of the world's first liquid-fueled rocket, proposed atomic space travel as early as 1906 as a college student. Speculation continued over the years, and in 1954, interested Laboratory scientists formed a study group to explore the feasibility of a nuclear-powered rocket, unofficially starting Project Rover. Based on the group's feasibility report, the AEC formally established a demonstration program in 1955 with the U.S. Air Force and both laboratories, LASL and the University of California Radiation Laboratory at Livermore (RLL). LASL established a Nuclear Rocket Propulsion (N) Division, led by Raemer Schreiber. The Laboratory's role in this program crystalized in 1957, and in 1958, NASA joined the project. In 1961, as the space race began, and President John F. Kennedy inaugurated the Project Rover program (Carr 2020c; Machen et al. 2010:17; MacMillan 1962:1–2).

Project Rover sought to incorporate a nuclear-powered reactor into a rocket engine. Chemically powered rockets were already being developed elsewhere for the Intercontinental Ballistic Missile (ICBM) program, but it was not certain how far a chemically powered rocket could travel. The initial design of the Project Rover reactor sent a cool gas through a hot reactor that was powered by nuclear energy. The hope was that as superheated gas shot out of a nozzle, the resulting propulsion would far exceed that provided by chemicals. Nuclear-powered rockets could be used to reinforce the use of ICBMs, launch large manned or unmanned payloads, or meet the needs of an interplanetary mission—in particular, a manned mission to Mars. From 1955 to 1973, the Laboratory designed a series of reactors to investigate the principles of nuclear-powered rocket technology. They also led the fuels development efforts, constructed the test reactors, and conducted low-power testing at TA-18. The reactors were then disassembled and shipped to the Nevada Test Site, where the Laboratory conducted full-scale testing at the Nuclear Rocket Development Station (Fehner and Gosling 2006:196; Koenig 1986:1–3; Machen et al. 2010:103–104; McGehee and Garcia 1999:43).

Kiwi reactors, tested from 1959 to 1965, were used to develop the basic technology of nuclear-powered rockets. The series was named after New Zealand's flightless bird because these reactors were never meant to fly. Although the Kiwi-A tests exemplified simple prototypes, the Kiwi-B tests were a major leap forward, exhibiting 10 times more power. In August 1964, Kiwi-B4-E ran for 8 minutes at 900 megawatts (MW). Kiwi reactors demonstrated the feasibility of high-temperature, gas-cooled reactors. The last of the Kiwi tests comprised the Kiwi-Transient Nuclear Test. Conducted as a flight safety test, the Laboratory intentionally destroyed a Kiwi-B-type reactor through a nuclear excursion, or a rapid rise in the power level. The goal was to confirm the analytical models of reactor behavior after a catastrophic event. With the feasibility of nuclear-powered propulsion established, there was a new demand for a flightworthy model. The effort was called the Nuclear Engine for Rocket Vehicle Application (NERVA), and objectives were set with the hope that flight-testing could occur in 1967 (Carr 2020c; Koenig 1986:2–9; McGehee and Garcia 1999:43).

Reactors from the NERVA developmental Nuclear Reactor Experiment (NRX) were tested from 1964 to 1966. Astonishingly, the NRX-A6 reactor exceeded the design goal of a 60-minute run at 1,100 MW by running continuously for 60 minutes at 1,125 MW. In 1964, President Lyndon B. Johnson terminated NERVA. Costs had increased, chemically powered rockets were deemed more economical for orbit-to-orbit transfer, and the Apollo Program had become a strong competitor for funds. Without NERVA, Project Rover focused on research and development and continued without a specific mission (Carr 2020c; Koenig 1986:2–10).

The Reactor In-Flight Test (RIFT) project was cancelled before it was completed. Solely the responsibility of NASA, the RIFT project was an initiative to design, develop, fabricate, and flight-test a NERVA-powered vehicle as an upper stage for a potential Saturn-class rocket. In 1961, NASA contracted Lockheed to design and build the vehicle; however, full-scale power Kiwi tests in mid-1962 resulted in ejection of fuel elements, leading to safety concerns of the NERVA design. The federal government cancelled the RIFT project in December 1963 (Finseth 1991:1, 5; Van Vlack and Brown 2020:7–8).

Tested from 1965 to 1968, Phoebus reactors (named after Phoebus Apollo, the Greek god of light) were designed for interplanetary voyages. These reactors had greater coolant exit temperatures, power densities, and power levels than their predecessors (Figure 3-26). The most powerful reactor ever built, the Phoebus-2A, reached 4,080 MW in a 12-minute run in June 1968. The Phoebus series established that a nuclear-powered rocket could take a vehicle beyond the moon. The Peewee-1 reactor, tested once in 1968, investigated a smaller, more-compact reactor design, whereas the Nuclear Furnace-1 reactor, tested once in 1972, experimented with an advanced fuel and a radioactive emission–reducing design (Carr 2020c; Koenig 1986:6–11).

Project Rover was discontinued in January 1973 because of growing concerns about the overall cost of the space program and national priorities had changed. However, Project Rover was a success and demonstrated that a nuclear-powered rocket could be used for spacecraft propulsion. Project Rover produced new materials, handling techniques, and compact reactor designs; the heat pipe was its most significant spinoff technology. At its peak, Project Rover was the second largest program at the Laboratory, engaging many facilities, divisions, and staff. Noticeably, NASA's subsequent deep-space missions benefited greatly from technology developed by Project Rover scientists (Benegas 1995b:29; Carr 2020c; Koenig 1986:3; Machen et al. 2010:104; McGehee and Garcia 1999:46).

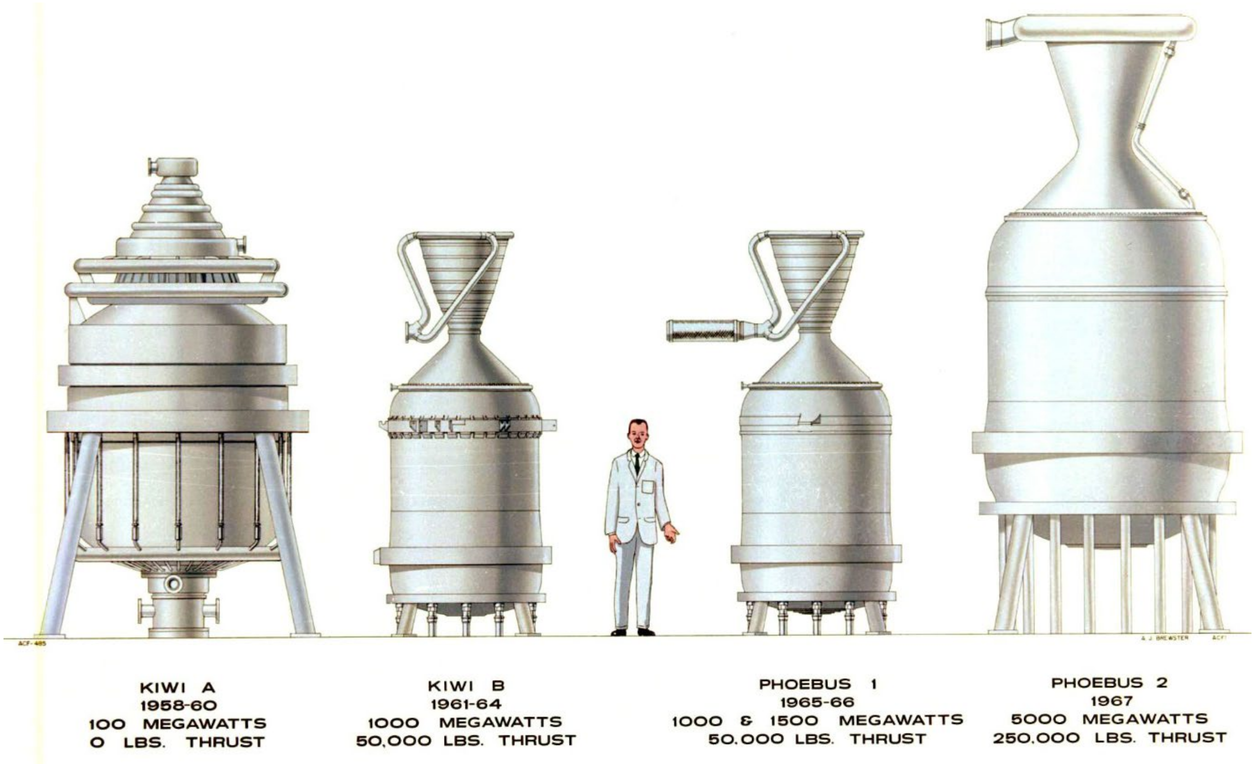

Figure 3-26. Relative sizes of Project Rover Kiwi and Phoebus reactors (LANL image, negative no. CIC-9:NN66145).

Project Rover at HRL

The Health Division participated in Project Rover, and notably, HRL tenants—the H-4, H-5, and H-8 Groups—conducted multiple investigations. Studying the radiation environment of the operating reactor, they focused on identifying potential problems associated with nuclear-powered propulsion systems. Primary activities included developing appropriate instrumentation, performing pre-test experiments, taking measurements during tests, and conducting post-test studies (Harris 1960:7).

In 1957, the H-4 Biophysics Section began preparing for Project Rover tests at the Nevada Test Site. For Kiwi tests, they designed and prepared foil systems to measure neutron flux, neutron exposure and dose rates, and gamma ray exposure and dose rates. In 1960, staff designed and fabricated additional equipment for the Kiwi tests. The H-4 Organic Chemistry Section developed “paired” liquid scintillators for simultaneous gamma-ray and fast-neutron dose-rate measurements in mixed radiation fields. The H-4 Radiobiology Section developed both a high-intensity gamma rate meter to measure gamma flux and a gamma dosimetry system. In advance of the Kiwi-Transient Nuclear Test, the H-5 Group conducted an experiment using a one-ninth scale model of the Kiwi reactor. They detonated the model and then measured and characterized the radioactive particle sizes and their distribution while developing a method to do the same after the Kiwi-Transient Nuclear Test. Subsequently, they conducted similar tests with 1-inch sections of fuel elements to study the effect of heat on fragmentation and the distribution of uranium (Campbell and Moss 1964; Langham and Shipman 1961a:129, 1961b:214, 314, 339; Schulte et al. 1966; Shipman 1958:67).

HRL tenants took numerous measurements during the Project Rover tests. The H-4 and H-8 Groups measured neutron fluxes, neutron and gamma ray radiation dose rates, and integral exposures, under both shielded and free-air conditions during multiple Kiwi tests. During at least one Kiwi test, the H-4 Group exposed a clear-plastic mannequin with synthetic human systems to a test (Figure 3-27).

The division's 1960 semi-annual report discussed the planned use of a mannequin to measure the neutron dose from the Kiwi-A reactors. Measuring gamma ray doses during one Kiwi test, the H-8 Group studied the radiation shielding effectiveness of the permanent structures at the test complex. Subsequently, they measured integral neutron fluxes and gamma-ray and neutron radiation doses produced by the NRX tests. The H-8 Group also documented effluent releases during the NRX series and a Phoebus test through an extensive sampling network that extended nearly 25 miles from the test complex. They studied the behavior and resultant activity of the effluent injected into the atmosphere (Cox et al. 1963; Harris 1960; Henderson and Larson 1966; Henderson et al. 1963, 1966; Langham and Shipman 1961a:5, 217, 1961b:12; Larson et al. 1966; Lee and Worman 1965; Lee et al. 1962, 1963; Worman and Lee 1965; Worman et al. 1961, 1963).

In another Kiwi series investigation, staff extrapolated results to flyable systems. The H-4 Radiobiology Section evaluated potential dangers to both operating personnel and the general public when they measured the radiation output of Kiwi reactors during operations that mimicked a nuclear-powered ground launch, second stage "lob," and orbital ignition. Conclusions were generally twofold. First, general biospheric contamination would be slight, and presently accepted tolerances would not be exceeded under normal conditions with appropriate distancing and shielding. Second, impacts of re-entry components in controlled or uncontrolled areas would create contamination areas with potentially serious consequences for limited populations (Graves et al. 1960:5–9; Langham and Shipman 1961b:343).

Figure 3-27. Payne S. Harris, H-4 alternate group leader and subsequently H-8 group leader, setting up Plastic Man named REMAB in advance of a Kiwi-A3 run, 1960 (LANL image, negative no. PUB60-0413-C).

All three HRL groups conducted post-test studies during the Kiwi series. The H-4 Radiobiology Section made gamma and neutron dose measurements of B-57 sampler aircrews, who conducted flights through resultant effluent of full-power reactor runs. During the Kiwi-B tests, the H-4 Radiobiology Section recalibrated earlier dose rates collected from Kiwi-A tests. The H-5 Group compiled data on the radioactive effluents from the Kiwi-B reactors, including air and ground concentrations, particle sizes, and isotopic compositions. Throughout the series, the H-4 Group assisted the H-5 Group with fission product release and fallout studies. The H-8 Group conducted surveys of contaminated areas surrounding the Kiwi-Transient Nuclear Test test point. Decay relationships were derived from these data, as was the resulting radiation environment. The H-4, H-5, and H-8 Groups collaborated during one investigation into the problems associated with the chemical and physical analysis of nuclear-powered engine effluents. The H-5 Group evaluated methods for collecting, sizing, and characterizing effluent particles; the H-8 Group collected particles at the test complex and documented the effluent and radiological data; and the H-4 Group analyzed the particles (Campbell 1962; Ide at al. 1963; Langham and Shipman 1961a:5, 192, 1961b:12, 335–336; Lee and Fultyn 1966).

Nuclear Testing by the United States

The United States conducted the first atomic bomb test (Trinity device) in July 1945. Subsequently, the United States dropped atomic bombs on Japan that August. The United States conducted intermittent nuclear testing through October 1958 and then entered into a moratorium that was contingent on reciprocity by the Soviet Union and ongoing negotiations. When the Soviet Union abruptly resumed nuclear testing in September 1961, the United States began a year-round testing program. The Soviet Union and the United States ratified the Limited Test Ban Treaty on August 5, 1963, as worldwide concern about radioactive fallout intensified. This treaty effectively banned all testing of nuclear weapons in space, the atmosphere, and the oceans, which redirected all subsequent nuclear testing underground. The United States and the Soviet Union developed the Threshold Test Ban Treaty and the Peaceful Nuclear Explosions Treaty in 1974 and 1976, respectively. These documents effectively restricted all nuclear tests to yields no greater than 150 kilotons.[2] The Soviet Union conducted their last nuclear test on October 24, 1990, and on December 11, they and the United States ratified the Threshold Test Ban Treaty. On October 2, 1992, the United States entered into another unilateral nuclear testing moratorium that it has observed to this day despite the fact that other countries conducted nuclear tests into the late 1990s (Carr 2020d:24; DOE 1994:i–iii; Machen et al. 2010:94).

This section focuses on nuclear testing conducted by the United States from June 1946 through June 1966. These two decades coincided with the establishment and development of the Laboratory’s Health Division and with the direct involvement by occupants of HRL. Notably, all of the early nuclear testing involved the direct participation of Laboratory staff (Tyler 1954:66–68). Speaking to the Laboratory’s involvement with nuclear testing, the Manager of the AEC’s Santa Fe Operations Office explained,

> The development of atomic weapons of all types involves a composite effort including: primary experimental research, theoretical investigations and calculations, component development experimentation, and full-scale nuclear detonations. It is essentially impossible to apportion credit . . . [Tyler 1954:66]

The Laboratory was directly involved in all nuclear tests conducted by the United States until 1953 and in most tests through June 1966. In 1952, RLL was folded into the AEC. Included at the behest of the U.S. Air Force, they brought their developmental weapons work to bear in 1953. In 1958, RLL was renamed the Lawrence Radiation Laboratory (LRL)—the institution was subsequently called the Lawrence Livermore Laboratory, and presently, it is the Lawrence Livermore National Laboratory. In 1962, Sandia

[2] A kiloton is the energy of a nuclear explosion equivalent to the explosive power of 1,000 tons of TNT.

Laboratory (present-day Sandia National Laboratories) participated in their first nuclear test (Carr 2020d:8; DOE 1994:6, 2015:3–51; Fehner and Gosling 2006:90; Kunkle et al. 2018a).

From June 1946 to June 1966, the United States conducted 467 nuclear tests. (Note that all dates and times in the nuclear testing record have been converted from local times to Greenwich Mean Time, which is how they are reflected in this section.) These tests were primarily conducted at the Pacific Proving Ground and at the Nevada Proving Ground. The Pacific Proving Ground was established by the AEC in 1947 at Enewetak Atoll in the Marshall Islands, where the United States had established military bases at former World War II Japanese bases. Acting on a proposal by President Truman, the United Nations took Trusteeship of the Marshall Islands (Occupied Enemy Territories) and gave the United States Administering Authority in April 1947, with a charge to protect the health and lands of the inhabitants (Brown 2014; DOE 1994:iii–28; Kunkle and Ristvet 2012:4, 19; Kunkle et al. 2018a, 2018b; Machen et al. 2010:94). This section does not detail the subsequent actions—social, political, financial, and legal—made by the Marshallese, the United Nations, or the United States regarding the trusteeship and subsequent agreements; for this history, the reader should consult other sources, such as Meade and Meade 2018.

President Truman approved development of a proving ground within the Nellis Air Force Base Gunnery and Bombing Range in December 1950. By February 1951, the United States had established the Nevada Proving Ground for nuclear testing. This location was renamed the Nevada Test Site in 1955 and the NNSS in 2010. From July 1946 to June 1966, a very few other tests were conducted within the Nellis Air Force Range (present-day Nevada Test and Training Range); in the Pacific Ocean near Johnston Atoll, on Christmas Island, and outside of San Diego, California; in the South Atlantic Ocean; in Carlsbad, New Mexico; in Fallon, Nevada; in Hattiesburg, Mississippi; and on Amchitka Island, Alaska. All tests were tracked as atmospheric (at the surface; from a barge or tower; or via an airburst, airdrop, balloon, or rocket), underground (from a crater, shaft, or tunnel), or underwater (Atomic Heritage Foundation 2019c; DOE 1994:iii–28; Fehner and Gosling 2006:44–46, 75, 126; Kunkle et al. 2018a, 2018b; Machen et al. 2010:94).

As explained by Laboratory senior historian Alan B. Carr (2020d:1–2), the United States conducted nuclear testing for many reasons, including to

- verify that weapons would work,
- explore what weapons could do in combat,
- improve and advance weapon designs,
- confirm the reliability of stockpiled weapons,
- test weapon delivery systems,
- ensure that weapons would not detonate accidently,
- assess potential weapon vulnerabilities,
- study explosion phenomenology, and
- explore potential peaceful uses (such as large-scale excavation and fracking).

Early Cold War Era (1945–1956)

At the end of 1945, the United States had two nuclear weapons in its stockpile. The first nuclear test series, Operation Crossroads, occurred in June–July 1946 at Bikini Atoll in the Pacific Ocean. The Laboratory manufactured the plutonium components of two Fat Man–type devices and directed two tests, which were requested by the Joint Chiefs of Staff and approved by President Truman. Before the tests, the military moved more than 160 inhabitants of Bikini Atoll to Rongerik Atoll. Focused on the effects of an atomic weapon on naval forces both from an airdrop and from underwater, this test series used 95 scrapped and anchored World War II ships. The operation's task force included more than 40,000 people. To explore the biological effects of nuclear weapons, the test included almost 5,500 test animals placed on the ships. Unexpectedly, the second detonation (Baker device) created a serious radiation problem and deposited more radioactive material than expected on the remains of the anchored fleet (Figure 3-28). During the post-blast survey, retrieval of animals and decontamination, personnel exposure levels climbed (Bass 2008; Brown 2014; Carr 2020d:4–6; DOE 1994:1; Fehner and Gosling 2006:30–32; Kunkle et al. 2018a; Machen et al. 2010:12, 69, 94; McGehee and Garcia 1999:15, 71; McGehee et al. 2003:15). As noted by DOE senior historian Terrence R. Fehner and Deputy Federal Preservation Officer F. G. Gosling (2006:32):

> A worried Stafford Warren, who headed the testing task force's radiological safety section, concluded that the task force faced "great risks of harm to personnel engaged in decontamination and survey work unless such work ceases within the very near future." With exposure data in hand, Warren prevailed and decontamination operations ceased.

The task force canceled a planned third detonation. By the end of 1946, the United States had nine nuclear weapons in its stockpile (Carr 2020d:5–6; Fehner and Gosling 2006:32).

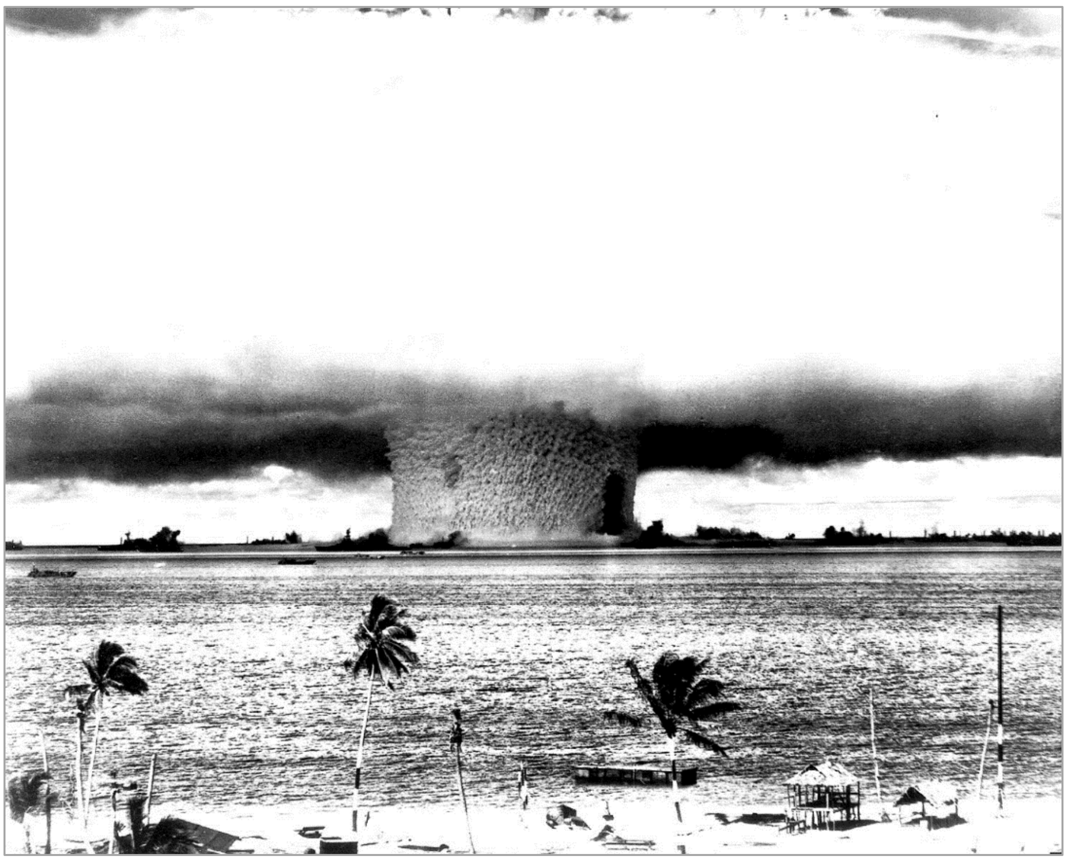

Figure 3-28. Detonation of Baker device at Bikini Atoll during Operation Crossroads test series, July 24, 1946 (NNSS image, negative no. NTS-XX71).

The AEC took over atomic energy activities in the United States on January 1, 1947. Responsibilities were shared with the Armed Forces Special Weapons Project, a group established from military vestiges of Manhattan Project personnel. The AEC was responsible for the design and manufacture of nuclear weapons and the handling of special nuclear materials, whereas the Armed Forces Special Weapons Project maintained the nuclear stockpile and participated in field testing. The United States had only 13 unassembled nuclear weapons in its stockpile in 1947, primarily due to the scarcity of weapons-grade fissionable materials. Although Laboratory weapons designers theorized ways to use the limited supply of radioactive materials more efficiently, they could prove their theories only through full-scale tests. The demand for nuclear weapons grew as the Cold War intensified, and the Laboratory proposed a 1948 test series to assess weapon design instead of weapons effects. The location was debated because the United States faced worldwide criticism for its poor handling of the Bikini Atoll population. President Truman opposed continental tests; the Joint Chiefs of Staff strongly opposed returning to the Trinity Site; the AEC favored continuing tests in the Pacific Ocean; and Laboratory staff wanted to return to Bikini Atoll (Carr 2020d:5–6; Fehner and Gosling 2006:32–33, 36; Machen et al. 2010:12).

The 1948 Operation Sandstone test series occurred at Enewetak Atoll, south and west of Bikini Atoll. Compared with Bikini Atoll, Enewetak Atoll had a larger land area, was more isolated, and received less rain. The military relocated 142 residents from Enewetak Atoll in advance of the tests. The military headed up the Joint Task Force, and the Laboratory directed the three tests. Investigations included measurements of gamma rays (Teller Light) and alpha particles, an electromagnetic pulse study, and observations of fireball growth. Information learned from this test series led to the mass production of weapon components through the use of assembly-line manufacturing techniques (DOE 1994:1, 2015:2–3; Fehner and Gosling 2006:33–34; Kunkle et al. 2018a; Machen et al. 2010:69, 92).

Importantly, it was during this test series that the term “fallout” was first used. Observations were made of radioactive rain occurring 400 miles away on the day after the detonation of the Yoke device, which had the largest explosive yield yet (Kunkle et al. 2018a). When discussing the hazards of experimental or accidental detonation of nuclear weapons, Langham and others (1955:3) shared that the “hazard results from residual plutonium deposited in the fall-out pattern, which may produce chronic contamination over a long period of time.” Fallout became the principal danger of nuclear testing. Carr (2020d:2) summarized the term and its potential prevention and consequences with respect to the Trinity test:

> During a nuclear test, particles that come in contact with the fireball are irradiated and a portion of the material is ejected into the atmosphere. Eventually, these contaminated particles fall back to earth, hence the infamous term: fallout. To minimize the dangers of fallout, nuclear tests (including Trinity) were generally performed in very arid regions. Ideally, the irradiated particles would climb high into the atmosphere and be evenly dispersed across the globe at very low levels, which posed no significant threat to people. Precipitation, however, would drive irradiated particles back to earth quickly in a very concentrated area; this concentration of radioactive material could be very hazardous to anyone below. As such, weather was an important consideration in selecting the bombing range as the location for the test.

Petersen (1995), remembering back to the schism within the scientific community on the effects of fallout, shared,

> [Some] thought that we had already caused a disaster. Others [said] that we simply had to test in order to defend ourselves, the way the world [was]…. Then there was the group that said, ‘This can’t be a concern in a vacuum. It has to have some kind of a quantitative understanding associated with it. How much fallout have we dumped? What is the concentration of this fallout on the land surfaces? What is the contamination [of the] food chain? How fast is it going into people, with special emphasis on the very young, because they are the ones that are laying [bone] down at the fastest rate?’ That whole

> business, the next generation of radiation effects, the early carcinogenesis studies which were not terribly successful, [are examples of studies resulting from that group's concern].

Renewed, albeit safeguarded, conversations about establishing a continental nuclear testing site resumed. Although a continental site would resolve existing challenges of Marshallese stewardship, access, logistics, weather forecasting, safety, and security, it could have serious domestic-relations problems. Navy Captain Howard B. Hutchinson of the Armed Forces Special Weapons Project researched the idea of a continental testing site under Project Nutmeg. As noted by Fehner and Gosling (2006:36), "Under suitable conditions, Hutchinson stated, it did 'not seem probable that harmful concentrations of soluble radio isotopes' could result from nuclear testing" at a properly engineered site. Hutchison narrowed his preferred locations to the arid southwest and the humid southeast. In the southwest, he liked New Mexico, because the state had already endured an atomic test, the Laboratory was located within its bounds, and atomic bombs were stored at Sandia Base just outside of Albuquerque. In the southeast, he liked the North Carolina Coast between Cape Hatteras and Cape Fear because prevailing winds could take any unexpected radioactive fallout to the Atlantic Ocean (Fehner and Gosling 2006:36–37).

Nuclear weapons are of two basic types: a fission (atomic) bomb and a thermonuclear (hydrogen) bomb. Fission bombs, such as those used in World War II, split uranium or plutonium atoms. A thermonuclear bomb—a theory first proposed by Fermi in 1941—is a nuclear explosive device in which more than half of the total explosive yield comes from fusion reactions. Fission bombs have upper limits to their explosive yields and thermonuclear bombs do not. In 1948, the nation increased its nuclear stockpile to 50. On August 29, 1949, the Soviet Union secretly detonated their first fission bomb. By the end of 1949, the United States had 170 nuclear weapons in its stockpile and was debating thermonuclear-bomb development. In January 1950, President Truman accelerated atomic weapons development, including research into a thermonuclear bomb. The administration tasked the Laboratory with a rapid determination of the technical feasibility of a thermonuclear device (Carr 2020d:6, 2020e:7; Fehner and Gosling 2006:34, 38; Kunkle et al. 2018a; Machen et al. 2010:91–92). Historian Judy Machen and others (2010:92) note that this effort became the Laboratory's first Cold War weapons program.

Project Nutmeg was revived when war broke out on the Korean Peninsula, and national priorities changed. The stakes were high, and on November 30, 1950, President Truman indicated at a press conference that atomic weapons were a viable option for use in the Korean conflict. He subsequently directed the AEC, assisted by the DoD, to identify a suitable continental nuclear testing site. With Project Nutmeg results in hand and a recommendation by the Laboratory's J Division Leader Dr. Alvin Graves, the National Security Council for Atomic Energy chose the Nevada location. Bradbury felt that the Nevada site had a degree of public radiological safety that exceeded the other two options—the Wendover Bombing Range at Dugway Proving Ground in western Utah and the White Sands Proving Ground (formerly part of the Alamogordo Bombing Range) in south-central New Mexico (Atomic Heritage Foundation 2019c; Carr 2020d:7; Fehner and Gosling 2006:38–44; Kunkle et al. 2018a).

Operation Ranger was the first test series at the newly established Nevada Proving Ground. Conducted in 1951 by the Laboratory, five tests studied a low-yield detonation, measurements of alpha particles, potential design flaws, and manned and unmanned aircraft penetrations of atomic clouds. The manned flights measured gamma ray doses, and the unmanned flights collected atomic cloud samples. Next to performance, radiological safety was of critical concern. Shipman, the Laboratory's Health Division leader at the time, directed the radiological survey work. He expected only the most minimal exposure by Operation Ranger to any offsite population but developed emergency plans for any unexpectedly high exposures. Subsequent radiological surveys indicated no areas of significant activity. However, of little apparent consequence, radioactive snow subsequently fell in the midwestern and northeastern United States due to radioactive materials caught in high-altitude winds. Notably, the Laboratory would play a much larger role in continental tests than they did in Pacific Proving Ground tests (DOE 1994:1, 2015:2–

3; Fehner and Gosling 2006:45–46, 55–57, 61–65; Kunkle et al. 2018a; Petersen 1995; Shipman 1958:68).

Other 1951 test series included Operation Greenhouse, Operation Buster, and Operation Jangle. The Laboratory directed the four tests of the Operation Greenhouse test series in the Pacific Proving Ground. The proof-of-principle test using the George device demonstrated that a fission device could detonate a secondary hydrogen device. The Nevada Proving Ground hosted Operation Busters and Jangle. Operation Buster included five tests directed by the Laboratory and involved ground-level tests, the first troop participation exercises, and the first airdrop from a jet aircraft. Operation Jangle included two tests codirected by the Laboratory and the DoD. This test series observed the first underground nuclear detonation (Uncle device) by the United States. Several Health Division groups supported the test series, including the H-1 Monitoring Group, H-4 Radiopathology Section, H-5 Industrial Hygiene Group, H-6 Special Problems Section, and H-6 Test Operations Section. Operation Greenhouse had a large biomedical component (Atomic Heritage Foundation 2019c; Carr 2020d:7, 9, 2020e:18; DOE 1994:1–2, 2015:2–3; Fehner and Gosling 2006:65–72; Kunkle et al. 2018a; Langham and Storer 1953:76; Machen et al. 2010:12, 92; Petersen 1995; Shipman 1953:22, 44, 65, 69, 1954:43, 53). Relaying his memories about the Laboratory's participation in the early test series, Petersen (1995) stated,

> So there is a thread that goes through from early times, where Los Alamos had virtually entire responsibility for health and safety. Then, the military started to involve their people beyond Buster Jangle, which incidentally [annoyed] Tom Shipman here because he had the whole responsibility dumped in his lap at a very late time, when it was very, very difficult to acquire enough competent people to assume the extra health and safety responsibilities that [the] combined Buster and Jangle tests [required]. You see, in the early times, Los Alamos had a pretty good handle on everything. That is, Los Alamos H Division in health and safety, and also in describing what's going to happen in the biomedical tests.
>
> The first of the Pacific tests, [Greenhouse], [that] did have a major biomedical component, had a director from the University of Chicago, George LeRoy. Much of the preliminary [investigation] was done here. Baselines were [established] here [and at] Oak Ridge. The whole AEC community participated in those tests. The whole AEC community representatives largely were responsible for defining what the test program looked like from the standpoint of experimental design, what biological questions were asked, what biological questions were answered, what test object would be involved, would it be mice [or] would it be something else[, etc.].
>
> Then, as the military started using the continental tests as a familiarization tool for units—combat regiment-sized groups of people, five thousand [troops at a time]—the health and safety headaches had to be spread out, and military responsibility for health and safety started.

By the end of 1951, the United States had 438 nuclear weapons in its stockpile and 4 new weapon types. The 1952 Operation Tumbler-Snapper test series occurred at the Nevada Proving Ground. Eight tests were directed by the Laboratory, with three of those codirected by the DoD. Scientists studied shock velocity, shock overpressure, and explosion yields, and notably atomic clouds using remotely piloted aircraft with Laboratory-designed wing-tip sampling pods. Unfortunately, one of the detonations caused the first known livestock injuries since the Trinity test, but there were no hazards to test personnel. Once again, several Health Division groups were on hand to support, including the H-1 Monitoring Group, H-3 Safety Group, H-5 Test Operations Section, H-6 Meteorology Section, and H-6 Test Operations Section (Carr 2020d:7; DOE 1994:2, 2015:2–5; Fehner and Gosling 2006:79–80; Kunkle et al. 2018a; Shipman 1953:9, 22, 38–39, 43–45, 67, 1954:53, 56).

Designed, fabricated, and assembled at the Laboratory, the United States detonated the first thermonuclear bomb (Mike device) on October 31, 1952. It stood 20 feet tall, had a diameter of 7 feet, and weighed 82 tons (Figure 3-29). Using the fission-fusion concept developed by the Laboratory, it was set off on Elugelap Island in the Enewetak Atoll in the Pacific Proving Ground during Operation Ivy. With a 10.4-megaton burst and a 3-mile-wide fireball, the blast disintegrated the island, left a near-mile-wide crater, and deforested nearby islands. Several Health Division groups supported the two Laboratory-directed tests of Operation Ivy, including the H-1 Monitoring Group, H-3 Safety Group, H-5 Industrial Hygiene Group, H-6 Radiologic Physics Group, and H-6 Special Problems Section (Carr 2020d:9; DOE 1994:2, 2015:4–5; Fehner and Gosling 2006:79–80, 84; Kunkle et al. 2018a; Machen et al. 2010:92; Shipman 1953:7, 22, 39, 45, 51, 62, 1954:53–54).

Figure 3-29. The Laboratory's Test Director Marshall Holloway (center) and colleagues standing in front of the Mike device (Operation Ivy) on Elugelap Island in the Enewetak Atoll in the Pacific Proving Ground (LANL image, negative no. P-66:C246009).

By the end of 1952, the Health Division had participated in at least five test series. In addition to many specific tasks, they were also responsible for providing radiation-safe trainings to staff and personnel at both the Pacific Proving Ground and the Nevada Proving Ground; directing off-site air sampling and monitoring within a 200-mile radius of the Nevada Proving Ground; and providing advice whenever sought by J Division, other Laboratory divisions, AEC's Santa Fe Operations Office, AEC's Division of Biology and Medicine, or the military (Shipman 1953:6–7, 10–11, 22). At this time, Shipman (1953:9) wrote,

> Participation in tests which are inflated beyond recognition by military activities is a luxury which the Division simply cannot afford. We cannot do two major jobs at the same time. A small operation in Nevada involving only air drops, much on the same pattern as Operation Ranger, could probably be handled by H-Division with a minimum of outside help. Large operations such as Tumbler-Snapper, circuses without cakes, go far beyond the abilities of our limited staff unless the Laboratory is to be temporarily abandoned.

President Dwight D. Eisenhower set a new defense policy in July 1953 that had a greater reliance on nuclear weapons. The 1953 Operation Upshot-Knothole test series at the Nevada Proving Ground comprised Upshot weapons-development tests and Knothole military-effects tests. Of the 11 tests, the Laboratory directed 8, the Laboratory and the DoD codirected 1, and RLL directed 2. Notably, the test series included the only airburst delivery by the United States, a collaboration between the Laboratory and Picatinny Arsenal in Wharton, New Jersey. Like previous test series, Operation Upshot-Knothole integrated troop maneuvers, performed manned penetrations of atomic clouds, and conducted biomedical tests on animals. The latter included two drone aircraft each carrying 60 mice and 2 monkeys that flew through the atomic cloud. Once the aircraft landed, the animals were taken to the Laboratory for examination. This test series also hosted the Federal Civil Defense Administration and an array of effects experiments—using trucks, cars, backyard shelters, and wood-frame buildings with basement shelters, furniture, mannequins, and household items (Carr 2020d:9–10; DOE 1994:2–3, 2015:4–5; Fehner and Gosling 2006:88–95; Kunkle et al. 2018a; LASL 1954:4).

Operation Upshot-Knothole experienced a large problem with radioactive fallout. Several communities, including St. George, Utah, and at least two Nevada highways experienced off-site exposures. Laboratory Test Director Graves requested state and local police to set up roadblocks to monitor cars for radioactivity. The DoD had increased the AEC's allowable radiation dose limits to 6.0 roentgens for any one test or in a 6-month period. During the test series, one battalion and several military volunteers were exposed to 4.8 to 16.3 roentgens, and they were immediately evacuated. The surrounding communities reported numerous livestock deaths and injuries. Of this test series, the Harry device caused the highest amount of radioactive fallout of any test in the United States, which later garnered it the name Dirty Harry (Atomic Heritage Foundation 2019c; Fehner and Gosling 2006:103–112). Carr (2020d:9) stated, "It has been estimated that the Upshot-Knothole tests produced about 50% of all radiation doses received by populations neighboring the test site during the era of testing."

The Health Division provided support during the Operation Upshot-Knothole test series, including the new occupants of HRL. The H-4 Biomedical Research Group investigated the radiation hazards to personnel who had flown through atomic clouds and studied dermal lesions on regional sheep. The H-5 Test Operations Section directed the offsite monitoring program using knowledgeable personnel from the U.S. Public Health Service and the DoD. They monitored air, water, milk, and soils for radioactivity up to 200 miles away from the detonation; directed and participated in roadblocks; checked vehicles and ran decontamination stations; alerted residents and investigated complaints and special problems; and interviewed residents and public officials. While on site, they provided information to the radiological safety team and directed the fallout studies. Upon return to the Laboratory, they reviewed and compiled the collected data. Through analysis and subsequent research, they developed a way to measure the activity of individual particles of fallout. The H-3 Safety Group, H-6 Nuclear Field Test Section, and H-6 Meteorology Section provided additional division support (LASL 1954:4, 41–42; Richmond and Sullivan 1974:xviii; Shipman 1953:56–57, 1954:10–12, 31, 37–38, 50–52).

Following the Soviet Union's announcement in August 1953 that they possessed a thermonuclear bomb, the United States began investigating whether a superweapon could be produced in a short period. Although it was a thermonuclear device, Mike was not a deliverable weapon. The already planned spring 1954 Operation Castle test series in the Pacific Proving Ground—expanded in the spring of 1953 to include Bikini Atoll—was redirected toward the testing of superweapons and fallout theories (Carr 2020d:10; Fehner and Gosling 2006:113; Kunkle et al. 2018b; Kunkle and Ristvet 2012:4). Thomas D. Kunkle and others (2018b) noted, "Ideas as to how to build thermonuclear bombs were as common at Los Alamos as screen plays in Hollywood. Perhaps more than any other single person, it was Marshall Holloway who translated scientific fantasy into actual, functioning superweapons." The first thermonuclear gravity bomb was ready for service in February 1954, without ever having been tested (Kunkle et al. 2018b).

The Operation Castle test series was planned for both Bikini and Enewetak Atolls. All with projected megaton[3] yields, the Laboratory directed five of the six shots. Radioactive fallout beyond the immediate area of the two atolls was deemed unlikely. On February 28, 1954, the United States conducted its largest nuclear test when they detonated the Bravo device—the first of the Operation Castle test series—at Bikini Atoll (Figure 3-30). At 15 megatons, it yielded more than twice the anticipated 6 megatons. The blast sent large radioactive particles into the stratosphere, and then they plunged back to Earth. The radiation levels were surprisingly high both onsite and downwind, and test personnel immediately experienced hazardous conditions. In a control bunker 20 miles from the detonation site, radioactivity measured 800 roentgens, and ships stationed 30 miles from the site experienced up to 5 roentgens of radioactivity. While the fallout cloud drifted east toward neighboring atolls, evacuations of test personnel ensued (Brown 2014; Carr 2020d:10; DOE 1994:3, 2015:4–5; Fehner and Gosling 2006:114–116; Kunkle et al. 2018b; Machen et al. 2010:94).

One day after detonation of the Bravo device, the U.S. Air Force evacuated military personnel stationed at a weather station on Rongerik Atoll—133 miles from ground zero—where exposures measured 40 to 98 roentgens. The day after that, 82 residents were evacuated from Rongelap Atoll, where doses were estimated at 100 to 125 roentgens. Islanders of Rongelap and Ailinginae Atolls experienced symptoms of high radiation exposure. The military also evacuated residents of other nearby islands, including Rongerik and Utirik Atolls. Approximately 665 residents received radiation overexposures from the Castle-Bravo blast, and approximately 236 Marshallese were evacuated during the emergency. Two weeks later, a Japanese fishing boat arrived home with a crew of 23 who were suffering from radiation exposure—approximations range from 130 to 450 roentgens. The *Daigo Fukuryu Maru* was 100 miles east of Bikini Atoll, trawling for tuna, when the Bravo device was detonated. The remaining tests were reshaped and subjected to much more stringent weather criteria using an expanded danger zone. Subsequent to these tests, HRL occupants in the H-4 Radiobiology and Biochemistry Sections conducted urinalysis of test personnel, Rongelap islanders, and the Japanese fishermen exposed to radioactive fallout. Samples were flown to the Laboratory, where gross and detailed gamma and beta assays were conducted. They determined internal contamination was negligible compared with the external gamma radiation dose received from fallout. The H-3 Safety Group, H-6 Meteorology Section, and H-6 Nuclear Field Test Section provided additional division support (Carr 2020d:11, 2020e:9; Fehner and Gosling 2006:114–116; Kunkle and Ristvet 2012:2; Langham and Storer 1955:4–5, 20, 43, 54–55; Shipman 1954:10–12).

[3] A megaton is the energy of a nuclear explosion that is equivalent to the explosive power of one million tons of TNT.

Figure 3-30. Detonation of Bravo device during Operation Castle on Bikini Atoll in the Pacific Proving Ground, February 28, 1954 (Defense Threat Reduction Information Center image, negative no. DTRIAC 22-AQB1-13).

Operation Castle made thermonuclear weapons a reality, completely revolutionized atomic weapons development, and solidified opposition to atomic testing for its long-term implications on international relations and humanity. Extremely disturbed by the dangers posed by thermonuclear weapons, President Eisenhower gave an “Atoms for Peace” speech to the United Nations assembly on December 8, 1953. Subsequently, he pressed his administration to explore curbing the arms race or setting a moratorium on large-scale testing. The State Department, the AEC, both laboratories (LASL and RLL), and the DoD all opposed a nuclear testing moratorium because it was not seen to be in the national interest (Fehner and Gosling 2006:116–120; Kunkle et al. 2018b; Machen et al. 2010:93). As noted by Fehner and Gosling (2006:123), “Radioactive fallout set the context for nuclear weapons testing over the remainder of the decade. No respecter of national boundaries, fallout had spread worldwide and become a contentious international issue.”

Fallout became the primary concern, affecting yield, type, and location of all tests. In preparation for the 1955 Nevada Test Site test series Operation Teapot, the H-4 Radiobiology Section conducted calibration experiments on film packets and studied the effect on mice of radiation and cold stress. The H-4 Biophysics Section worked with Columbia University to prepare for tissue-equivalent ion chamber measurements. Air-sampling stations, set up atop HRL and at Sandia Base in Albuquerque, were activated the first day of testing. Precipitation samples were collected in a pan outside of HRL and at the TA-01 weather station. Results reflected that air concentrations of beta activity increased up to ten times the baseline after each shot. Operation Teapot’s 14 tests included tests by both laboratories and a Laboratory-DoD test. Experiments sought to improve small weapons for tactical applications and examine a fireball’s interaction with nearby structures. Due to advocating by U.S. Test Director Graves, the AEC was as transparent as they could be about Operation Teapot, especially regarding offsite exposures to civilian populations. Operation Wigwam, a Laboratory-DoD test also conducted in 1955, was the first underwater test by the United States (Carr 2020d:11; DOE 1994:3–4, 2015:4–7; Fehner and Gosling 2006:123–126, 139; Johnson 1956:2–4; Kunkle et al. 2018b; Langham and Storer 1955:43, 70, 77, 80, 97, 100).

In 1955–1956, the Laboratory conducted Operation Project 56 at the Nevada Test Site. The test series of four detonations included safety experiments that significantly alerted the nuclear weapons community that the nuclear stockpile was not safe and could be set off accidently. If that was not enough, a recovery team recorded radiation exposures ranging from 4.3 to 28 roentgens after the No. 4 device and plutonium contamination measuring 10 by 2 miles after the entire series. Subsequently, safety tests became part of the regular testing program. The United States conducted Operation Redwing in 1956 in the Pacific Proving Ground. Both laboratories participated in the series of 17 tests, and the Laboratory codirected one test with the DoD. Goals were to proof-test the stockpile, continue tests on developmental weapons, advance research on new techniques and designs, and further the DoD's weapon effects program. The test series also included the first airdrop by the United States of a thermonuclear weapon (Carr 2020d:12; DOE 1994:4–5; Fehner and Gosling 2006:143–146; Kunkle et al. 2018b). In June 1956, the National Academy of Sciences-National Research Council published *The Biological Effects of Atomic Radiation: A Report to the Public*, which "called for stringent limits on off-site exposures" (Fehner and Gosling 2006:153).

First Decade of the Late Cold War Era (1956–1966)

The test series of 1957 included Operation Project 57 in the Nellis Air Force Range and Operations Plumbbob and Project 58 at the Nevada Test Site. Operation Project 57 was one safety experiment on plutonium dispersal, and Operation Plumbbob comprised 29 tests. Significantly, during Operation Plumbbob, the Laboratory conducted the first true underground test with the Pascal-A device in a shaft, and RLL conducted the first contained underground detonation (Rainier device) with no radioactive release detected. Operation Plumbbob also saw the first test by the United States using a balloon (Lassen device) and a rocket (John device), or air-to-air missile. Operation Plumbbob exposed 3,000 service personnel to high levels of radiation and was responsible for approximately 32 percent of all civilian exposure to radioiodine from atmospheric tests. The Operation Project 58 test series created fallout measuring 50 roentgens on the nearby highway, which continued over neighboring Jackass Flats and then on to Los Angeles, California, where they had very low readings. By the end of 1957, the United States had 5,543 nuclear weapons in its stockpile (Atomic Heritage Foundation 2019c; Carr 2020d:12, 2020e:18; DOE 1994:5–6, 2015:8–11; Fehner and Gosling 2006:159–160, 178, 186; Kunkle et al. 2018b).

The Soviet Union launched Sputnik, the first space satellite, on October 4, 1957. Nikita Khrushchev, who became the Soviet Premier in March 1958, announced the discontinuation of all nuclear testing and requested the same of other nuclear countries. The United States conducted five test series between February and October 1958: Operation Project 58 A at the Nevada Test Site, Operation Hardtack in the Pacific Proving Ground, Operation Newsreel on Johnston Atoll (700 miles west of Hawaii), Operation Argus in the South Atlantic Ocean, and Operation Hardtack II at the Nevada Test Site. Notably, one of the Operation Newsreel exoatmospheric tests (Teak device) triggered the first high-altitude electromagnetic pulse. President Eisenhower announced a 1-year nuclear testing moratorium on August 22, 1958, to end all nuclear testing by the United States on October 30. Operation Hardtack II was originally named Operation Millrace; its name was changed after President Eisenhower's moratorium announcement to avoid potential criticism for starting a new test series. Operation Hardtack II would now focus on exploring methods to detect underground detonations. In 1958, the United States added 12 new weapons types to its stockpile (Carr 2020d:12–14; DOE 1994:6–10; Fehner and Gosling 2006:184–187, 190, 193; Kunkle et al. 2018b; Machen et al. 2010:94).

Fehner and Gosling (2006:195) noted,

> The moratorium was not entirely unwelcome in the testing community. After a record seventy-seven nuclear weapons tests in 1958, the testing system, noted one participant, “was tired, tired, tired.” Sufficient data existed from the Hardtack I and II and Argus shots to keep weapon scientists busy for at least a year or two.

During the moratorium, the United States worked on indirectly related activities. These projects helped to keep the nuclear testing apparatus (staff and infrastructure) in a state of readiness. Hydronuclear tests, pioneered by LRL, were conducted at the Laboratory during the moratorium. Preapproved by President Eisenhower, these tests used very small amounts of fissile material and produced fission yields less than the device’s built-in high explosives. In 1959, the United States added nine new weapons types to its stockpile (Carr 2020d:13–15; Fehner and Gosling 2006:195).

Talks failed with the Soviet Union, and President Eisenhower announced that the voluntary nuclear testing moratorium would expire on December 31, 1959. While testing remained on hold, weapons manufacturing did not. Talks continued to flounder, and on August 30, 1961, the Soviet Union announced their resumption of nuclear testing. Moving quickly, they conducted 50 atmospheric tests in 60 days, with a combined yield that totaled more than all previous tests of all nations combined. The nuclear testing community put pressure on President Kennedy for the United States to resume atmospheric nuclear testing. Reluctantly, he agreed, but nuclear testing would have to be conducted without fallout. The 1961 Operation Nougat test series at the Nevada Test Site ran from September to June 1962, and all but one test was conducted entirely underground. The test series also included the first joint United States-United Kingdom test (Pampas device) on March 1, 1962. Almost all of the tests vented radioactive clouds, and fortunately, almost all were minor releases. The exception was the Des Moines device. Detonated by the LRL, it spewed radioactive debris across a canyon at the test site. A radiation safety monitor 10 miles away had to take immediate cover, and within a week, analysts found contaminated milk in Spokane, Washington (Carr 2020d:15–18, 21; DOE 1994:10–12; Fehner and Gosling 2006:197–198; Kunkle et al. 2018b).

Bowing to pressure for renewed atmospheric testing, President Kennedy approved Operation Dominic. The first atmospheric tests conducted by the United States since October 1958, the test series was conducted from April to October 1962 on Christmas Island, which was owned by the United Kingdom and located southwest of San Diego, California. Notably, an LRL device (Frigate Bird) was the first and only fully operational test of a nuclear-tipped missile. October 1962 saw the largest nuclear test by the Soviet Union. The Tsar Bomba device yielded 50 megatons, or a blast three times more powerful than the Castle Bravo device. This month also saw the beginning of the Cuban Missile Crisis, a time when nuclear war seemed imminent. Even during the crisis, both nations continued to test (Carr 2020d:17–18; DOE 1994:12–17; Fehner and Gosling 2006:198; Kunkle et al. 2018b).

The fiscal year 1963 (July 1962–June 1963) test series encompassed Operation Sunbeam at the Nevada Test Site, Operation Fishbowl in the Pacific Proving Ground, Operation Storax at the Nevada Test Site, and Operation Roller Coaster within the Nellis Air Force Range. The DoD directed both Operation Sunbeam and Operation Fishbowl. Operation Storax saw an LRL shot (Sedan device) that resulted in the largest crater at the Nevada Test Site. Operation Roller Coaster was the first joint United States-United Kingdom test series and included the last atmospheric test conducted by the United States. It is notable that the United States conducted more nuclear tests during 1962 than in any other year. In the 1961–1962 period, 15 new weapons types were added to the nuclear weapons stockpile that then totaled 25,540 (Carr 2020d:18–19, 2020e:18; DOE 1994:15–19; Fehner and Gosling 2006:198–199; Kunkle et al. 2018b).

President Kennedy gave his “peace speech” in June 1963, and in July, Soviet Premier Khrushchev proposed a ban on nuclear tests in the atmosphere, in outer space, and underwater. Ratification of the

Limited Test Ban Treaty in August 1963 by the United States and the Soviet Union sent all United States' nuclear testing underground, which left many unanswered questions about nuclear weapons effects beyond the atmosphere. Operation Niblick, the 1964 test series; Operation Whetstone, the 1965 test series; and Operation Flintlock, the 1966 test series, were conducted primarily at the Nevada Test Site. Each series also conducted one test outside of the Nevada Test Site: Fallon, Nevada; Hattiesburg, Mississippi; and Amchitka, Alaska; respectively. Scientists used these one-off tests as nuclear test detection research experiments (DOE 1994:10–28; Fehner and Gosling 2006:199; Kunkle et al. 2018b).

The participation of HRL tenants in nuclear testing appears to have waned after 1955, when most of their associated activities were shifted to other groups in other buildings. However, in that same year, the presence of cesium-137, a byproduct of worldwide nuclear fallout, was discovered in man. Shortly after this discovery, the H-4 Biomedical Research Group (and subsequently the H-4 Biological and Medical Research Group and the H-4 Mammalian Radiobiology Group)—in coordination with AEC's Division of Biology and Medicine and later Oak Ridge National Laboratory—began measuring cesium-137 in a controlled population of Los Alamos area residents (Shipman 1958:68). First reported in 1960, these investigations continued at least through 1976 (Anderson and Sullivan 1975; Langham and Shipman 1961a, 1962, 1964a, 1964b, 1965, 1966; Ott 1968; Petersen and Sullivan 1977; Richmond and Sullivan 1974; Richmond and Voelz 1972, 1973). As noted by Shipman (1958:68), "These studies . . . represent perhaps the most meaningful documentation of the temporal changes in men of a radioactive material released to the environment."

Bioscience: Occupational Health, Bioassay, and Health Physics

Early Biological Research at the Laboratory

Following World War II, the biological science program evolved and expanded to keep pace with the Laboratory's growing research mission. For example, Laboratory biologists began to study the physiological effects of chemicals and other materials its workers were exposed to in carrying out defense-related programs (Machen et al. 2010:113).

Postwar Origins of the Health Division's Occupational Health Program (1947–1950)

Following the end of the Manhattan Project, the state of knowledge concerning radiation effects on humans and animals matured rapidly. Much of the Laboratory's earliest knowledge on radiobiology was derived from occupational hazards, including studies of exposure to the high-intensity beams of particle accelerators, comprehensive surveys of personnel exposed in the Daghlian and Slotin criticality accidents, and medical accounts of atomic bomb survivors from Hiroshima and Nagasaki. By 1950, the Health Division amassed a considerable amount of primary source information on the biological mechanisms of acute radiation syndrome, producing a three-volume analysis of the subject. Despite the rapid growth of the field, most of the research was still limited to the study of high-exposure accidents (Hempelmann and Lisco 1950:5).

The biological impacts of radiation would pose the greatest concern to the Laboratory's occupational health program in the immediate postwar era. Although the Laboratory's wartime Safety Committee had set guidelines on radioactive contamination and biological dose limits, many lessons learned between 1943 and 1945 were focused on immediate workplace hazards with only limited technical data on chronic radiological exposures. Occupational health guidelines were based on robust scientific consensus, bolstered by federal radiation protection standards established by the U.S. Public Health Service in 1940, yet the program had little in the way of resources to expand on its current base of knowledge (Hempelmann 1943:2, 1944:1–2, 8).

Due to the sheer scarcity and novelty of the materials synthesized at the Laboratory, such as polonium and plutonium, acceptable exposure limits were based on limited data obtained from animal experimentation and analysis of historic industrial radiological accidents. This state of highly limited, site-specific, health research remained in effect throughout the Manhattan Project era and well into early 1948 (Hempelmann 1944:4, 1986:4, 6; Hinch et al. 1945:5–7; Taylor 1984:3). Despite the pressures and expediencies faced during World War II, the Health Division would continually revise acceptable exposures to radiological material, as Hempelmann (1986:7) noted, ". . . there were levels of radiation that had been designated as being tolerable. They were called the maximum allowable dose, but these values kept going down and down as we learned more about [plutonium and polonium]."

Fundamental questions essential to occupational health and safety, such as acceptable limits of exposure for chronic radiation sources, were largely theoretical and based on the extrapolation of elements with roughly similar radioactive characteristics (Hempelmann 1986:4–5; Hinch et al. 1945:5–7). As Hempelmann would later recall (1986:5):

> But everything we did, including our operating procedures, using dry boxes and things was based on what we had learned from the radium dial painting operations. We based our ideas on toxicity on what had been found in the radium dial workers. The early ideas we had on tolerance were based on the difference in the activity of the two products (radium and plutonium).

Although the Laboratory had established basic techniques for bioassay and radiological safety by the end of World War II, health physics and occupational medicine were subject to the stress of a nuclear-research institution experiencing rapid growth and diversification. In the Health Division's 1949 annual report (LASL 1950:11), the H-1 Radiologic Safety Group identified deficiencies in its ability to monitor Laboratory staff for "contamination, overexposure, and misuse of radiation sources." Although a majority of the H-1 Group's concerns resulted from limited availability of personnel to monitor the growing number of routine radiological activities and experiments (which were rectified through a concerted hiring campaign between 1949 and 1950), concerns about long-term personnel exposures to radioactive materials were a lingering problem (LASL 1950:4, 11).

"One of the biggest headaches for 1950," to quote the Health Division's 1949 annual report (LASL 1950:6), came as a result of the Permissible Doses Conference held in Chalk River, Ontario, during September 29–30, 1949. Attended by representatives from Canada, the United Kingdom, and the United States, the purpose of this conference was to develop closer technical collaboration between the three governments in the field of radiation protection. Although the field of radiation protection had been an international endeavor before 1940, scientific bodies such as the International Council of Radiological Protection and the U.S. Advisory Committee on X-ray and Radium Protection had been decimated because nuclear research in the United Kingdom and United States focused on wartime applications. Though both bodies had been reconstituted following the end of World War II, the international exchange of research relating to radiation exposure was slow and limited because of difficulties in communications (Langham 1972:947; Taylor 1984:1–2, 4).

The initial impact of the Chalk River Conference on the Laboratory was an exhaustive discussion on acceptable dose limits on nuclear materials that—before the Manhattan Project—had been produced in miniscule quantities. Of particular interest to the H-1 Radiologic Safety Group were revised estimates on both the chemical toxicity and radiological body burden of plutonium and polonium in human subjects. Although considered a significant technical challenge in light of the group's limited staffing and occupational health duties, the H-1 Group considered the research to be of high importance and encouraged personnel to collaborate with the H-4 Biomedical Research Group on their studies. At the federal level, the AEC's Division of Biology and Medicine identified the need for developing long-term plutonium toxicity studies in animal species with longer lifespans than contemporary studies involving mice, rats, and rabbits. Federal interest in radioactive exposures would prove to be long-lived because research groups from the University of Utah, University of Rochester, Hanford Site, and the Laboratory would receive more than 20 years of uninterrupted funding into plutonium's effect on biological systems in canine species (Langham 1972:948; LASL 1950:11).

As greater attention and investments were focused on long-term exposure limits, the H-1 Radiologic Safety Group turned their attention toward building a more robust occupational health and safety culture within the Laboratory. Between 1949 and 1952, improvements in training and procedures would result in the first Laboratory-wide handbook for radiation monitoring. This handbook would be revised three times throughout the 1950s and included sections for maximum radiation exposure; permissible contamination levels; and monitoring of alpha, beta, gamma, and neutron radiation (Dummer and Barker 1958). By the time of HRL's occupancy, the H-1 Group had developed the first edition of the *Los Alamos Handbook*. Even though they were no longer colocated with the H-4 Biomedical Research Group and the H-5 Industrial Hygiene Group, their monitoring activities would remain heavily influenced by the primary research of the H-4 and H-5 Groups.

Maturation of the Occupational Health, Bioassay, and Health Physics Programs (1951–1959)

From pragmatic foundations during the Manhattan Project, bioassay and health physics research would see a significant outburst of activity during the early Cold War era. The Chalk River Conference of 1949 and subsequent tripartite meetings between health physicists from the United States, United Kingdom, and Canada over the next 5 years would have a transformative effect on the state of health research within the Laboratory. The early effects of this international collaboration were immediately felt within the Health Division. Although Los Alamos had devised analytical chemical techniques to detect the internal contamination of elements such as plutonium, polonium, and tritium in the late 1940s, the Laboratory faced numerous dilemmas in its bioassay and health physics programs. Of particular concern to Laboratory scientists were the long-term analysis of radiological impacts on living organisms and the adoption, adaptation, and improvement of radiation-monitoring equipment used by private industry and academic institutions outside the Laboratory. Dividing the research would be straightforward, with the H-4 Group's assuming responsibility for the Health Division's radiobiology research program that focused on the biochemistry of ionizing radiation. Meanwhile, the H-5 Group would focus on the improvement of radiation-monitoring devices (Clark 2005:1; Langham and Storer 1953:13; Shipman 1953:43, 54–56).

As atmospheric nuclear weapons testing accelerated in the early 1950s, a significant number of the H-5 Group personnel would support radiological-monitoring projects in the Nevada and Pacific Proving Grounds for the Buster-Jangle, Ivy, and Tumbler-Snapper series of atmospheric tests. The importance of this deployment was threefold: to protect personnel from radiological exposure, to estimate the absorption of radioactive isotopes from fallout in the environment, and to determine the lethality of high doses of radiation from weapons effects (Shipman 1953:22).

From 1952 to 1955, the H-5 Group initiated several multi-year studies to measure absorption of radioisotopes in plant and animal life around the United States, in addition to conducting long-term health studies of Rongelap natives (in collaboration with the H-4 Group). At the same time, the H-5 Group would collaborate with the DoD, AEC, and a wide variety of private industries as experts in the fields of radiation monitoring and occupational health. The H-5 Group's offsite support program would work extensively to monitor radiological activities for the DoD, Lawrence Radiation Laboratories, the Bendix Corporation, and Pantex, throughout the mid-1950s, until the offsite-monitoring program was transferred to the H-6 Radiologic Physics Group in 1956–1957 (Langham and Storer 1955:4; Shipman 1953:44–45, 51, 56–59; Shipman 1958:87).

The H-4 Biophysics section, in collaboration with the H-5 Industrial Hygiene Group, would make significant progress in the development of radiation-counting equipment. Although the majority of the Health Division's research in the early Cold War era focused on analytical chemistry techniques, the most important developments in bioassay would come from refinement and maturation of scintillation detectors for use as radiation counters. Although using scintillators to measure whole-body doses of radiation had been put into practice by multiple academic and commercial entities by the mid-1950s, Laboratory scientists were not satisfied with the fidelity of existing equipment. Emerging from the development of HUMCO I in 1955, the H-5 Organic Chemistry section would initiate a multi-year study to develop improved liquid-scintillation mediums that could count low levels of radiation with greater accuracy. Working with teams from Iowa State University, the University of Louisville, and the University of New Mexico, more than 100 compounds were tested to tackle the sensitivity problem. This research, spearheaded by Langham and conducted jointly with the Physics Division of Argonne National Laboratory, would be used in the development of HUMCO II (Langham and Storer 1955:47; Shipman 1958:50–52).

By the beginning of 1953, the Laboratory's health physics program was firmly established and collaborating extensively with researchers from the DoD and academic institutions such as the University of Utah. Researchers in the H-4 Group were engaged a wide spectrum of inquiries spanning from acute exposures of high-intensity gamma radiation on primates to early experiments with radioactive isotopes as biochemical tracers. Concurrent to this research was a long-term focus on measuring and assessing the immediate effects of radioactive materials for chemical toxicity and ionizing damage to cellular mechanisms such as cell division (Langham and Storer 1953:5, 12–13, 1955:17, 36, 42; Pickering et al.:1956; Shipman 1954:14).

The H-5 Group would find themselves focused on the development and refinement of sampling equipment designed to assess the body burdens of materials such as tritium, beryllium, arsenic, lithium, uranium, plutonium, and mercury throughout the 1950s. Although H-5 operated a variety of chemical and radiological assay techniques, many of these technologies provided limited sensitivity and were difficult to calibrate. As part of The Laboratory's mission, the Health Division tasked themselves toward the adoption, refinement, and upscaling of techniques pioneered in other laboratories throughout the United States. The H-5 Group's research during the 1950s included notable improvements in the detection of radioactive elements such as tritium, plutonium, and americium from urine samples. Considerable work was also made in the study of occupational exposures of other elements such beryllium, lead, cadmium, and mercury, leading to the group's development of a robust handbook of analytical procedures by the beginning of 1955 (Campbell and Head 1955; Hempelmann 1986:6–7, McClelland 1955; McClelland and Milligan 1954:3; Shipman 1953:45–48, 1958:78–80).

The timing of the Health Division's diversification was fortuitous, occurring at an equally transformative time within the Laboratory. As the early Cold War era progressed, it became apparent that the safety culture of Project Y was too informal to meet the challenges of nuclear weapons production. The CMR Division—whose responsibility included everything from preparing materials for basic research to developing metallurgical techniques necessary for special nuclear materials—would be an especially dramatic case in point. During the first half of the 1950s, the CMR Division was subdivided into the CMB and CMF Divisions,[4] each with their own unique health and safety challenges. CMB Division, which moved the Sigma Complex in TA-03, would form the foundations of the Laboratory's materials science program. CMF Division, with their operations firmly seated in TA-21, would be responsible for processing and manufacturing the special nuclear materials necessary for the production of the hydrogen

[4] The acronyms of CMB and CMF both stood for Chemistry-Metallurgy (Division). The "B" in CMB denoted Richard D. Baker, its original Division Leader, and the "F" in CMF denoted Robert D. Fowler, its original division leader (Carr 2020a).

bomb, nuclear rocket program, and radioisotope heat sources for deep space probes (Garcia et al. 2015b:5; McGehee et al. 2004:10–11; Schultz et al. 2019:8–9).

In the midst of this dramatic operational expansion, a program was established to study the long-term health effects of radiological material on human mortality. Starting in December 1952, Langham, Hempelmann, and a cohort of researchers from the H-4 Group initiated a long-term study to observe 27 Manhattan Project–era staff members who had absorbed small doses of radioactive material due to industrial accidents. The purpose of the research—essentially to gauge the chronic toxicity and health hazards of microgram quantities of plutonium—would evolve into one of the longest human health case studies at the Laboratory. Analysis of their absorbed doses and body burdens would be taken annually until 1976 through a combination of whole-body counting, hematology (red and white blood) cell counts, and urinalysis. The lattermost analytical technique, which would be a staple of bioassay until the development of more-sensitive whole-body counters and blood sampling in the late 1950s, would generate the moniker of the study (Shipman 1954:14; Voelz et al. 1978:4–5). To quote from George Voelz in a retrospective for *Los Alamos Science* (Voelz and Buican 2000:85), "Wright Langham, the originator of this ongoing study, roguishly called this tiny cohort of men the UPPU (or U-P-Pu!) club, a name by which they have been known since."

This project would eventually become the longest-running human study at the Laboratory, with annual reports conducted for 25 years. Today, the Manhattan Project Plutonium Worker Study is one of the longest occupational health case studies conducted by the Laboratory, with regular interviews and checkups on surviving personnel some 50 years after the study was inaugurated (Voelz and Buican 2000:85; Wiggs 2010).

Biomedical Research and Development

Early Genetics Research: Growth and Competition (1954–1962)

The Laboratory's involvement with genetics research began in 1954, little more than a year after the landmark discovery of the chemical structure of DNA. Physicists George Gamow and Nicholas Metropolis undertook the first published studies into the chemistry of genetics at the Laboratory, using the Laboratory's MANIAC I computer to examine how the 4 nucleic acids of DNA could be used to encode the 20 amino acids used to make proteins. Although interest in the field was high, the Health Division's investment in molecular genetics would take several years to develop. Yet, by 1960, researchers from the Health Division were studying genetic mutations by altering the DNA of viruses and allowing them to infect colonies of bacteria (Anderson 1986:743–744; Gamow and Metropolis 1954:779–780; Goad 1983:53). To quote Walter Goad, group leader of the Laboratory's GenBank in the 1980s, upon the state of genetics research during this period (Goad 1983:53):

> Before (automated) sequencing was possible, almost all of the advances in molecular genetics were based on making a single change, with radiation or chemicals, in the DNA of an organism and seeing what happens . . . In these experiments, you are essentially asking yes or no questions the way you do in the game of twenty questions.

As techniques for introducing genetic mutations became increasingly viable, the Health Division's genetic research program began in earnest in 1957. Spearheaded by the H-4 Biochemistry Section, a clear majority of the Laboratory's earliest investigations were influenced by the necessity to investigate ionizing radiation's impact on reactions and physical changes to structures ranging from individual cells to whole organisms. Many of the Health Division's early scientific investigations, such as a yearlong study to examine the behavior of nucleic acids exposed to X-rays, would be an extension of existing biochemistry research programs (Shipman 1958:65).

By the turn of the decade, the Health Division was firmly invested in genetics as a discipline, reflected by the growing number of studies in the physics and chemistry of DNA produced in the division's annual reports. Yet most of the genetics research conducted in Los Alamos during the early 1960s was still limited to the measurement of colonies of cells exposed to radiation and varying chemical solutions. By 1962, however, the volume of genetic research began to increase as researchers in the H-4 Molecular Radiobiology Section worked to tackle the analytical chemistry of DNA's individual nucleic acids (Cram et al. 1980:43; Langham and Shipman 1960:59, 64–65, 71, 1962:85–129, 268, 276).

The reason for the rather slow start of molecular genetics at the Laboratory was both technical and programmatic. Although the Health Division was pioneering methods of genetic replication and purification (by cultivating cloned bacterial colonies) for its own research, the state of molecular genetics research in the early 1960s was still quite limited. Though microscopic techniques were available to stain, isolate, and extract genetic material from highly active cells such as malignant tumors, the diagnostics were complicated, time-consuming, and lacked resolution to look at anything smaller than individual chromosomes. Methods of isolating individual cells for study were cumbersome and employed manual techniques which, while reasonably accurate, had not changed since 1934 (Cram et al. 1980:42–43; Givan 2001:19).

Concurrently, the pace of atmospheric testing and federal concerns about radioactive fallout played a significant role in the direction of the Health Division's research priorities. Throughout the late 1950s, the AEC remained focused on the biological effects of atmospheric testing, following policies that had remained in effect since President Truman ordered the National Institutes of Health (NIH) and all other federal agencies "to focus their resources on activities that would benefit national security needs" (DOE 2012). For the Health Division, that directive meant prioritizing the development of technologies to test for radioactive fallout absorbed by plants, animals, and people (Marrone: 2013:i).

Cellular Biology and the Flow Cytometry Revolution (1963–1979)

With the suspension of atmospheric nuclear testing in 1963, a corresponding reduction in federal support for animal radiation studies ensued. Post 1963, the AEC would direct the Health Division toward analyzing the impacts of radiation at the cellular level. This led to dramatic growth, both in personnel and in scientific output, of the H-4 Group's research in the fields of microbiology and biochemistry. From 1963 to 1965, the H-4 Molecular Radiobiology and Biophysics Sections transitioned from large-scale metabolic studies toward cellular biochemistry and cancer research. Coinciding with this transition, the H-4 Group recognized that new equipment was needed to quickly and efficiently isolate and purify populations of individual cells for research purposes. This intersection of technical needs and federal reprioritization would produce one of the most transformative technologies in the history of bioscience (Cram et al. 1980:43; Marrone: 2013:i).

Before 1965, the H-4 Biophysics and Cellular Radiobiology Sections used a device known as a Coulter counter for routine blood chemistry and leukemia research. Patented in 1953 by electrical engineer Wallace H. Coulter, the counter used microscopic channels and rapidly oscillating electrical currents to segregate individual particles. As particles pass through a narrow channel—typically filled with an electrolyte or other conductive liquid solution—the electrical resistance of the liquid changes. With sufficiently sensitive detection equipment, this variance in electrical resistance can be used to determine the size of particles as small as 0.5 micrometers—half the length of an E. coli bacterium, or approximately 200 times smaller than the width of a human hair (Beckman Coulter, Inc. 2020; Buchanan 2014; Coulter 1949; Marrone 2013:i).

By 1961, scientists in the H-4 Group were using Coulter counters to measure populations of controlled samples of bacterial colonies (Langham and Shipman 1962:211–213). Almost immediately, Coulter counters were a welcome addition to the capabilities of HRL. To quote study authors Irene U. Boone and Summers C. Cox, measurements of individual cells had “always been tedious and dependent on relatively unprecise methods” (Langham and Shipman 1962:211–213). As the 1960s progressed, the counters proved to be a crucial diagnostic tool in the fields of blood chemistry and cancer research; however, by 1964, their limitations were becoming an impediment to the Health Division’s ability to conduct research in cellular microbiology (*Cytometry* 2020).

Coulter counters could measure the quantity and sizing of individual particles far faster than manual microscopic methods, but they could not segregate individual cells based on differences in physical properties. To segregate populations of cells that required detailed analysis, scientists still needed microscopes and precision tools to catalogue cells by hand. This technical limitation prompted Clarence Lushbaugh and Wright Langham to search for ways improve upon the basic design of the Coulter counter (Cram et al. 1980:43; *Cytometry* 2020).

In late 1964, Langham met with a team of Laboratory physicists lead by Mack Fulwyler, Marvin Van Dilla, and Phil Dean, to discuss the problem of automated cell counting. They would be responsible for devising a method of improving the Coulter counter to meet the H-4 Group’s needs. Inspired by the principles behind ink-jet printing technology, Fulwyler’s device would charge small batches of droplets in a fast-moving stream after passing through the Coulter counter (Figure 3-31). Because each droplet series could be individually charged based on variances in size or electrical conductivity, the stream of particles could also be deflected by electromagnetic means (Givan 2001:20; Langham and Shipman 1965:114).

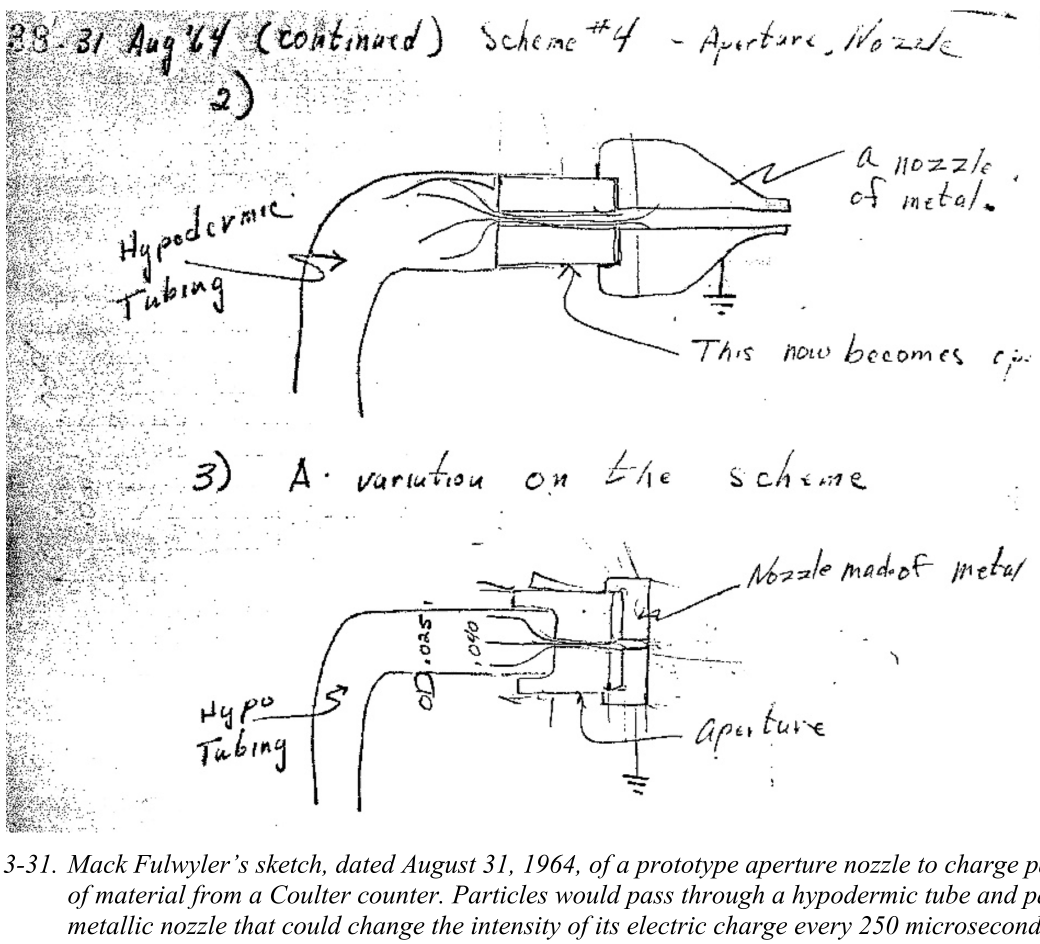

Figure 3-31. Mack Fulwyler’s sketch, dated August 31, 1964, of a prototype aperture nozzle to charge particles of material from a Coulter counter. Particles would pass through a hypodermic tube and past a metallic nozzle that could change the intensity of its electric charge every 250 microseconds. This particular nozzle design would be refined to form the basis of Fulwyler’s first successful particle sorting prototype in April 1965 (Fulwyler 1965a).

The advantages of Fulwyler's prototype were immediately apparent. First, individual cells or particles could be isolated at a greater degree of speed and precision than mechanical methods; and second, because cell counting could be done without intrusive mechanical manipulation, Fulwyler's device would be able to preserve the viability populations of cells for analysis and experimentation (Cram 2002:1–2; Fulwyler 1965a, 1965b:911; Langham and Shipman 1965:115).

Initial tests of Fulwyler's approach to electromagnetic separation were promising. On April 1, 1965, Fulwyler demonstrated the viability of his technology by separating microscopic beads of polystyrene. Less than 2 weeks later, the prototype was able to sort red blood cells from a stream of solution that produced 72,000 droplets per second. By late June, Fulwyler's "Cell Sorter" prototype would be used in a cancer study conducted by the H-4 Mammalian Radiobiology Section, where it proved capable of analyzing 1,000 red blood cells per second with a separation accuracy of 50 percent (Figure 3-32). Before the end of the year, the AEC would file a patent that credited Fulwyler as the sole inventor, and details of the cell sorter prototype were published in the prestigious journal *Science* (Fulwyler 1965a, 1965b:910–911, 1965c; Langham and Shipman 1965:116–117).

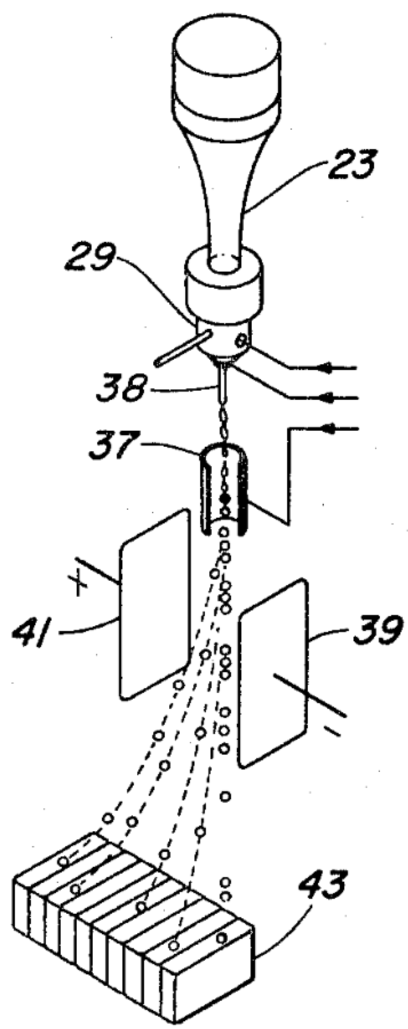

Figure 3-32. A schematic diagram of Mack Fulwyler's "Cell Sorter" prototype (Fulwyler 1965c).

The impact of Fulwyler's invention on the fields of genetics and molecular biochemistry was profound but not complete. To make the transition from the Laboratory's cell sorter to modern flow cytometry would require measurements beyond cell size and shape; however, the necessary breakthroughs needed for flow cytometry would not take long, due in large part to the rapid growth of fluorescent biochemistry in the late 1950s.

Advances in the discovery of fluorochromes—chemical compounds that emit light when exposed to narrow wavelengths of electromagnetic energy, like laser light—were the final piece of the puzzle. Although the concept of exposing cells and other microscopic organisms with stains and dyes has been a part of biology since the seventeenth century, fluorochromes made it possible for cellular biologists to identify specific proteins and nucleic acids in large populations of cells. In the 1950s, the technology was sophisticated enough to highlight elevated amounts of DNA within cells, a major precursor for malignant cancer. And, as the 1950s gave way to the 1960s, advances in the technology had made it possible to highlight specific sequences of proteins related to enzyme activity and the structure of antibodies (Cram 2002:1; Cram et al. 1980:42, 1985:77).

Researchers in the United States and West Germany would be the first to capitalize on these joint discoveries. Dr. Wolfgang Göhde at the University of Münster and scientists from Lawrence Livermore National Laboratory, working independently from each other between 1967 and 1968, used lasers attuned to specific wavelengths of light as a triggering mechanism for Fulwyler's cell sorter. Within a year, both research teams were routinely using their modified cell sorters to separate individual chromosomes and portions of genetic sequences. Progress was swift and, by 1970, fundamental technologies had been established (Cram 2002:3; Cram et al. 1980:43; Givan 2001:19–20).

The 1970s and 1980s would see major breakthroughs in molecular biology at the Laboratory (Figure 3-33). Scientists from HRL, in collaboration with the National Cancer Institute, would use the technology to automate the sorting and analysis of cancers ranging from leukemia to lung carcinoma (Figure 3-34 through Figure 3-36). In 1982, the Laboratory's national leadership in flow cytometry would lead to the creation of the NFCR, funded in part by the NIH, to improve the speed and fidelity of flow cytometers for basic biomedical research. The NFCR's development of more accurate measurement techniques and instrumentation, paired with the discovery of DNA restriction enzymes to isolate and replicate billions of copies of specific genetic sequences, would provide the necessary grounds for the development of the Human Genome Project (Crissman et al. 1976; Enger et al. 1984:92; Goad 1983:53; Mullaney et al. 1978).

GenBank's status as the preeminent repository of genetic sequence data would exceed even the most optimistic projections of the T-10 Theoretical Biology and Biophysics Group. Scientific investigations into the structure and function of mammalian chromosomes and the processes of gene regulation, combined with the development of flow-cytometry resources at the Laboratory and newly developed recombinant-DNA technology, were directed toward the construction of chromosome-specific DNA libraries. In 1983, that work led to initiation of the National Laboratory Gene Library Project, which put the Laboratory in contact with hundreds of human-genetics laboratories throughout the world. All of these contributions led to the Laboratory's selection as one of three national centers for human genome research when the first such centers were designated by the DOE in 1988 (Cram et al. 1985; Deaven and Moyzis 1992).

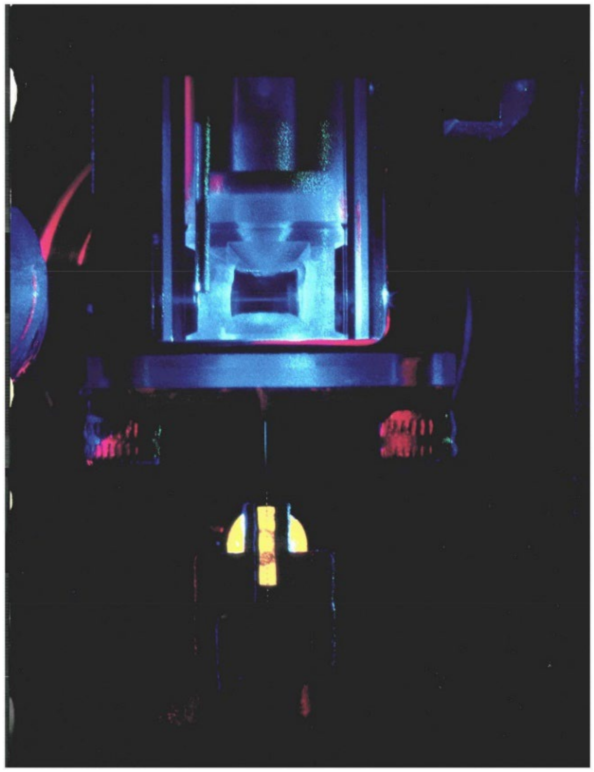

Figure 3-33. A Laboratory flow cytometer chamber showing a liquid jet emerging from the bottom of the chamber and breaking into droplets. The droplets, illuminated by lasers emitting different wavelengths of light, detect the presence of fluorescent chemicals for a variety of specialized biochemical markers. By 1980, flow cytometers at the Laboratory were sensitive enough to detect and isolate mutations in populations as small as 1 in 10,000 cells (from LA-UR-80-05014 [Cram et al. 1980:41]).

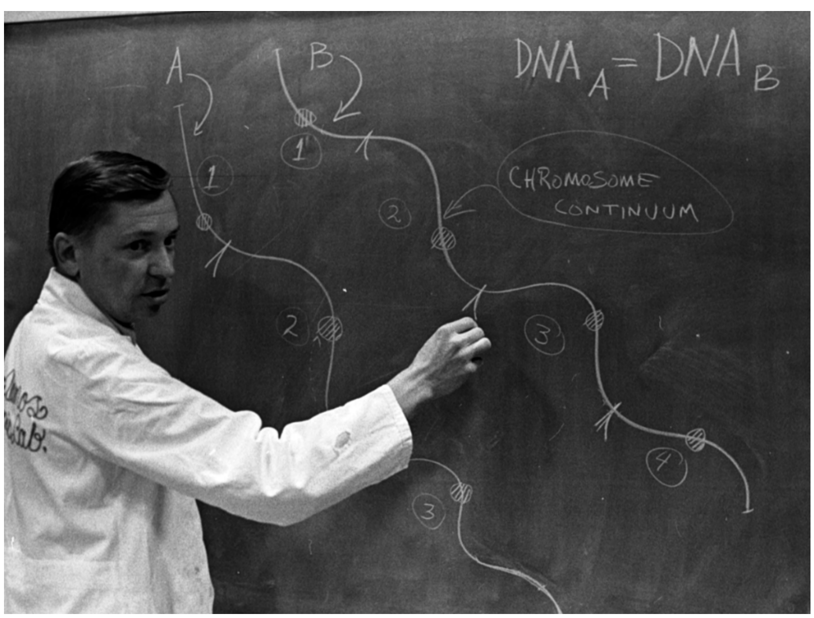

Figure 3-34. Cancer cell research by the H-4 Group, February 1972 (LANL image, negative no. PUB-72112-20).

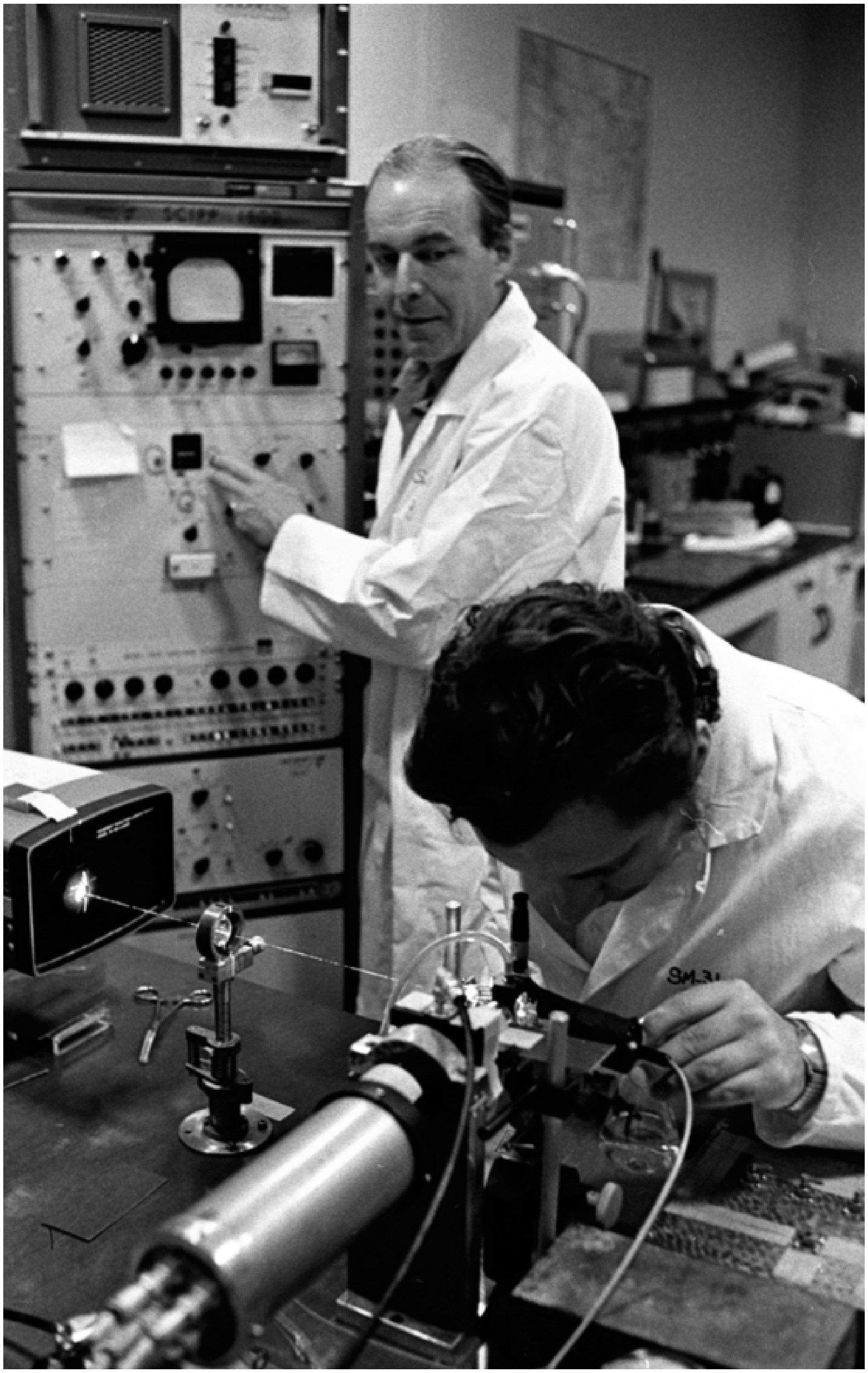

Figure 3-35. Cancer cell research by the H-4 Group, February 1972 (LANL image, negative no. PUB-72112-6).

Figure 3-36. Cancer cell research by the H-4 Group, February 1972 (LANL image, negative no. PUB-72112-47).

In 1986, as GenBank neared the end of its first of two 5-year contracts with the Laboratory, the database contained more than 5.2 million base pairs of genetic code, outpacing even the most optimistic models in use by the repository's managers. GenBank's success would provide a crucial blueprint for the development of similar but highly specialized genetic sequence databases—including the first national database of human immunodeficiency virus/AIDS evolution—as well as the earliest databases concerned with sequencing the human genome (Bilofsky et al. 1986:1; Burks et al. 1992; McDonald 2013:9).

In 1987, the DOE proposed the Human Genome Initiative to Congress. One year later, the NIH would fund the first research grants for the project. Due in large measure to the presence of GenBank and the NFCR, the Laboratory was selected to be one of the first DOE-sponsored centers of genomic research, collaborating with Lawrence Livermore and Lawrence Berkeley National Laboratories. In 1988, Laboratory scientists who were doing genetic research made a major discovery when they identified the nucleotide composition of the human telomere.[5] By 1990, the DOE and NIH published the first 5-year plan of what was estimated to be a 15-year project, formally initiating the Human Genome Project (Machen et al. 2010:118–119; NIH 2013). It was the first large, coordinated effort in the history of biological research to make a detailed map of the human DNA, the hereditary instructions inscribed in DNA that guide the development of human beings from a fertilized egg cell.

Barely 2 years after GenBank's founding, the federal government expressed interest in examining the feasibility of mapping and sequencing the complete human genome. Representatives of the DOE and NIH

[5] Telomeres protect the ends of chromosomes from erosion during cell division; without them, essential genetic material would be lost.

jointly managed these first meetings, held in December 1984. For the DOE, and the Laboratory by extension, mapping the human genome was part of a concerted effort to understand the nature of mutations produced by ionizing radiation, paralleling research promoted by the AEC in 1963. These efforts would eventually culminate with the Genome Sequencing Workshop, a 2-day conference in Santa Fe, New Mexico, sponsored by representatives from DOE's OHER and the Laboratory's LS Division. The purpose of the workshop would be to establish a professional consensus for funding the project that would take an estimated 15 years to complete (McDonald 2013:8–9; NIH 1986, 2013).

GenBank and the Human Genome Project (1983–2003)

The Laboratory had established itself as a global leader in genetics research by the 1970s. The discovery of restriction enzymes, combined with the NFCR's expertise in flow cytometry, made it possible for Laboratory scientists to isolate and replicate individual genetic sequences on a massive scale. As it became easier and more affordable for researchers to synthesize genetic material, the volume of sequence data also grew exponentially. To share this growing body of research, an international scientific consensus emerged by the end of the 1970s to produce an accessible and open computerized database of genetic sequences (Cram et al. 1985:74; NIH 2008).

In 1979, the NIH held a series of workshops across the nation to formulate the United States' approach to the challenge. Responding to the NIH's request, a group of Laboratory scientists, led by Goad, drafted a proposal to the National Science Foundation and the NIH for a data bank and computer analysis center of genetic information. In 1982, the NIH approved a 5-year contract for GenBank as a collaboration between the private firm of Bolt, Beranek, and Newman and the Laboratory (Figure 3-37). A year later, the National Science Foundation, the DOE, and the DoD would join as official partners to the project. GenBank would become the first of three such international genetic libraries, with the European Molecular Biology Laboratory and the DNA Data Bank of Japan formed by the mid-1980s (Goad 1983:56; NIH 2008).

In 1990, geneticists had fully sequenced the genetic code of only a handful of simple pathogens, such as viruses and bacteriophages, whose genome totaled no more than a few thousand base pairs (Heather and Chain 2015:2). With approximately 3 billion base pairs, sequencing the human genome represented the most daunting and complicated project in the field of bioscience at the time. The first challenge would be to identify means to map, sequence, and analyze sections of the genetic code in order. This painstaking process would eventually lead to the mapping of large sections of the human genome using yeast artificial chromosomes (YACs) separated by flow cytometry (Doggett et al. 1992: 184). Unlike older methods of copying and storing DNA fragments using viruses to infect bacteria, YACs could carry genetic sequences totaling millions of base pairs and cloned by the billions, greatly speeding up the mapping of the human genome. Although YACs proved unstable for large-scale sequencing, they helped map chromosome 16—the first complete chromosome of the human genome—by 1992. Construction of the first high-resolution physical map of human chromosome 16 was one of the Laboratory's proudest accomplishments in genome research. Genes on chromosome 16 included those associated with leukemia, breast cancer, prostate cancer, Batten disease, hemoglobin disorders, and a type of kidney disease (Doggett et al. 1992).

In 1992, after managing the repository for 10 years, GenBank would be moved to the recently created National Center for Biotechnology Information, a division of the NIH's National Library of Medicine. Today, GenBank's open-source repository contains more than 2.3 billion genetic sequences that represent some 15 trillion base pairs of DNA, remaining the largest library of genetic sequences on the planet. Although no longer directly affiliated with the Laboratory, GenBank's first decade was a landmark achievement of scientific collaboration both nationally and internationally (National Center for Biotechnology Information 2021; NIH 2008).

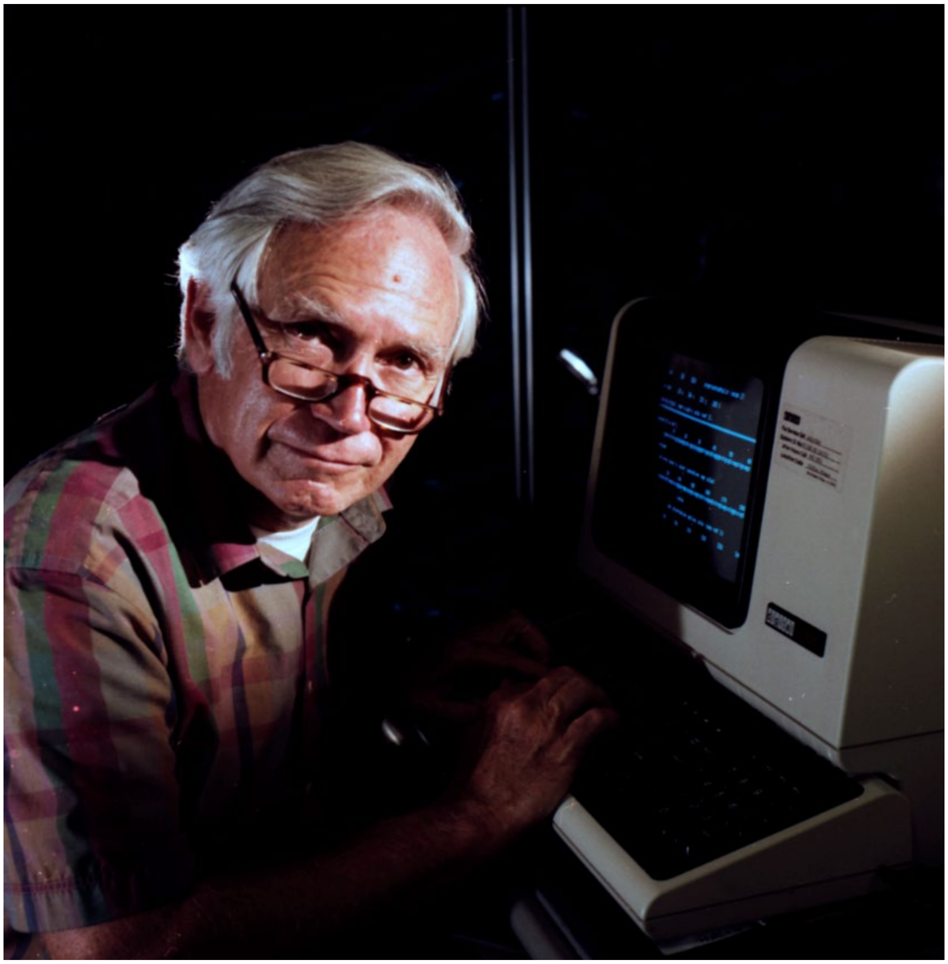

Figure 3-37. Walter Goad, group leader for GenBank from 1982 until 1987, at work on an entry for GenBank's national repository of nucleic acid sequence data (LANL image, negative no. PUB83-045-KN-7).

In 1996, Los Alamos joined forces with the Lawrence Livermore and Lawrence Berkeley National Laboratories to form the DOE's Joint Genome Institute (JGI), combining the genome centers of each laboratory into one virtual organization. The JGI was part of a consortium of five genome institutes that worked together to sequence the entire human genome. By June 2000, that goal was reached. Scientists and historians have compared the significance of unraveling the three billion or so base pairs in the human genome to that of science and engineering accomplishments such as landing on the moon and splitting the atom (Delucas 2001; Machen et al. 2010:119).

The Human Genome Project, one of the most important collaborative spinoffs from GenBank, came to an official end in April 2003, when the full sequence of the human genetic code was published (McDonald 2013:8). Completed 2 years ahead of schedule, scientists from HRL were instrumental in the success of one of the most complicated international collaborations in the field of bioscience.

Competition between the Laboratory and the Human Genome Project's partner organizations, which would eventually include more than 20 NIH- and DOE-funded institutions across the globe, would produce several brand new methods of analyzing genetic sequences. One of these methods—known as whole-genome shotgun sequencing—would break up the entire genome of an organism into small fragments and use computer algorithms to assemble the random sequences in the correct order. This type of approach forms the basis of all modern genetic sequencing and has been used to great effect to produce complete genomes of a wide variety of plant, animal, and bacterial species since 2003 (McDonald 2013:9–10). This effort includes active sequencing of the severe acute respiratory syndrome–associated coronavirus 2 (or SARS-CoV-2) genome by members of the Bioscience Division's B-10 Biosecurity and Public Health Group, whose tenants currently reside in HRL (LANL 2021).

Historical Themes

The preceding historic context of TA-43 reflects many potential historical themes, which are activities or patterns of physical or cultural development that are related to one or several areas of significance (Lee and McClelland 1999:6). Both the PA and the Laboratory's CRMP (Purtzer et al. 2019) define Laboratory-specific historical themes from the Manhattan Project period and both Cold War eras. Through an examination of these documents and the development of additional concepts based on project-specific archival research, several key historical themes were identified as being related to the HRL complex, including

- Architectural History;
- Reactor Technology;
- Weapons Research, Development, Testing, and Stockpile Support;
- Bioscience–Health Physics; and
- Biomedical Research and Development.

Architectural History

As a theme, architectural history reflects the physical and cultural development of the landscape and built environment. Relevant topics are architectural styles, methods of construction, principal architects and landscape architects, builders, artists, and craftpersons. Pertinent concepts include architectural impacts, feature relationships, and environmental influences (Lee and McClelland 1999:13). The architectural style of TA-43-0001 is International Modernism, and the principal architect was W. C. Kruger. He was a prolific architect in New Mexico, brought the Territorial Revival style to maturity, implemented the style in numerous public buildings, and brought much-needed federal investment to the state (Raymond and McCullough 2009:E.32). In describing Kruger's designs, Raymond and McCullough (2009:E.32) stated, "While admittedly more traditional than transcending, they were the right forms at the right time, not only for the public that used the buildings, but for the regional movement itself."

Reactor Technology

Reactors have been developed and used by the Laboratory since the Manhattan Project period and have supported a diverse range of investigations. This work includes providing fundamental nuclear measurements essential to the development of the first atomic bombs, producing radioisotopes for research projects, conducting criticality experiments to determine when a chain reaction would occur in fissionable materials, and powering rockets in space (Machen et al. 2010:100). The pursuit of nuclear-powered propulsion through Project Rover engaged many HRL staff, who measured the radioactivity produced by various reactors, analyzed effluent particles, and explored shielding methods.

Weapons Research, Development, Testing, and Stockpile Support

The central mission of the Laboratory throughout the Cold War was the design and testing of weapons for the nation's nuclear arsenal. First developed were fission (atomic) weapons, based on the Manhattan Project–period implosion device Fat Man. Next came the design, testing, and fabrication of thermonuclear (hydrogen) weapons, with the first success in the detonation of the Mike device in the Pacific (Machen et al. 2010:91). The Laboratory was directly involved in all nuclear tests conducted by the United States until 1953 and in most tests through at least June 1966. HRL staff were directly involved in numerous tests, which primarily occurred within the Pacific Proving Ground and the Nevada Proving Ground (present-day NNSS).

Bioscience-Health Physics

Biological science has been an integral part of the scientific activity at the Laboratory since the days of the Manhattan Project. Health research units were established in the wartime Laboratory because, although radiation was known to cause cell injury and genetic mutation, little was known about exposure limits and the mechanisms of damage. Early biological research was devoted to whole-animal studies to better understand the physiological consequences of radiation exposure and to set rational dose limitations for workers. Later, research was undertaken to understand these effects at the cellular and subcellular level, which led naturally into investigations of the genetic effects of radiation and even later, into the Laboratory's central role in the Human Genome Project (Machen et al. 2010:113).

Biomedical Research and Development

To study pressing biological problems, many areas of research biology and medicine required the capability to examine and analyze biochemical and physical properties of cells or cellular components. In response to this need, the Laboratory developed a high-speed, cell-analysis technique: flow cytometry—the process by which one or more selected properties of cells, such as DNA or protein content, are measured, cell by cell, as the cells flow in fluid past various sensors such as a laser beam. Scientists soon recognized the potential of flow cytometry for monitoring the growth pattern of cells, the transformation of cells from normal to malignant, and the function of the immune system. By the 1980s, the Laboratory was using laser-based, flow-cytometric methods to separate chromosomes from mammalian, including human genomes. Scientists cloned DNA from these chromosomes, allowing study of the basic structure and functional organization of the chromosome (Cram et al. 1980; Crawford 1983; Machen et al. 2010:116–117).

The Laboratory's interest in genetics and the role of DNA also stem from early Manhattan Project days because scientists knew that radiation could cause cell injury and genetic mutations. The shift (dictated by the AEC) in the early 1960s from whole-animal studies to studies at the cellular and molecular levels resulted in the recruitment of the Laboratory's first group of cell biologists. During the 1960s and 1970s, the basic methods for computer manipulation and analysis of DNA sequences were developed, leading ultimately to the establishment at the Laboratory, in 1982, of GenBank, the national genetic-sequence databank (Goad 1983; Machen et al 2010:117). The National Laboratory Gene Library Project, the Human Genome Project, and DOE's JGI followed these efforts.

Chapter 4: Multiple-Property Method of Evaluation and Eligibility Criteria

Properties at TA-43 were evaluated using a multiple-property documentation approach. This systematic approach served as a useful evaluation tool to determine the historical significance of a group of thematically related properties, such as those located within the HRL complex (see Figure 1-2).

Context Statement

A key element of the multiple-property documentation approach is context. Historic contexts provide information about historical patterns and trends by defining historical themes, geographical areas, and chronological periods. These three components provide a consistent framework for evaluations (Lee and McClelland 1999:11). The properties at the HRL complex are technologically related, and the historic context provided in Chapter 3 establishes the following relevant historical themes: Architectural History; Reactor Technology; Weapons Research, Development, Testing, and Stockpile Support; Bioscience–Health Physics; and Biomedical Research and Development. The defined geographical area is TA-43. The HRL complex was in use during the early and late Cold War eras (1953–1990). The properties under study were evaluated for NRHP eligibility within their historic context, with decisions relating to final eligibility recommendations based on their property type and retention of integrity.

Property Types

The multiple-property documentation approach requires the identification of property types that are associated with the relevant historic contexts. This identification facilitates the evaluation of individual properties within the broader complex of all evaluated properties. Properties are compared with other historical resources that have similar histories and similar physical characteristics (DOE, Richland Operations Office 1997). Properties are first assessed against the list of properties exempt from review. Properties that are not exempt are then subdivided into associated property types.

Properties Exempt from Review

Some property types are exempt from evaluation. The CRMP and the PA provide a list of those that require no formal documentation unless they exhibit significant architectural or engineering features or are associated with an NRHP-eligible site or district. Exempted properties include the following:

- Structures with minimal or no visible surface manifestations (i.e., pits; underground storage tanks; underground vaults; buried material disposal areas; septic tanks; underground pipelines; sewer lines; and steam, storm-water, acid, or electrical manholes)
- Aboveground fuel and water tanks
- Wells and boreholes
- Road-block barriers
- Transformer and pressure-relief-valve stations
- Mobile trailers, modular buildings, and enclosures[6] that serve as temporary administrative support office space or storage facilities

[6] These structures are either moved onsite or have pre-engineered sides and roofs that are typically resting on poured concrete pads.

Additionally, properties less than 50 years old may also be exempt from review until a later date. In general, buildings and structures must be 50 years old or older and meet at least one of the four criteria to be eligible for inclusion in the NRHP. Sometimes a property less than 50 years old is evaluated. The following properties in the HRL complex are exempt from evaluation because of their property type according to the PA or because of their age (Figure 4-1 through Figure 4-8; also see Table 3-1):

- TA-43-0010 Sewage Lift Station
- TA-43-0022 Shed
- TA-43-0028 Shed
- TA-43-0044 Cooling Tower
- TA-43-0047 Safety Storage Shed
- TA-43-0049 Safety Storage Shed
- TA-43-0061 Safety Storage Shed

Associated Property Types

After removing exempted property types from review, the remaining properties to be evaluated in this report are TA-43-0001 (HRL) and TA-43-0012 (warehouse). As reflected in the PA and the CRMP, four general property types are associated with the Laboratory's historical themes:

- Laboratory-Processing Facilities, such as research, testing, processing, and production facilities
- Administration Facilities, such as office buildings, cafeterias, and health and safety offices
- Security Facilities, such as guard stations, security lights, and fencing
- Support Facilities, such as warehouses, water tanks, utilities, and waste-treatment facilities

Figure 4-1. Overview and geographic context of exempt facilities, view to the north (LANL image, file no. DSCN1613).

Figure 4-2. Exempt facility TA-43-0010 (sewage lift station), view to the north (LANL image, file no. DSCN1607).

Figure 4-3. Exempt facility TA-43-0022 (shed), view to the north (LANL image, file no. DSCN1606).

Figure 4-4. Exempt facility TA-43-0028 (shed), view to the north-northeast (LANL image, file no. DSCN1605).

Figure 4-5. Exempt facility TA-43-0044 (cooling tower), view to the west (LANL image, file no. DSCN1614).

Figure 4-6. Exempt facility TA-43-0047 (safety storage shed), view to the north-northeast (LANL image, file no. DSCN1609).

Figure 4-7. TA-43-0049 (safety storage shed), view to the west (LANL image, file no. DSCN1608).

Figure 4-8. Exempt facility TA-43-0061 (safety storage shed), view to the west-northwest (LANL image, file no. DSCN1610).

Laboratory-processing facilities have forms and shapes that are most often directly related to the essential activities and the equipment they house. The type of pursuits carried out in these facilities also determines the configuration of interior spaces. Laboratory-processing facilities are divided into two subcategories: first-tier facilities house key operations for research and development activities; second-tier facilities do not house key operations, and research and development activities could not function without them. An example is a storage magazine. TA-43-0001 (HRL) is a first-tier laboratory-processing facility.

Administration facilities are closely associated with the operation of laboratory-processing facilities and typically house support and research operations such as control rooms, administrative and staff offices, light laboratory spaces, break areas, and change rooms. Administration buildings are typically located away from experimental areas. This practice allows administrative personnel and material to remain separate from operational hazards and maximizes their distance from experiments. Security facilities are associated with the general operation of a property or TA and support the main overarching theme of research, development, and testing related to the Laboratory's nuclear weapons program. Examples of this property type include guard stations, guard towers, special nuclear material vaults, and physical exclusion structures such as fencing and barriers.

Support facilities were constructed to support Manhattan Project activities and Cold War research and development. Like laboratory-processing facilities, support facilities are divided into two subcategories: first-tier facilities are primarily buildings and include machine shops, warehouses, and power plants; second-tier facilities are primarily structures. Examples include water tanks and electrical substations. TA-43-0012 (warehouse) is a first-tier support facility.

Eligibility Criteria

Under the NHPA, historic properties are defined as prehistoric and historic sites, buildings, structures, districts, and objects included in, or eligible for inclusion in, the NRHP, as well as artifacts, records, and remains related to such properties (54 U.S. Code 300308). The criteria for evaluating cultural resources for inclusion in the NRHP are set forth in the 36 CFR 60.4:

> The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and
>
> (a) that are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> (b) that are associated with the lives of significant persons in our past; or
>
> (c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
>
> (d) that have yielded, or may be likely to yield, information important in prehistory or history.

Additional criteria, called criteria considerations, allow for the inclusion of cultural resources that are not usually considered for listing in the NRHP. Under 36 CFR 60.4, resources considered under the criteria considerations must also be eligible under one or more of the four above criteria and possess integrity.

> (a) a religious property deriving primary significance from architectural or artistic distinction or historical importance; or
>
> (b) a building or structure removed from its original location but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event; or

(c) a birthplace or grave of a historical figure of outstanding importance if there is no appropriate site or building directly associated with his productive life; or

(d) a cemetery which derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events; or

(e) a reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived; or

(f) a property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own exceptional significance; or

(g) a property achieving significance within the past 50 years if it is of exceptional importance.

Eligibility evaluations for this project followed National Park Service guidelines *How to Apply the National Register Criteria for Evaluation* (Shrimpton 2002). It should be noted that one of the evaluated resources (TA-43-0012) is less than 50 years old. Generally, properties less than 50 years old are not considered eligible for listing in the NRHP because not enough time has passed to gain the historical perspective necessary for evaluation of significance. However, Criteria Consideration (g) allows for historical resources to be considered eligible if they demonstrate exceptional importance. To qualify under Criteria Consideration (g), a resource that has not reached the 50-year threshold must first meet at least one of the four above criteria and possess integrity as outlined by the National Park Service (Sherfy and Luce 1998).

Integrity

Beyond the application of the above significance criteria and criteria considerations, a cultural resource must also retain sufficient integrity to be eligible for listing in the NRHP. To possess integrity, properties must be able to convey their importance from the period of significance by retaining several, and usually most, of the seven aspects of integrity: location, design, setting, materials, workmanship, feeling, and association. Historic properties either retain integrity or they do not (Shrimpton 2002:44). The National Park Service guidance (Shrimpton 2002:44–45) provides the following:

- Location is the place where the historic property was constructed or the place where the historic event occurred.
- Design is the combination of elements that create the form, plan, space, structure, and style of a property.
- Setting is the physical environment of a historic property.
- Materials are the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property.
- Workmanship is the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory.
- Feeling is a property’s expression of the aesthetic or historic sense of a particular period of time.
- Association is the direct link between an important historic event or person and a historic property.

Notably, the order of these aspects reflects their importance, and they range from physical qualities to perceptions. Thus, a property that retains only integrity of feeling and association (perceptions) could not be eligible for listing in the NRHP. Additionally, the importance of which aspects of integrity a property should retain is dependent on the criteria for which it is significant. As such, significance must be established to assess integrity. A property eligible under Criterion (a) or (b) should retain the essential physical features it possessed during the significant association. A property eligible under Criterion (c) must retain most of the essential physical features (distinctive characteristics or artistic values) it possessed during its period of significance. Less importance to physical features is given to a property eligible under Criterion (d). Ultimately, properties eligible under Criteria (a), (b), and (c) should be able to convey their significance through the visual qualities that made them important (Shrimpton 2002:44–47).

Chapter 5: Descriptions and Eligibility Determinations of Evaluated Properties

TA-43-0001 (HRL)

Technical Area: 43
Building Number: 0001
Original Function: Health Research Laboratory
Current Function: Health Research Laboratory
Date Constructed: 1953
TA Building(s) with Same Floorplan: none
Associated Theme(s): Architectural History; Reactor Technology; Weapons Research, Development, Testing, and Stockpile Support; Bioscience-Health Physics; Biomedical Research and Development
Property Type: Laboratory-Processing Facility (First Tier)
Integrity: Yes
Eligible: Yes (Criteria a and b)

Figure 5-1. Oblique aerial of TA-43-0001, view to the southwest, October 14, 2021 (LANL image, file no. 20211014F01 RANGER SR5189507 DTH 0008).

Figure 5-2. Oblique aerial of TA-43-0001, view to the north-northwest, October 14, 2021 (LANL image, file no. 20211014F02 RANGER SR5189507 DTH 0013).

Figure 5-3. Oblique aerial of TA-43-0001, view to the northeast, October 14, 2021 (LANL image, file no. 20211014F02 RANGER SR5189507 DTH 0026).

Figure 5-4. Oblique aerial of TA-43-0001, view to the west-southwest, October 14, 2021 (LANL image, file no. 20211014F02 RANGER SR5189507 DTH 0005).

Architectural Description

TA-43-0001 (HRL) is a one- and two-story building with penthouses, a subbasement, and a basement. The building is located east and south of Diamond Drive near the edge of the Los Alamos Canyon escarpment (Figure 5-1 through Figure 5-4; also see Figure 1-2). Irregular in plan, the facility comprises an original building with seven additions. HRL measures approximately 305 by 232 feet, encompasses approximately 103,369 square feet, and is oriented north-northwest by south-southeast. The facility cascades from higher elevations near Diamond Drive to lower elevations near the escarpment. Built on poured-concrete foundations and piers, the building is constructed of reinforced and poured-in-place concrete, CMUs, and structural steel. Exterior wall materials include concrete, CMUs, asbestos-cement panels, and metal panels that are painted or clad in a fine-grained (or rubbed) concrete plaster or stucco. Some of the exterior materials exhibit actual expansion joints, whereas others are scored in a similar manner.

The facility has numerous rooflines, and roofs are constructed of poured concrete, metal framing and decking, and asbestos-cement panels, with some covered in gravel, built-up roofing, or waterproof membranes. Although most of the roofs are flat (or extremely low-pitched for water runoff), there is one shed roof and one gabled roof. Most of the flat roofs have parapets, and the original parapet at the northeast corner of the building has been augmented with stepped metal panels. The shed roof features six skylights. Atop many of the roofs are equipment that is accessed by numerous fixed ladders between the various levels. Portable metal-pipe railings have been placed on a few of the roofs. Most of the building has no eaves, but the one-story section on the southern portion of the building features a wide, overhanging closed eave on some façades. This section of the building also features outdoor animal runs associated with interior cages. The runs are flanked by two gated porticos and enclosed by a poured-concrete and CMU wall. Additionally, the building has two large stacks (one constructed of brick) that extend beyond the rooflines near the south-southeast corner of the building, and the roofs exhibit numerous lightning rods, antennas, exhaust vents, smaller stacks, and other mechanical equipment.

The building has numerous entries, and the main entrance is located on the north-northwest façade. Access is provided through paired, metal-framed glass personnel doors with a metal-framed, fixed-pane transom window and flanking metal-framed, fixed-pane sidelights. Located under a long, broad concrete canopy, the doors are accessed via poured-concrete stairs with a metal-pipe railings and a poured-concrete ramp. At the western end of the entryway, a wall extends up from the concrete platform to the edge of the canopy. In this wall are three square, framed decorative openings. Above the main entrance canopy is a deeply inset ribbon of 10/10 fixed-pane windows in a protruding concrete frame. Other entrances to the building include paired, metal-framed glass personnel doors (one pair is flanked by metal-framed, fixed-pane sidelights and has metal-framed, fixed-pane transom windows); paired, metal-panel personnel doors; paired, metal-panel personnel doors with fixed lights (one has a metal-framed, fixed-pane transom window); standard and wide single, metal-panel personnel doors (one has a glass-block transom window); a single, metal-panel personnel door with a louvered vent; and a single, metal-panel personnel door with a louvered vent and a fixed light. Entrances are inset or flush, with some of the latter located under canopies or overhanging eaves or at the top of a stoop. These entrances are accessed via poured-concrete sidewalks, stairs, loading docks, and ramps; metal-framed stairways; and rooftop walkways. Loading docks are located at the rear of the building, and the largest one features a standing seam canopy with a shed roof supported by steel posts.

Fenestration, in addition to those windows already mentioned, includes numerous bands of windows in protruding concrete frames: metal-framed, fixed-pane, interior hopper windows evenly spaced between corrugated concrete panels; single and paired, three-pane, steel-framed windows (fixed pane with an exterior hopper above and an awning below) evenly spaced between corrugated or plain concrete panels; a ribbon of three-pane, steel-framed windows (fixed pane with an exterior hopper above and an awning below); metal-framed, fixed-pane windows flanking a corrugated concrete panel; aluminum-framed, sliding-sash windows; and metal-framed, fixed-pane windows. Other bands of windows include slightly inset 8-by-8 glass-block windows evenly spaced between concrete panels (note that one is modified by an addition); ribbons of metal-framed, fixed-pane windows with protruding concrete sills; a ribbon of 4-over-4 fixed-pane windows; a ribbon of steel-framed, awning windows; metal-framed, casement windows; and metal-framed, fixed-pane windows. Other non-banding fenestration includes paired, steel-framed, three-pane windows (fixed pane with an exterior hopper above and an awning below); three-pane, steel-framed windows with protruding concrete sills; metal-framed, fixed-pane windows with protruding concrete sills; and a metal-framed, six-pane window in a protruding concrete frame. Replacement windows include metal-framed, fixed-pane over sliding sash windows and metal-framed fixed-pane windows. Additionally, many windows have been modified with the addition of air-conditioning units or metal grilles or have been covered up with plywood or painted. Additionally, the facility exhibits numerous small and large metal-framed louvered vents; exterior lights, sensors, and cameras; signs; and supplemental mechanical equipment on the western and southern sides of the building.

Since the facility's original construction, the Laboratory has constructed seven substantive additions, replaced most doors, replaced or modified many windows, replaced a large metal-framed louvered vent, and made numerous interior modifications. TA-43-0001 has structural integrity, and the exterior is in good condition. Its architectural design is influenced by the International Modernist architectural style, and character-defining features include geometrical massing, lack of ornament, flat roofs, continuous surface planes, bands of windows, and unornamented doors and windows.

Historical Background

A complete history of TA-43-0001 is provided in Chapter 3, and only a summary of major modifications is provided here. W. C. Kruger and Associates completed drawings for the HRL campus in August 1951, and staff moved into HRL in August 1953. HRL cost $2.2 million, provided nearly 56,000 square feet of floor space, and included laboratories, administrative offices, a medical library, a seminar room, animal quarters, workshops, photographic darkrooms, an X-ray exposure room, a cobalt-source exposure room, a special counting room, supply and storage space, a lobby, and a repository for classified material. Additional animal quarters designed in March 1959 by W. C. Kruger and Associates was completed in 1960 at a cost of approximately $325,000. This basement-level addition was constructed at the southern end of the building. L-shaped in plan, the addition was one story with a small penthouse and measured approximately 154 by 181 feet. The new space included pens, kennels, outside exercise areas, feeding rooms, lodging rooms, breeding rooms, quarantine rooms, cage-cleaning rooms, necropsy and treatment areas, storage areas, a veterinary office, and a locker room. The Laboratory constructed a basement-level, one story addition to HRL in 1969. Located on the southwest façade, it was constructed adjacent to the 1959 addition. Rectangular in plan and measuring approximately 25 by 55 feet, it included a small penthouse. The addition provided more space for offices, animal quarantine, and necropsy.

In 1975, HRL underwent two modifications. The Laboratory constructed a basement-level, one-story addition that measured approximately 12 by 30 feet. Rectangular in plan, the addition was located on the northeast façade and expanded the cage-washing facilities. In May, Philippe Register designed a one-story, basement-level addition on the backside of HRL. Located on the southeast façade, it was rectangular in plan and measured approximately 35 by 96 feet. The addition provided for seven new office/laboratory rooms. In September 1977, Clark, Arrison, Germanas, Architects designed a first floor–level addition that was located atop the Philippe Register–designed space. It provided room for one very large office and a computer room.

HRL experienced substantial upgrades in the 1990s. A two-story addition at the first-floor level was constructed on the northwest end of the building in 1991. Irregular in plan, it measured approximately 58 by 63 feet. Designed by Holmes and Narver and dated to October 1990, the addition provided space for a utility room, a cold room, an isotope lab, wet labs, and instrument labs. In 1997, another two-story addition was constructed on the northwest end of the building. Located at the basement level, it was rectangular in plan and measured nearly 49 by 69 feet. Designed by Flatow Moore Shaffer McCabe, it served as a biophysics laboratory addition.

Eligibility Determination

TA-43-0001 was evaluated under the historic context provided in Chapter 3 of this report. The building was designed and constructed during the Cold War and has been altered since its original construction. TA-43-0001 retains integrity of location, setting, materials, workmanship, feeling, and association.

TA-43-0001 has connections with numerous significant historical themes; however, not all of those associations are specific enough or important enough to qualify. Although associated to the significant themes of (1) Architectural History; (2) Reactor Technology; and (3) Weapons Research, Development, Testing, and Stockpile Support, the HRL building did not play a significant role in those histories. Thus, it is not a good representative to convey those significant themes. However, the HRL building was an important factor in the significant themes of (1) Bioscience–Health Physics and (2) Biomedical Research and Development and is evocative of those histories. Therefore, TA-43-0001 is eligible for listing in the NRHP under Criterion (a).

TA-43-0001 does have associations with significant persons, and its association with Wright H. Langham, PhD, is specific and important. Langham is a significant figure of the Laboratory’s Health Division. He facilitated the design, funding, and development of HRL; guided much of its research as the alternate division leader, H-4 group leader, assistant division leader, and associate division leader; served as a principal investigator in numerous significant scientific investigations; and pioneered whole-body radiation-counting equipment within its walls. Like the studio of a significant artist, HRL is a property that represents and conveys the importance of Langham and his work. Therefore, TA-43-0001 is eligible for listing in the NRHP under Criterion (b).

TA-43-0001 does not have the distinctive characteristics of an architectural style or characteristics of a type and method of construction, possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction. Although W. C. Kruger is one of the state’s most important architects, the HRL building is not one of his more important works. Therefore, TA-43-0001 is not eligible for listing in the NRHP under Criterion (c).

TA-43-0001 has not yielded, and is not likely to yield, information important in history that can be acquired through testing or research. The building is not an important source of data. Therefore, TA-43-0001 is not eligible for listing in the NRHP under Criterion (d).

TA-43-0012 (Warehouse)

Technical Area: 43
Building Number: 0012
Original Function: Warehouse
Current Function: Warehouse
Date Constructed: 1978
TA Building(s) with Same Floorplan: none

Associated Theme(s): Reactor Technology; Weapons Research, Development, Testing, and Stockpile Support; Bioscience-Health Physics; Biomedical Research and Development
Property Type: Support Facility (First Tier)
Integrity: Yes
Eligible: No

Figure 5-5. TA-43-0012, view to the south-southwest, June 16, 2021 (LANL image, file no. DSCN1611).

Figure 5-6. TA-43-0012, view to the south-southeast, February 14, 2021 (LANL image, file no. DSCN1567).

Architectural Description

TA-43-0012 is a one-story building located behind (southeast of) HRL at the edge of the Los Alamos Canyon escarpment (Figure 5-5 and Figure 5-6; also see Figure 1-2). The building is a pre-engineered, rigid-frame steel building constructed on a poured-concrete foundation. Rectangular in plan, the facility measures 60 by 24 feet and is oriented east-northeast by west-southwest. The walls are constructed of metal, standing-seam siding. The facility has a low-pitched gabled roof clad in metal sheeting with extremely narrow eaves provided by an enclosed gutter system. The roof ridgeline supports three evenly spaced exhaust fans. Access to the building is provided through a single and paired metal-panel personnel doors. The three doors are centered on the north-northwest façade under an extremely narrow, hollow, metal canopy. The gabled ends feature metal-framed louvered vents. The Laboratory does not appear to have made any modifications since the facility's original construction. TA-43-0012 has structural integrity, and the exterior is in good condition. The building is utilitarian in character, and its character-defining features include low massing, corrugated siding, windowless walls, and a gabled roof.

Historical Background

In January 1978, the Laboratory approved drawings of a Warehouse Facility by the Engineering Department. The building manufacturer is "Apache," based on the placard attached to the building. Located southeast of HRL along the Los Alamos Canyon escarpment, the one-story building measured 60 by 24 feet. No subsequent modifications are reflected in the architectural record.

Eligibility Determination

TA-43-0012 was evaluated under the historic context provided in Chapter 3 of this report. The building was designed and constructed during the Cold War and has not been subsequently altered. TA-43-0012 retains integrity of location, design, setting, materials, workmanship, feeling, and association. TA-43-0012 does not have any associations to significant events or persons; therefore, it is not eligible for listing in the NRHP under Criterion (a) or (b). The building does not have the distinctive characteristics of an architectural style or characteristics of a type and method of construction, represent the work of a master, possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction. Therefore, it is not eligible for listing in the NRHP under Criterion (c). This property has not yielded, and is not likely to yield, information important in history; therefore, it is not eligible for listing in the NRHP under Criterion (d).

Chapter 6: Summary and Conclusions

As part of the LANL Footprint Reduction Program's D&D process, all facilities of the HRL complex are scheduled for characterization and future demolition. In compliance with Section 106 of the NHPA, 36 CFR 800, and the PA, an evaluation of the HRL complex for inclusion in the NRHP was conducted. Of the nine extant properties, seven were exempt from review. Therefore, eligibility evaluations were performed for two properties within the HRL complex: TA-43-0001 (HRL) and TA-43-0012 (warehouse). TA-43-0001 is determined eligible for listing in the NRHP under Criteria (a) and (b) for its significant contributions to important historical themes of the Laboratory during the Cold War era and for its significant association to Wright H. Langham, an early visionary of the Health Division. TA-43-0012 is determined not eligible for listing in the NRHP (Figure 6-1).

In addition to these determinations of eligibility, Volumes 1 and 2 of this report meet the level of standard historic documentation that will be required to mitigate future adverse effects to TA-43-0001 pursuant to requirements outlined in Part II, Section 10, of the CRMP and Section 2.B of Appendix D of the PA itself. To support the D&D characterization process, the standard historic documentation package for TA-43-0001 has been prepared and is being submitted to the SHPO at this time. Any changes to TA-43-0001 between now and the official Notice of D&D will be documented appropriately and provided as a supplement to this report.

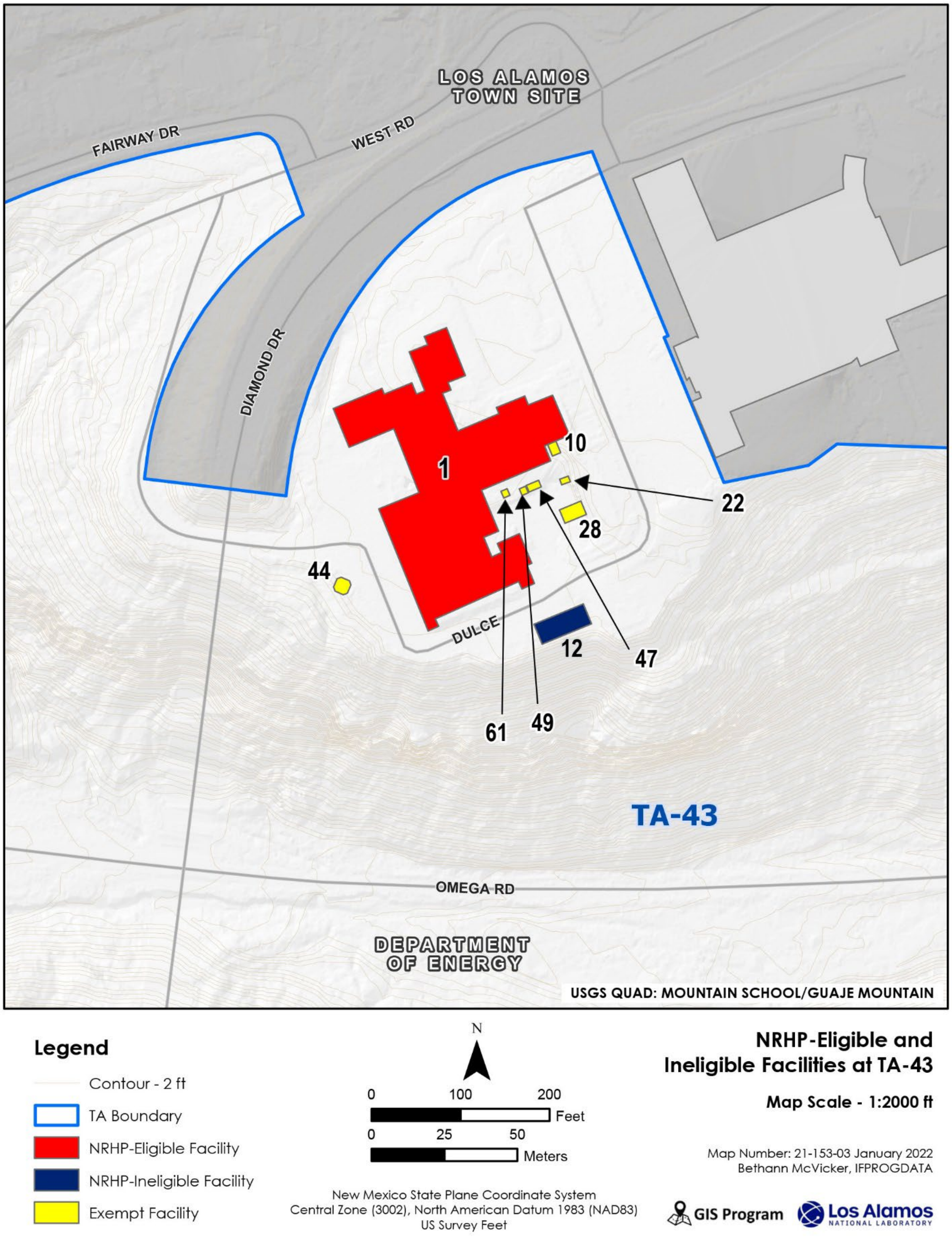

Figure 6-1. NRHP-eligible and -ineligible facilities at TA-43.

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Appendix A: Additional Buildings and Complexes Designed by W. C. Kruger Company and W. C. Kruger and Associates

Name	Year Built	Firm	City	State	Listed	Reference
Clayton Public Schools Campus No. 1	1935–1941	W. C. Kruger Company	Clayton	NM	NRHP; SRCP	Kammer 1995a:7.1
Carrie Tingley Hospital for Crippled Children (New Mexico State Veteran's Home)	1937	W. C. Kruger Company	Truth or Consequences	NM	NRHP; SRCP	Kammer 2003:3; Makeda 2020
Clayton Public Library	1939	W. C. Kruger Company and J. M. Frame	Clayton	NM	NRHP; SRCP	Monroe 2002:3; Works Projects Administration 1940:210
Longfellow School	1939	W. C. Kruger Company	Raton	NM	NRHP; SRCP	Kammer 1995b:8.3
Raton Junior-Senior High School	1939	W. C. Kruger Company	Raton	NM	NRHP; SRCP	Kammer 1995c:8.3
Pantex Plant	1942	W. C. Kruger Company	Amarillo	TX	-	Massey and Sawayda 2019:4; Pantex Plant 2020
Manhattan Project Facilities	1943–1947	W. C. Kruger Company; W. C. Kruger and Associates	Los Alamos	NM	NRHP; SRCP	Jones 1985:466–468; Koyl 1955:313, 1962:396; LANL drawings on file; U.S. Congress 1949a:115
Los Alamos Townsite (including housing areas, shopping mall, school facilities, hospital, etc.)	1943–1955	W. C. Kruger Company; W. C. Kruger and Associates	Los Alamos	NM	-	Koyl 1955:313, 1962:396; LANL drawings on file; Martin 2000; Mead 2020; U.S. Congress 1949a:115, 1949b:673
New Mexico Public Welfare Building	1945	W. C. Kruger Company	Albuquerque	NM	-	Raymond and McCullough 2009:F.37
New Mexico Public Welfare Building	1946	W. C. Kruger and Associates	Espanola	NM	-	Raymond and McCullough 2009:F.37
LASL Cutting Building (TA-15)	1947	W. C. Kruger and Associates	Los Alamos	NM	-	LANL drawings on file
LASL Control Building (TA-15)	1947	W. C. Kruger and Associates	Los Alamos	NM	-	LANL drawings on file
Fuller Lodge Additions	1947–1948	W. C. Kruger and Associates	Los Alamos	NM	SRCP*	Mead 2020; Spears Architects 2013; Storms 1966:22
LASL East Gate Pass Office Complex	1948	W. C. Kruger and Associates	Los Alamos	NM	-	Garcia et al. 2015:7
U.S. Post Office	1948	W. C. Kruger and Associates	Los Alamos	NM	NRHP; SRCP	McKenna 2014

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Name	Year Built	Firm	City	State	Listed	Reference
LASL Criticality Accident Sequence Assessment 1 Building (TA-18)	1948	W. C. Kruger and Associates	Los Alamos	NM		LANL drawings on file
LASL Hillside Vault (TA-18)	1948	W. C. Kruger and Associates	Los Alamos	NM		LANL drawings on file
LASL Steam Generating Plant	ca. 1948	W. C. Kruger Company	Los Alamos	NM	-	LANL drawings on file
Sandia Base Technical Area I	1948–1951	W. C. Kruger and Associates	Albuquerque	NM	-	Massey and Sawayda 2019:4; Ulrich 2010:30; Van Citters and Bisson 2003:100
LASL South Mesa Access Road	ca. 1949	W. C. Kruger and Associates	Los Alamos	NM	-	LANL drawings on file
LASL Police Barracks Area (AEC/DOE Headquarters)	ca. 1949	W. C. Kruger and Associates	Los Alamos	NM	-	LANL drawings on file
Tierra Amarilla Air Force Station P-8	1949–1952	W. C. Kruger and Associates	Tierra Amarilla	NM	NRHP; SRCP	Kammer 2000a:3
Sandia Base Technical Area II Weapons Assembly Buildings	1950	W. C. Kruger and Associates	Albuquerque	NM	-	Massey and Sawayda 2019:4; Van Citters et al. 2009:34
Upper Air Research Observatory (Sunspot Solar Observatory)	1951–1953	W. C. Kruger and Associates	Sunspot	NM	-	CH2MHill, Inc. 2017:2.7–2.12
Holloman AFB Missile Assembly Building	1952	W. C. Kruger and Associates	Alamogordo	NM	-	Fulton and Cooper 1996:171
Holloman AFB Sanitary Sewage Pump Station	1952	W. C. Kruger and Associates	Alamogordo	NM	-	Fulton and Cooper 1996:113
Holloman AFB Solid Fuel Conditioning Building	1952	W. C. Kruger and Associates	Alamogordo	NM	-	Fulton and Cooper 1996:213
Holloman Air Force Radar Triangulation Building	1952	W. C. Kruger and Associates	Alamogordo	NM	-	Fulton and Cooper 1996:379
Mabry Hall Office Building (Jerry Apodaca Building)	1952	W. C. Kruger and Associates	Santa Fe	NM	-	Raymond and McCullough 2009:F.37
New Mexico School for the Blind Gymnasium	1952	W. C. Kruger and Associates	Alamogordo	NM	-	Raymond and McCullough 2009:F.38
New Mexico State Police Headquarters Addition	1952	W. C. Kruger and Associates	Santa Fe	NM	-	Raymond and McCullough 2009:F.38
St. John's Methodist Church	1952	W. C. Kruger and Associates	Santa Fe	NM	-	City of Santa Fe Historic Design Review Board 2011:5
Holloman AFB Booster Inspection Building	ca. 1952	W. C. Kruger and Associates	Alamogordo	NM	-	Fulton and Cooper 1996:209
Holloman AFB Change House	ca. 1952	W. C. Kruger and Associates	Alamogordo	NM	-	Fulton and Cooper 1996:201

Name	Year Built	Firm	City	State	Listed	Reference
Holloman AFB Continuity Check Stand	ca. 1952	W. C. Kruger and Associates	Alamogordo	NM	-	Fulton and Cooper 1996:205
Holloman AFB Special Projects Laboratory	ca. 1952	W. C. Kruger and Associates	Alamogordo	NM	-	Fulton and Cooper 1996:259
Upper Air Research Observatory Family Housing (Sunspot Solar Observatory housing)	1952–1959	W. C. Kruger and Associates	Sunspot	NM	-	CH2MHill, Inc. 2017:2.7–2.14
Holloman AFB Ground Powered Equipment Repair Shop	1953	W. C. Kruger and Associates	Alamogordo	NM	-	Fulton and Cooper 1996:85
New Mexico Public Welfare Building Addition	1953	W. C. Kruger and Associates	Santa Fe	NM	-	Raymond and McCullough 2009:F.37
LASL Source Storage Building (TA-03)	1953	W. C. Kruger and Associates	Los Alamos	NM	-	LANL drawings on file
Holloman AFB Electronics and Atmospheric Research Testing Building	ca. 1953	W. C. Kruger and Associates	Alamogordo	NM	-	Fulton and Cooper 1996:317
New Mexico State Penitentiary	1953–1956	W. C. Kruger and Associates	Santa Fe	NM	-	Koyl 1955:313, 1962:396; Raymond and McCullough 2009:F.38; U.S. Bureau of Prisons 1960
Holloman AFB Aircraft Maintenance Hangar	1954	W. C. Kruger and Associates	Alamogordo	NM	-	Fulton and Cooper 1996:219
New Mexico State Capitol Building Remodel (Bataan Memorial Building)	1954	W. C. Kruger and Associates	Santa Fe	NM	-	Koyl 1955:313, 1962:396; New Mexico Society of Architects, AIA 1970a:18; Price 2000:369; Raymond and McCullough 2009:F.37
New Mexico State Governor's Mansion	1954–1955	W. C. Kruger and Associates	Santa Fe	NM	-	New Mexico Society of Architects, AIA 1970a:21; Raymond and McCullough 2009:F.37; Van Citters et al. 2009:34
Holloman AFB Base Operations Building and Control Tower	1955	W. C. Kruger and Associates	Alamogordo	NM	-	Fulton and Cooper 1996:43
Kruger Residence	1955	W. C. Kruger	Santa Fe	NM	-	Weideman 2018
New Mexico State Hospital Addition	1955	W. C. Kruger and Associates	Las Vegas	NM	-	Koyl 1955:313, 1962:396
New Mexico State Highway Department Building	1956	W. C. Kruger and Associates	Santa Fe	NM	-	Raymond and McCullough 2009:F.38; Wallace 2011:14

Appendix A: Additional Buildings and Complexes Designed by W. C. Kruger Company and W. C. Kruger and Associates

Name	Year Built	Firm	City	State	Listed	Reference
New Mexico State Highway Department Car Wash and Motor Pool	1956	W. C. Kruger and Associates	Santa Fe	NM	-	Raymond and McCullough 2009:F.38
Our Lady of Fatima Church	1956	W. C. Kruger and Associates	Albuquerque	NM	-	Raymond and McCullough 2009:E.31
Bank of New Mexico, Hoffmantown Branch	1957	W. C. Kruger and Associates	Albuquerque	NM	-	*Albuquerque Journal* 2013
New Mexico School for the Blind Boys Dormitory	1957	W. C. Kruger and Associates	Alamogordo	NM	-	Raymond and McCullough 2009:F.38
New Mexico State Highway Department Materials and Testing Lab	1957	W. C. Kruger and Associates	Santa Fe	NM	-	Raymond and McCullough 2009:F.38
Holloman AFB Missile Assembly Building	ca. 1957	W. C. Kruger and Associates	Alamogordo	NM	-	Fulton and Cooper 1996:159
Albuquerque National Bank	1959	W. C. Kruger and Associates	Albuquerque	NM	-	Dodge 2013:20
LASL Sherwood Building (TA-03)	1959	W. C. Kruger and Associates	Los Alamos	NM	-	LANL drawings on file
Shiprock Hospital	ca. 1959	W. C. Kruger and Associates	Shiprock	NM	-	U.S. Congress, House 1958:471
New Mexico State Land Office	1959–1960	W. C. Kruger and Associates	Santa Fe	NM	-	New Mexico Society of Architects, AIA 1981:13; Raymond and McCullough 2009:E.26
National Education Association Building (Concha Ortiz y Pino Building)	1960	W. C. Kruger and Associates	Santa Fe	NM	-	Raymond and McCullough 2009:F.37
University of New Mexico Stadium	1960	W. C. Kruger and Associates	Albuquerque	NM	-	Hooker and Howard 2000:141; Raymond and McCullough 2009:E.31
Bank of New Mexico Building	1962	W. C. Kruger and Associates	Albuquerque	NM	-	Portland Cement Association 1962:6
Walker AFB Control Tower	ca. 1962	W. C. Kruger and Associates	Roswell	NM	-	U.S. Congress, House 1960:271
LASL UHTREX Buildings (TA-52)	1962; 1965	W. C. Kruger and Associates	Los Alamos	NM	-	Schultz et al. 2020:29
Del Norte High School	1964	W. C. Kruger and Associates	Albuquerque	NM	-	New Mexico Architectural Foundation 2019; Raymond and McCullough 2009:E.31
Key Financial Center	1964	W. C. Kruger and Associates	Boise	ID	-	Emporis 2020; Kohl 2020
New Mexico Supreme Court Addition	1964	W. C. Kruger and Associates	Santa Fe	NM	NRHP; SRCP*	Kammer 2000b:7.6; Raymond and McCullough 2009:F.38

Name	Year Built	Firm	City	State	Listed	Reference
Kirtland AFB Officers' Quarters	ca. 1964	W. C. Kruger and Associates	Albuquerque	NM	-	U.S. Congress, House 1963:277
St. John's Methodist Church North Wing	ca. 1964	W. C. Kruger and Associates	Santa Fe	NM	-	City of Santa Fe Historic Design Review Board 2011:5
New Mexico State Capitol Building	1964–1966	W. C. Kruger and Associates	Santa Fe	NM	-	Price 2000:369–371; Raymond and McCullough 2009:F.38
New Mexico State Library	1964–1966	W. C. Kruger and Associates	Santa Fe	NM	-	Price 2000:369; Raymond and McCullough 2009:F.38; State of New Mexico 1965
University of New Mexico Basic Medical Sciences Building	1965	W. C. Kruger and Associates	Albuquerque	NM	-	Crego Block Co., Inc. 1968:23; New Mexico Society of Architects, AIA 1968:24; Raymond and McCullough 2009:E.31
Albuquerque Technical Vocational Institute (Central New Mexico Community College)	ca. 1965	W. C. Kruger and Associates	Albuquerque	NM	-	Central New Mexico Community College 2020; New Mexico Society of Architects, AIA 1987:6
LASL High Frequency Radio Facility	1964–1966	W. C. Kruger and Associates	Los Alamos	NM	-	LANL drawings on file
Canon AFB Composite Medical Facility	1966	W. C. Kruger and Associates	Clovis	NM	-	Hydro Conduit Corporation 1967:28; U.S. Congress, House 1964:352
LASL Occupational Health Laboratory (TA-59)	1966	W. C. Kruger and Associates	Los Alamos	NM	-	LANL drawings on file
New Mexico State Highway Department Building Annex	1966	W. C. Kruger and Associates	Santa Fe	NM	-	Raymond and McCullough 2009:F.38
Santa Fe Senior High School	1966	W. C. Kruger and Associates	Santa Fe	NM	-	Portland Cement Association 1966:2; Raymond and McCullough 2009:E.31
New Mexico Bank and Trust Building	1968	W. C. Kruger and Associates	Albuquerque	NM	-	Emporis 2020
New Mexico State University Chemistry Building Addition	1968	W. C. Kruger and Associates	Las Cruces	NM	-	Grumet 2004:511; Hooker 1974:25; Van Citters et al. 2009:34, 82
New Mexico State University Pan-American Arena	1968	W. C. Kruger and Associates	Las Cruces	NM	-	Van Citters et al. 2009:34

Appendix A: Additional Buildings and Complexes Designed by W. C. Kruger Company and W. C. Kruger and Associates

Name	Year Built	Firm	City	State	Listed	Reference
New Mexico State University Physics Addition (Gardiner Hall)	1968	W. C. Kruger and Associates	Las Cruces	NM	-	Grumet 2004:521; Hooker 1974:25; Van Citters et al. 2009:35, 85
Public Employee Retirement Association Building	1968	W. C. Kruger and Associates	Santa Fe	NM	-	Weideman 2018
Public Service Company of New Mexico Building (PNM Building)	1968	W. C. Kruger and Associates	Albuquerque	NM	-	Emporis 2020; New Mexico Society of Architects, AIA 1970b:9
St. Joseph's Hospital (Lovelace Hospital)	1968	W. C. Kruger and Associates	Albuquerque	NM	-	Edgar D. Otto and Son, Inc. 1968a:10; Emporis 2020
West Mesa High School Gymnasium and Shop	ca. 1968	W. C. Kruger and Associates	Albuquerque	NM	-	Edgar D. Otto and Son, Inc. 1968b:31
Indian Memorial Park (educational and ceremonial complex)	1969	W. C. Kruger and Associates	Gallup	NM	-	New Mexico Society of Architects, AIA 1969:15
Holloman AFB Academic Classroom Improvements	ca. 1969	W. C. Kruger and Associates	Alamogordo	NM	-	Ernst et al. 1998:19
LASL Physics Analytical Center (TA-03)	ca. 1969	W. C. Kruger and Associates	Los Alamos	NM	-	LANL drawings on file
Albuquerque Federal Savings and Loan	1971	W. C. Kruger and Associates	Albuquerque	NM	-	Mason Contractors Association of New Mexico 1972:12; Modern Albuquerque 2020
Downs at Santa Fe	1971	W. C. Kruger and Associates	Santa Fe	NM	-	Krasnow 2017; New Mexico Society of Architects, AIA 1987:6
U.S. Post Office and Vehicle Maintenance Facility	1971	W. C. Kruger and Associates	Albuquerque	NM	-	Hydro Conduit Corporation 1971:24; U.S. Congress, House 1972:378
LASL Los Alamos Meson Physics Facility Nuclear Chemistry Wing (TA-53)	ca. 1971	W. C. Kruger and Associates	Los Alamos	NM	-	LANL drawings on file
New Mexico State University Biology Addition (Foster Hall)	1972	W. C. Kruger and Associates	Las Cruces	NM	-	Grumet 2004:248, 260; Hooker 1974:25
Kirtland AFB Weapons Lab Transmission-Line Aircraft Simulator (Atlas-I)	1972–1980	W. C. Kruger and Associates; McDonald-Douglas Aircraft Company; R. D. Krause Engineering	Albuquerque	NM	-	Emmer 2020; Raymond and McCullough 2009:E.31
Wells Fargo Bank Building	1973	W. C. Kruger and Associates	Albuquerque	NM	-	Emporis 2020

Name	Year Built	Firm	City	State	Listed	Reference
ABC Bank Complex	ca. 1973	W. C. Kruger and Associates	Albuquerque	NM	-	Hydro Conduit Corporation 1973:28
Southwestern Indian Polytechnic Institute	ca. 1973	W. C. Kruger and Associates	Albuquerque	NM	-	Mason Contractors Association of New Mexico 1973:8
University of New Mexico Humanities Building	1974	W. C. Kruger and Associates	Albuquerque	NM	-	Hooker 1974:24; Raymond and McCullough 2009:E.31; Strasser 2020
University of New Mexico Lecture Hall (Woodward Hall)	1974	W. C. Kruger and Associates	Albuquerque	NM	-	Hooker 1974:24; Raymond and McCullough 2009:E.31; Strasser 2020
Employment Security Commission Office Building	ca. 1976	W. C. Kruger and Associates	Albuquerque	NM	-	Southwestern Portland Cement Company 1976:18
Albuquerque Municipal Court Facility	ca. 1978	W. C. Kruger and Associates	Albuquerque	NM	-	Southwest Panel Industries, Inc. 1978:10
Indian Health Service Facility	ca. 1978	W. C. Kruger and Associates	Santa Fe	NM	-	Hydro Conduit Corporation 1978a:20
Bank of Santa Fe	ca. 1978	W. C. Kruger and Associates	Santa Fe	NM	-	Hydro Conduit Corporation 1978b:20
American Bank of Commerce	ca. 1980	W. C. Kruger and Associates	Albuquerque	NM	-	Hydro Conduit Corporation 1980:20
University of New Mexico Biomedical Research Facility Building	1982	W. C. Kruger and Associates	Albuquerque	NM	-	Wang and Carter 2014:75
U.S. Veterans Administration Medical Center Addition	ca. 1982	W. C. Kruger and Associates	Albuquerque	NM	-	Hoagland 1985
Bernalillo County Administration Building	1983–1985	W. C. Kruger and Associates; Dean/Hunt and Associates	Albuquerque	NM	-	Deacon 2020
One Civic Plaza	1985	W. C. Kruger and Associates	Albuquerque	NM	-	Emporis 2020

* Listed property includes the additions; AFB = Air Force Base; LANL = Los Alamos National Laboratory; LASL = Los Alamos Scientific Laboratory; NRHP = National Register of Historic Places; SRCP = New Mexico State Register of Cultural Properties; TA = Technical Area

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Appendix A: Additional Buildings and Complexes Designed by W. C. Kruger Company and W. C. Kruger and Associates

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Appendix B: Health Research Laboratory Leadership Personnel from 1953 to 1990

The following list of staff led the work conducted at HRL. The data were compiled from the available annual and semi-annual reports written by the Health (H) Division and the proceeding Life Sciences (LS) Division between 1946 and 1990 and from Senior Historian Alan Carr's (2020) *LANL Organization Chart 1943–1984* (LA-UR-20-28134). Note that the following reports were either unavailable or not produced for certain years: 1955, 1956, 1958, 1968, 1969, and 1970.

Anderson, Ernest C.

- 1950: H-4 Biochemistry Section staff member
- 1953–1954: H-4 Biophysics Section Leader
- 1957: H-4 Alternate Radiobiology Section Leader
- 1959–1962: H-4 Low-Level Counting Section Leader
- 1963: H-4 Molecular Radiobiology Section staff member
- 1964–1967: H-4 Cellular Radiobiology Section staff member
- 1971–1972: H-4 Assistant Group Leader for Special Problems
- 1974–1978: H Division scientific advisor
- 1979: H Division scientific advisor; LS-1 consultant
- 1980–1986: LS-1 consultant

Barnhart, Benjamin J.

- 1965–1967, 1971–1972: H-4 Cellular Radiobiology Section staff member
- 1973–1978: H-9 staff member
- 1979–1980: LS-3 Alternate Group Leader

Bitensky, Mark W.

- 1981–1985: LS Division Leader

Boone, Irene U.

- 1950: H-4 summer research program participant
- 1954, 1959: H-4 Radiobiology Section staff member
- 1960–1962: H-4 Cellular Radiobiology Section Leader
- 1964–1966: H-4 Cellular Radiobiology Section staff member

Bradbury, E. Morton

- 1988–1990: LS Division Leader

Campbell, Evan E.

- 1957: H-5 Laboratory Alternate Section Leader
- 1975–1980: H-5 Alternate Group Leader

Cassidy, M. C.

- 1988: LS-1 Technical Coordinator/Personnel Specialist; LS-4 National Flow Cytometry Resource
- 1989: LS-4 National Flow Cytometry Resource
- 1990: LS-4 National Flow Cytometry Resource Manager

Cram, L. Scott

- 1971–1972: H-4 Biophysics Section staff member
- 1973–1974: H-10 staff member
- 1975–1978: H-10 Alternate Group Leader
- 1979–1980: LS-4 Alternate Group Leader
- 1981–1984: LS-4 Deputy Group Leader
- 1985: LS-4 Group Leader (acting)
- 1986: LS-4 staff member
- 1987: LS Deputy Division Leader (acting)
- 1988–1990: LS Deputy Division Leader

Dean, Philip N.

- 1962–1963: H-4 Low-Level Counting Section staff member
- 1964–1967: H-4 Biophysics Section staff member
- 1971: H-4 Biophysics Section staff member
- 1972: H-4 Physical Radiobiology Section Leader
- 1973: H-10 staff member
- 1974–1975: H-10 Alternate Group Leader

Deaven, Larry L.

- 1971–1972: H-4 Cellular Radiobiology Section postdoctoral appointee
- 1973–1978: H-9 staff member
- 1979–1984: LS-4 staff member
- 1985: LS-4 Deputy Group Leader (acting)
- 1986–1990: LS-4 staff member

Eliot, Frankee P.

- 1957: H-4 Veterinary Medicine Section Leader
- 1959: H-4 Veterinary Services Section Leader

Appendix B: Health Research Laboratory Leadership Personnel from 1953 to 1990

Enger, Merlin D.

- 1965–1967, 1971–1972: H-4 Cellular Radiobiology Section staff member
- 1973–1978: H-9 staff member
- 1979–1981: LS-3 Group Leader
- 1982–1984: LS Deputy Division Leader

Furchner, John E.

- 1954, 1959: H-4 Radiobiology Section staff member
- 1960–1967: H-4 Mammalian Metabolism Section staff member
- 1971: H-4 Mammalian Metabolism Section Leader
- 1972: H-4 Mammalian Radiobiology Section staff member
- 1973–1975: H-4 staff member

Gould, R. Gordon

- 1952–1954, 1957, 1959: H-4 Biochemistry Section Leader

Guralnik, S. E.

- 1984–1985: LS Assistant Division Leader

Gurley, Lawrence R.

- 1965–1967: H-4 Molecular Radiobiology Section staff member
- 1971–1972: H-4 Cellular Radiobiology Section staff member
- 1973–1978: H-9 staff member
- 1979–1980: LS-1 staff member
- 1981: LS-1 Deputy Group Leader (acting)
- 1982: LS-1 staff member
- 1983: LS-1 staff member; Fellow
- 1984–1986: LS-1 staff member
- 1987: LS Division Leader (acting)
- 1988–1990: LS-2 staff member

Habbersett, R. C.

- 1984–1985: LS-4 technician
- 1986: LS-4 Technical Administrative Specialist
- 1987: LS-1 Technical Coordinator/Personnel Specialist; LS-4 National Flow Cytometry Resource
- 1988–1990: LS-4 technical staff

Harris, Payne S.

- 1954, 1957: H-4 Radiobiology Section Leader
- 1958: H-4 Alternate Group Leader
- 1959: H-4 Alternate Group Leader; H-4 Radiobiology Section Leader
- 1960: H-4 Alternate Group Leader
- 1961–1962: H-8 Group Leader

Hayes, Francis Newton

- 1950, 1954: H-4 Organic Chemistry Section staff member
- 1957, 1959: H-4 Organic Chemistry Section Leader
- 1960–1967: H-4 Molecular Radiobiology Section Leader
- 1971–1972: H-4 Molecular Radiobiology Section Leader
- 1973–1975: H-9 staff member
- 1976: H-9 consultant

Hildebrand, Carl Edgar

- 1971: H-4 Cellular Radiobiology Section postdoctoral appointee
- 1972: H-4 Cellular Radiobiology Section staff member
- 1973–1978: H-9 staff member
- 1979–1981: LS-3 staff member
- 1982: LS-3 Deputy Group Leader (acting)
- 1983–1988: LS-3 Deputy Group Leader
- 1989–1990: LS-3 Group Leader (acting)

Holland, Laurence M.

- 1966–1967: H-4 Mammalian Radiobiology Section staff member
- 1971–1972: H-4 Veterinary Section Leader
- 1973: H-4 staff member
- 1974–1978: H-4 Alternate Group Leader
- 1979–1980: LS-1 Alternate Group Leader
- 1981–1982: LS Deputy Division Leader; LS-1 Alternate Group Leader
- 1983–1984: LS-1 Group Leader

Holm, Dale M.

- 1971: H-4 Personnel Liaison
- 1972–1978: H-5 Group Leader
- 1979: LS-2 Alternate Group Leader
- 1980: LS-2 Group Leader (acting)
- 1981: LS-DOT Group Leader (acting)

Hyatt, Edwin C.

- 1952–1956: H-5 Alternate Group Leader
- 1957: H-5 Alternate Group Leader; Field Section Leader
- 1958–1971: H-5 Alternate Group Leader

Jett, James H.

- 1972: H-4 Physical Radiobiology Section staff member
- 1973–1977: H-10 staff member
- 1978: H-10 Alternate Group Leader (acting)
- 1979–1980: LS-2 staff member
- 1981: LS-DOT staff member
- 1982–1985: LS-4 staff member
- 1986–1990: LS-4 Deputy Group Leader

Johnson, Ogden S.

- 1954–1958: H-4 Assistant Group Leader for Administration
- 1959: H-4 Assistant Group Leader for Administration; H-4 Radiobiology Section staff member
- 1960: H-4 Alternate Group Leader; H-4 Veterinary Services Section Leader
- 1961–1962: H-4 Alternate Group Leader; H-4 Mammalian Metabolism Section staff member
- 1963–1964: H-4 Assistant Group Leader for Administration; H-4 Mammalian Radiobiology Section staff member
- 1965–1967: H-4 Administrative Deputy
- 1968: H-4 Alternate Group Leader for Administration
- 1971: H-4 Mammalian Radiobiology Section staff member
- 1972: H-4 Administrative Deputy; H-4 Mammalian Radiobiology Section staff member
- 1973–1977: H-4 staff member

Jordan, Harry S.

- 1957: H-5 Engineering Development Section Leader
- 1961: H-8 Alternate Group Leader
- 1962–1973: H-8 Group Leader
- 1975–1980: H Assistant Division Leader for Operations
- 1981–1983: H Associate Division Leader

Kraemer, Paul M.

- 1965–1967, 1971–1972: H-4 Cellular Radiobiology
- 1973–1978: H-9 staff member
- 1979–1981: LS-4 Group Leader
- 1982–1990: LS-4 staff member

Langham, Wright H.

- 1947–1948: H Alternate Division Leader; H-4 Alternate Group Leader
- 1949–1952: H Alternate Division Leader; H-4 Group Leader
- 1953: H Assistant Division Leader; H-4 Group Leader
- 1954: H Assistant Division Leader; H-4 Group Leader; H-4 Organic Chemistry Section Leader
- 1955–1970: H Assistant Division Leader; H-4 Group Leader
- 1971–1972: H Associate Division Leader; H-4 Group Leader

Lumpkin, Janice L.

- 1980–1981: Personnel Administration Division–(PAD-) 5 Group Leader
- 1982: LS Associate Division Leader; Personal Administration–(PA-) 15 Group Leader
- 1984: Information Services Department (ISD) Associate Division Leader

Lushbaugh, Clarence C.

- 1950: H-4 Pathology Section Leader
- 1952–1954, 1957, 1959: H-4 Radiopathology Section Leader
- 1960–1962: H-4 Clinical Investigations Section Leader

Milligan, Morris F.

- 1957: H-5 Laboratory Section Leader
- 1973: H-5 Assistant Group Leader for Analytical Chemistry

Moyzis, Robert K.

- 1982–1983: LS-3 staff member
- 1984–1988: LS-3 Group Leader
- 1989–1990: Center for Human Genome Studies

Mullaney, Paul F.

- 1966–1967, 1971: H-4 Biophysics Section staff member
- 1972: H-4 Biophysics Section Leader
- 1973–1978: H-10 Group Leader
- 1979–1981: LS-2 Group Leader

O’Donnell, James M.

- 1987–1988: LS-1 staff member
- 1989: LS-DOT Group Leader

Ott, Donald G.

- 1954, 1959: H-4 Organic Chemistry Section staff member
- 1960–1962: H-4 Molecular Radiobiology Section staff member
- 1963–1970: H-4 Alternate Group Leader
- 1971–1972: H-4 Alternate Group Leader; H-4 Isotope Applications Section Leader
- 1973–1976: H-11 Group Leader
- 1983–1984: LS-1 staff member

Petersen, Donald F.

- 1959: H-4 Biochemistry Section staff member
- 1960–1962: H-4 Molecular Radiobiology Section staff member
- 1963–1967, 1971–1972: H-4 Cellular Radiobiology Section Leader
- 1973–1974: H-9 Group Leader
- 1975–1978: H Alternate Division Leader for Management of U.S. Atomic Energy Commission Division of Biomedical and Environmental Research
- 1979: LS Division Leader (acting)
- 1980–1981: LS Division Leader

Reynolds, Richard J.

- 1971–1972: H-9 Group Leader
- 1985–1990: LS-3 staff member

Richmond, Chester R.

- 1959: H-4 Biochemistry Section staff member
- 1960–1967: H-4 Mammalian Metabolism Section Leader
- 1971–1972: H-4 Group Leader
- 1973: H Alternate Division Leader; H-4 Group Leader
- 1974: H Alternate Division Leader

Ronzio, Anthony R.

- 1950: H-4 Organic Chemistry Section Leader
- 1952–1953: H-4 Organic Chemistry Section Leader

Rothermel, Samuel M.

- 1953: H-4 Radiobiology Section Leader (acting)
- 1954: H-4 Radiobiology Section staff member

Saponara, Arthur G.

- 1964–1967, 1971–1972: H-4 Cellular Radiobiology Section staff member
- 1973–1974: H-9 staff member
- 1975–1979: H-9 Group Leader
- 1983–1986: LS-3 staff member
- 1987–1989: LS-2 staff member

Schulte, Harry F.

- 1948: H-2 Alternate Group Leader
- 1949–1974: H-5 Group Leader
- 1975–1977: H-5 scientific advisor
- 1978–1979: H-5 consultant

Shipman, Thomas L.

- 1948–1969: H Division Leader

Sinex, Donal G.

- 1984: LS-DOT staff member
- 1985: LS-7 Group Leader (acting)
- 1986: LS-7 Group Leader
- 1987–1988: LS-1 Group Leader

Sklar, Larry A.

- 1990: National Flow Cytometry Resource Director

Smith, David A.

- 1964–1967, 1971–1972: H-4 Molecular Radiobiology Section staff member
- 1973–1978: H-9 staff member
- 1980–1981: LS Alternate Division Leader

Smith, David M.

- 1974–1978: H-4 staff member
- 1979–1981: LS-1 staff member
- 1982: LS-1 Assistant Group Leader
- 1983–1984: LS-1 Deputy Group Leader

Spalding, John F.

- 1954: H-4 Radiopathology Section staff member
- 1959: H-4 Radiobiology Section staff member
- 1960–1967, 1971–19: H-4 Mammalian Radiobiology Section Leader
- 1973–1978: H-4 Group Leader
- 1979: LS-1 consultant

Spingler, Gordon M.

- 1983–1985: LS Associate Division Leader
- 1987: LS Associate Division Manager for Management/ Administration

Stafford, Carolyn G.

- 1977–1978: H-4 Secretary
- 1979: LS-1 Senior Secretary
- 1981–1982: LS Administrative Assistant
- 1983–1984: LS Budget/Fiscal Specialist
- 1985: LS Assistant Division Leader
- 1987–1988: LS Assistant Division Leader for Finances

Steger, James G.

- 1978: H-12 Alternate Group Leader
- 1979–1980: LS-6 Alternate Group Leader
- 1981–1982: LS-6 Deputy Group Leader
- 1983: LS-6 Group Leader (acting)
- 1984–1985: LS Assistant Division Leader

Stewart, Carleton C.

- 1980: LS-4 visiting staff member
- 1981–1985: LS-4 Group Leader
- 1986–1989: LS-4 staff member
- 1990: LS-2 distinguished visitor

Storer, John B.

- 1950: H-4 Pathology Section staff member
- 1952: H-4 Alternate Group Leader; H-4 Radiobiology Section Leader
- 1953–1954, 1956: H-4 Alternate Group Leader
- 1957: H-4 Alternate Group Leader; H-4 Radiobiology Section Leader
- 1958: H-4 Alternate Group Leader

Strniste, Gary F.

- 1971: H-4 Molecular Radiobiology Section staff member
- 1972: H-4 Molecular Radiobiology Section postdoctoral appointee
- 1975–1978: H-9 staff member
- 1979–1982: LS-3 staff member
- 1983: LS-3 Deputy Group Leader
- 1984–1987: LS-3 Associate Group Leader
- 1988: LS-3 Technical Coordinator
- 1989–1990: LS-3 Deputy Group Leader (acting)

Thomas, Robert G.

- 1974–1978: H-4 Group Leader
- 1979: LS-1 staff member

Tobey, Robert A.

- 1964–1967, 1971–1972: H-4 Cellular Radiobiology Section staff member
- 1973–1978: H-9 staff member
- 1979–1982: LS-1 Group Leader
- 1983–1986: LS-1 staff member
- 1987–1988: LS-3 staff member
- 1989–1990: LS-2 staff member

Trewhella, Jill

- 1987–1989: LS-2 staff member
- 1990: LS-2 Deputy Group Leader

Van Dilla, Marvin A.

- 1959–1962: H-4 Low-Level Counting Section staff member
- 1963: H-4 Low-Level Counting Section Leader
- 1964–1967, 1971: H-4 Biophysics Section Leader
- 1972: H-4 Biophysics Section staff member

Walters, Ronald A.

- 1966–1967: H-4 Cellular Radiobiology doctoral candidate (Associated Rocky Mountain Universities, Inc.)
- 1971–1972: H-4 Cellular Radiobiology Section staff member
- 1973–1978: H-9 staff member
- 1979: LS-3 staff member
- 1980: LS-3 Alternate Group Leader
- 1981–1982: LS-3 Deputy Group Leader
- 1983: LS-3 Group Leader
- 1984: Assistant to the Associate Director of the Chemistry, Earth, and Life Sciences Directorate

Whaley, Thomas W.

- 1971–1972: H-4 Isotope Applications Section staff member
- 1973–1975: H-11 staff member
- 1976–1978: H-11 Group Leader
- 1979–1981: LS-5 Group Leader
- 1983–1984: LS-1 staff member
- 1985: LS-1 Group Leader (acting)
- 1986: LS-1 Group Leader
- 1987–1990: LS-2 Group Leader

Wharton, Walker R.

- 1981–1985: LS-4 staff member
- 1986–1990: LS-4 Group Leader

Whipple, Harry O.

- 1946: A-10 Group Leader
- 1947: H-1 Group Leader; H-3 Group Leader
- 1948: H Division Leader (acting); H-3 Group Leader
- 1949–1953: H Alternate Division Leader
- 1954–1968: H Alternate Division Leader; H-2 Group Leader
- 1969–1970: H Division Leader (acting); H-2 Group Leader
- 1971–1973: H Alternate Division Leader; H-2 Group Leader
- 1974: H-2 Group Leader

Williams, David L.

- 1959: H-4 Organic Chemistry Section staff member
- 1960–1967, 1971–1972: H-4 Molecular Radiobiology Section staff member
- 1973–1975: H-9 staff member
- 1976–1978: H-11 staff member
- 1979–1980: LS-5 Alternate Group Leader
- 1981: LS-5 consultant

Appendix C: Health Research Laboratory–Led Investigations from 1953 to 1986

Year(s)	Investigation Title	Lead Group	HRL Personnel/Author(s)	Collaborator(s)
1953	Absorption of C14-Nicotinic Acid and Related Compounds by Lactobacillus	H-4	Kent Woodward, Donna Turney, and Irene Boone	
1953	Absorption of Tritium-Labeled Sterols by the Rat	H-4	Kenneth Kohr and R. Gordon Gould	
1953	Additional Biological Test Systems for Determining the Relative Biological Effectiveness of Various Kinds of Radiation Available at Los Alamos	H-4	John Spalding, Clarence Lushbaugh, Payne Harris, Dorothy Hale, and Lora Hughes	
1953	Application of Histochemical Techniques to Radiopathology	H-4	Julie Wellnitz, Dorothy Hale, Rita Smith, and Clarence Lushbaugh	
1953	Ba-La Metabolism	H-4	Harry Foreman and Ted Trujillo	
1953	Blood Lactate and Pyruvate in Monkeys Subjected to Large Doses of Gamma Radiation	H-4	Jean Sabine, Donna Turney, and Helen Miller	
1953	Ca EDTA as Skin Decontaminant	H-4	Harry Foreman and Ted Trujillo	
1953	Cataractogenic Effect of Thermal Neutrons and 250 KVP X Rays when Administered in Fractional Doses	H-4	Sam Rothermel, Verda Strang, Phyllis Sanders, William Schweitzer, and John Storer	
1953	Cholesterol Metabolism in Humans	H-4	R. Gordon Gould, Patricia Keegan, and Kenneth Kohr	G. V. LeRoy, University of Chicago, Illinois
1953	Cholesterol Metabolism in Patients with Cardiovascular Disease	H-4	R. Gordon Gould and Kenneth Kohr	Mr./Ms. Hausner, Santa Fe, New Mexico
1953	Chromatographic Separation of Tissue Lipid Fractions	H-4	Patricia Keegan, R. Gordon Gould, and Virginia Lotz	
1953	Coprogen as a Possible Protective Agent against Radiation Damage	H-4	Harry Foreman and R. Gordon Gould	
1953	Determination of RBE with the Use of AKm Leukemia in CF1 Mice	H-4	Irene Boone, Donna Turney, Sam Rothermel, and Kent Woodward	
1953	Distribution of C14-Nitrogen Mustard Following Intra-arterial and Intravenous Injection	H-4	Marguerite Magee	
1953	Effect of Hypophysectomy on Cholesterol Syntheses	H-4	Patricia Keegan and R. Gordon Gould	
1953	Effect of Radiation on Metabolic Processes with Emphasis on Steroid Synthesis	H-4	R. Gordon Gould and Patricia Keegan	

Appendix C: Health Research Laboratory–Led Investigations from 1953 to 1986

Year(s)	Investigation Title	Lead Group	HRL Personnel/Author(s)	Collaborator(s)
1953	Effect of Radiation on the Central Nervous System	H-4	R. Gordon Gould and Patricia Keegan	
1953	Effect of Thyroid Status on Cholesterol Metabolism	H-4	R. Gordon Gould, Patricia Keegan, and Kenneth Kohr	
1953	Effects of Radioactive Particles in the Respiratory Tract of the Rat	H-4	Irene Boone, Donna Turney, Ernest Anderson, Fred Worman, James Perrings, and John or Louise Larkins	
1953	Endocrinologic Study of the Functional Capacity of the Irradiated Pituitary Gland	H-4	John Spalding and Julie Wellnitz	
1953	Investigation of Methods of Preparation of Beryllium Hydride	H-4	Arthur Murray III	
1953	Isolation of C14-Labeled DPN and TPN from Lactobacillus Following Incorporation of C14-Nicotinic Acid and Its Amide into the Media	H-4	Irene Boone, Donna Turney, and Kent Woodward	
1953	J-Division Program	H-4	F. Newton Hayes, Robert Schuch, Betty Rogers, and Kenneth Kohr	J Division
1953	Mechanism of Control of Hepatic Cholesterol Synthesis by Dietary Cholesterol	H-4	R. Gordon Gould, Patricia Keegan, and Virginia Lotz	
1953	Median Survival Times of Mice Following Large Doses of X Rays and Thermal Neutrons	H-4	Sam Rothermel and Kent Woodward	
1953	Metabolism of C14-Caffeine	H-4	Marion Vier and Marguerite Magee	
1953	Metabolism of C14-Labeled Ca EDTA in Man	H-4	Harry Foreman and Ted Trujillo	
1953	Neutron Dosimetry Studies	H-4	Ernest Anderson, John Larkins, and James Perrings	
1953	Organocadmium Compounds for Scintillation Counting of Neutrons	H-4	David Williams and F. Newton Hayes	
1953	Pathological Effects of Rapidly Administered Large Amounts of Radiation	H-4	Clarence Lushbaugh, Julie Wellnitz, and Dorothy Hale	
1953	Preparation of Special Solvents for Scintillator Program	H-4	Arthur Murray III	
1953	Preparation or Synkayvite-C14	H-4	Arthur Murray III	
1953	Preparation, Purification and Drying of Cadmium Propionate for Neutron Studies	H-4	David Williams, Arthur Murray III, and Anthony Ronzio	
1953	Prophylactic Value of Various Bone Marrow Stimulants against X Radiation	H-4	L. Edward Ellinwood, Phyllis Sanders, William Schweitzer, and John Storer	
1953	RBE of Various Radiations on Microorganisms	H-4	Irene Boone, Fred Worman, and Donna Turney	
1953	Recovery and Purification of C14-Nitrogen Mustard	H-4	Arthur Murray III	

Year(s)	Investigation Title	Lead Group	HRL Personnel/Author(s)	Collaborator(s)
1953	Relationship of Pyridoxine and Its Derivatives to the Mechanism of Action of Isoniazid	H-4	Irene Boone and Kent Woodward	
1953	Small Scintillation Detectors for Measurement for Beta Radiation	H-4	Ernest Anderson and James Perrings	
1953	Studies of Dermal Beta Ray Injuries in Sheep and Other Animal Species	H-4	Clarence Lushbaugh, John Spalding, and Dorothy Hale	
1953	Studies of the Relative Effects of Neutrons, Gamma Rays, and X Rays on Cataract and Tumor Incidence and on Longevity of Mice	H-4	Sam Rothermel, Verda Strang, Phyllis Sanders, Payne Harris, and John Storer	
1953	Studies of the Synthesis of Pyridoxine-C14	H-4	Arthur Murray III	
1953	Studies on the Mechanism of Action of Thermal Neutrons in Producing Biological Effects: The Effect of Prophylactic Agents on Survival	H-4	John Storer, L. Edward Ellinwood, and Phyllis Sanders	
1953	Studies on the Therapy of Radiation Illness	H-4	John Storer, L. Edward Ellinwood, and Phyllis Sanders	
1953	Synthesis and Study of Organic Scintillators	H-4	F. Newton Hayes, Betty Rogers, Phyllis Sanders, and Kenneth Kohr	
1953	Synthesis of C14-Labled 1-Hydrazinophthalazine	H-4	Arthur Murray III and Wright Langham	
1953	Synthesis of Compounds for Liquid-Scintillator Studies	H-4	David Williams	
1953	Synthesis of Halogen Substituted Pyridine Ring Compounds	H-4	Arthur Murray III	
1953	Synthesis of Methyl-C14 Alcohol	H-4	David Williams	
1953	Synthesis of Pyridoxine-C14	H-4	David Williams	
1953	The Chronic Toxicity of Uranium-233 and Uranium-238	H-4	L. Edward Ellinwood, Phyllis Sanders, and John Storer	
1953	The Effect of Dicumerol in the Treatment of Radiation Illness	H-4	L. Edward Ellinwood, William Schweitzer, and John Storer	
1953	The Effect of Spleen Shielding as a Means of Increasing Resistance to Radiation	H-4	Clarence Lushbaugh, Lora Hughes, Dorothy Hale, Julie Wellnitz, and John Spalding	
1953	The Effects of Massive, Rapid Doses of X Rays Given Selectively to the Rat Brain	H-4	Kent Woodward, Sam Rothermel, and Fred Worman	
1953	The Neutrino Program	H-4	Ernest Anderson, F. Newton Hayes, Robert Schuch, and Betty Rogers	
1953	The Pathological Effects of Isoniazid Compared with Those of Desoxypyridoxine	H-4	Clarence Lushbaugh and Irene Boone	

Year(s)	Investigation Title	Lead Group	HRL Personnel/Author(s)	Collaborator(s)
1953	The Production of Lens Opacities in Mice with 14 Mev Neutrons	H-4	Irene Boone, Sam Rothermel, and Verda Strang	
1953	The Relationship of Pyridoxine to Isoniazid as an Antimetabolite in the Rat	H-4	Irene Boone and Donna Turney	
1953	The Relative Biological Effectiveness of Thermal Neutrons in Depressing Antibody Production in the Rat	H-4	Kent Woodward and Phyllis Sanders	
1953	The Relative Biological Effectiveness of Thermal Neutrons in Producing Intestinal Weight Loss in the Rat	H-4	L. Edward Ellinwood, William Schweitzer, Phyllis Sanders, and John Storer	
1953	The Relative Biological Effectiveness of Thermal Neutrons in Producing Lethality in Rats	H-4	John or Helen Furchner, L. Edward Ellinwood, Phyllis Sanders, and John Storer	
1953	The Relative Biological Effectiveness of Thermal Neutrons in Producing Testicular Atrophy in Mice	H-4	John Storer, L. Edward Ellinwood, John or Helen Furchner, and Phyllis Sanders	
1953	The Relative Effects of Energy Equivalent Injections of Pu and Ra in Depressing Fe59 Uptake by Red Blood Cells of Rats	H-4	John or Helen Furchner and Virginia Lotz	
1953	The Sulfhydril Content of the Lens Following Cataractogenic Doses of Radiation	H-4	Sam Rothermel and Verda Strang	
1953	The Uptake of C14-Labeled Isoniazid by Mycobacterium	H-4	Irene Boone and Donna Turney	
1953	Ultracentrifuge Studies of Heavy Molecules	H-4	Virgil Koenig and James Perrings	
1953	Assistance to Outside Groups	H-5		Berkeley Laboratory, California; University of Utah, Salt Lake City; Bendix Company, Kansas City, Kansas; Livermore Laboratory, California; Sandia Corporation, Albuquerque, New Mexico; Westinghouse Company, Arco, Idaho; and Convair Company, Fort Worth, Texas
1953	Beryllium Air Sampling and Analysis at V-Shop and New Shop Building	H-5		
1953	Development Work on New Sampling Equipment	H-5		
1953	Lithium Air Sampling and Analysis with Ventilation Studies at Several Sites	H-5		

Year(s)	Investigation Title	Lead Group	HRL Personnel/Author(s)	Collaborator(s)
1953	Plutonium Air Sampling and Analysis and Filter System Study at DP West	H-5		
1953	Review of New Materials and Establishment of Guide Tolerance Concentrations for Lithium and Boric Acid	H-5		
1953	Upshot-Knothole Operations: Assembly and Analysis of Data Collected	H-5	Test Operations Section	
1953	Upshot-Knothole Operations: Off-Site Monitoring Program	H-5	Test Operations Section	U.S. Public Health Service, North Bethesda, Maryland
1953	Uranium Urine Sampling and Analysis with Vacuum Cleaning System Efficiency Study at TU Building	H-5		
1953	Urine Assay for Tritium and Calibration of Equipment at Several Sites	H-5		
1953	Ventilation and Air Cleaning Studies	H-5		Engineering Department
1953–1954	Construction and Study of Large Volume Scintillation Detectors for Biological Use	H-4	Ernest Anderson, F. Newton Hayes, Robert Schuch, John Larkins, James Perrings, and Betty Rogers	Marvin Van Dilla, University of Utah, Salt Lake City
1953–1954	Effects of Total, Body Radiation on the Cholinesterase Levels of the Erythrocytes in Mice	H-4	Jean Sabine and Helen Miller	
1953–1954	Gross and Microscopic Pathology of Dermal Lesions of Nevada Range Sheep as Compared with Those Produced Experimentally with a Strontium-90–Yttrium-90 Application	H-4	Clarence Lushbaugh, John Spalding, Dorothy Hale, and Julie Wellnitz	
1953–1954	Metabolic Studies of C14 Isoniazid in Pyridoxine Deficient Rats	H-4	Irene Boone, Marguerite Magee, and Donna Turney	
1953–1954	Preparation of Carbon-14 Scintillation Standards	H-4	David Williams	
1953–1954	The Relative Biological Effectiveness of 14 Mev Neutrons in Producing Lethality in Mice	H-4	L. Edward Ellinwood, William Schweitzer, Kent Woodward, John Storer, Sam Rothermel, Payne Harris, Phyllis Sanders, and Verda Strang	
1953–1954	The Relative Biological Effectiveness of 14 Mev Neutrons in Producing Spleen-Thymus Weight Loss in Mice	H-4	L. Edward Ellinwood, Payne Harris, William Schweitzer, and Phyllis Sanders	
1953–1955	The Toxicology of Lithium Compounds	H-4	L. Edward Ellinwood, Phyllis Sanders, John Storer, and William Schweitzer	

Year(s)	Investigation Title	Lead Group	HRL Personnel/Author(s)	Collaborator(s)
1954	Absorption and Metabolic Effects of Dihydrocholesterol and Sitosterol	H-4	R. Gordon Gould, Virginia Lotz, and Edith Lilly	
1954	Analysis of Urines of Rongelap Natives Exposed to Radioactive Fall-Out of March 1, 1954	H-4	Radiobiology Section	
1954	Application of Filter Paper Electrophoresis to Clinical Laboratory Diagnosis	H-4	Marguerite Magee and R. Gordon Gould	
1954	Beta Ray Determinations on Urines of Personnel Exposed to Fall-Out of March 1, 1954	H-4	Radiobiology and Biochemistry Sections	
1954	Binding of Pu, Sr89, and Other Fission Products with Serum Proteins	H-4	Marguerite Magee, Harry Foreman, and R. Gordon Gould	
1954	Boron Analysis of Biological Materials using a Sigma Pile	H-4	John Larkins	
1954	Ca EDTA in Pu Excretion	H-4	Harry Foreman and William Moss	
1954	Calibration of the Godiva Assembly using Biological and Physical Evaluation of Neutron Dose	H-4	Payne Harris and Radiobiology Section	G. S. Hurst, Oak Ridge National Laboratory, Tennessee
1954	Calibration Studies for Participation in Operation Teapot, 1955	H-4	Radiobiology Section	
1954	Cataractogenic Effects of Neutrons	H-4	Sam Rothermel, Irene Boone, Verda Strang, and Payne Harris	
1954	Changes in vivo Enzymatic Systems Associated with Growth and Mitotic Division Post-Irradiation	H-4	Lora Hughes and Clarence Lushbaugh	
1954	Determination of RBE using AK Mouse Leukemia in Various Strains of Mice	H-4	Irene Boone, Donna Turney, Betty Rogers, Jo Ann Grometer, and Wilfred Stedman	
1954	Determination of the Mitotic Dynamics of Normal and Malignant Tissues after Death of the Host or after Their Removal from the Body	H-4	Dorothy Hale and Clarence Lushbaugh	
1954	Determination of the Mitotic Dynamics of the Fava Bean Root	H-4	Dorothy Hale, John Spalding, and Clarence Lushbaugh	
1954	Disappearance from the Peripheral Circulation of "True" Cholinesterase Released from Erythrocytes by Hemolysis	H-4	Jean Sabine, John Spalding, William Schweitzer, and Helen Miller	
1954	Effect of Ca EDTA on Absorption of Pu from Intramuscular Deposits	H-4	Harry Foreman and Camille Finnegan	
1954	Effect of Ca EDTA Therapy on Lung Absorption of Pu	H-4	Harry Foreman and Camille Finnegan	

Year(s)	Investigation Title	Lead Group	HRL Personnel/Author(s)	Collaborator(s)
1954	Effect of Hypothyroidism on Cholesterol Syntheses in Humans	H-4	R. Gordon Gould	surnames of LeRoy, Kabara, and Bergenstal, Argonne Cancer Research Hospital, Chicago, Illinois
1954	Effect of Massive Rapid Doses of Fission Neutrons on the Behavior of Monkeys	H-4	Radiobiology and Biophysics Sections	
1954	Effect of X Irradiation on Metabolic Processes	H-4	R. Gordon Gould, Patricia Keegan, and Jean Van Riper	
1954	Effect of X Irradiation on Mineral Metabolism	H-4	Harry Foreman, Camille Finnegan, and James Post	
1954	Effects of X Rays and Thermal Neutron Exposure on Gastrointestinal Physiology of the Rat	H-4	Kent Woodward and Sam Rothermel	
1954	Experimental Studies of the Hazards Associated with Inhalation of High Concentrations of Tritium Gas	H-4	Ted Trujillo, Ernest Anderson, and Wright Langham	
1954	Eye Counter and Study of Turnover Rates in the Anterior Chamber of the Rabbit's Eye	H-4	Ernest Anderson, Sam Rothermel, and Kent Woodward	
1954	Filter Paper Electrophoresis Studies of the Effect of X Irradiation on Serum Globulin Levels in Rats	H-4	Marguerite Magee and R. Gordon Gould	
1954	Histochemical Changes Following Radiation Damage	H-4	Julie Wellnitz and Clarence Lushbaugh	
1954	Hormonal Effects on Cholesterol Synthesis in Chicks	H-4	R. Gordon Gould, Virginia Lotz, J. Jeremiah Stamler, and C. Bolene-Williams	Michael Reese Hospital, Chicago, Illinois
1954	Inactivation of Cholinesterase by Gamma Radiation and by X rays: A Possible Biochemical Dosimeter	H-4	Jean Sabine and Helen Miller	
1954	Isolation of C14-Labeled DPN and TPN by Paper Chromatography from Lactobacillus plantarum	H-4	Irene Boone, Donna Turney, and Kent Woodward	
1954	Isoniazid in Pyridoxine-Deficient Rats	H-4	Irene Boone and Donna Turney	
1954	Kidney Damage from Ca EDTA	H-4	Harry Foreman and Camille Finnegan	
1954	Large Volume Liquid Scintillators	H-4	F. Newton Hayes and Donald Ott	
1954	Liquid Scintillation Counting	H-4	F. Newton Hayes	
1954	Measurement of Associated Gamma Irradiation from Godiva	H-4	Payne Harris	Lt. Sigoloff, U.S. Air Force School of Aerospace Medicine, Dayton, Ohio
1954	Micro-Analytical Laboratory	H-4	David Williams	

Year(s)	Investigation Title	Lead Group	HRL Personnel/Author(s)	Collaborator(s)
1954	Particle Size Radiation Studies of the Respiratory Tract of the Rat	H-4	Irene Boone, Donna Turney, Ernest Anderson, Fred Worman, James Perrings, and Louise Larkins	
1954	Preparation for Participation in Operation Teapot, 1955	H-4	Ernest Anderson, Joseph Sayeg, John Larkins, and Fred Worman	
1954	Preparation of an Absolute C14 Standard for Liquid Scintillation Counters	H-4	David Williams	
1954	Preparation of Manuscript on the Subject of "Organic Syntheses with Isotopes"	H-4	David Williams and Arthur Murray III	
1954	Pre-Test Biological Calibrations for Operation Teapot, 1955 (Effect of Cold Stress)	H-4	John Furchner and William Schweitzer	
1954	Quenching of Liquid Scintillators	H-4	F. Newton Hayes and Donald Ott	
1954	Rate of Weight Loss of Mouse Spleen and Thymus following Neutron Exposure	H-4	Kent Woodward and Sam Rothermel	
1954	Relationship of Bacteremia to Death in Mice following X Rays and Thermal Column Exposures	H-4	Irene Boone, Wilfred Stedman, Jo Ann Grometer, Payne Harris, and Kent Woodward	
1954	Relative Biological Effectiveness of 14-Mev Neutrons for the Production of Bone Marrow Damage	H-4	Payne Harris, Sam Rothermel, William Schweitzer, and Kent Woodward	
1954	Relative Biological Effectiveness of Fission Neutrons from Godiva for Production of Bone Marrow Damage	H-4	Payne Harris, William Schweitzer, Sam Rothermel, and Kent Woodward	
1954	Relative Pulse Heights of Organic Scintillators	H-4	F. Newton Hayes, Donald Ott, Betty Rogers, and Vernon Kerr	
1954	Relative Rates of Synthesis of Cholesterol and Fatty Acids in Various Organs and Tissues with Special Reference to the Aorta	H-4	R. Gordon Gould, Patricia Keegan, Virginia Lotz, and Edith Lilly	
1954	Scintillation Solutes: Oxazoles and 1,3,4-oxadiazoles	H-4	F. Newton Hayes, Donald Ott, Betty Rogers, and Vernon Kerr	
1954	Scintillation Solutes: Representative Polyaryls	H-4	F. Newton Hayes, Donald Ott, Betty Rogers, and Vernon Kerr	
1954	Spectroscopy of Organic Scintillators	H-4	Donald Ott and F. Newton Hayes	
1954	Strontium Metabolism Studies	H-4	Harry Foreman and Camille Finnegan	

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1954	Studies of Cell Surface Adsorption of C14-Labeled Compounds	H-4	Betty Rogers and Irene Boone	
1954	Supernatural C14	H-4	Donald Ott and F. Newton Hayes	
1954	Syntheses of Oxazolium Salts	H-4	Donald Ott and F. Newton Hayes	
1954	Synthesis of Acetic-1-C14 Acid	H-4	David Williams	
1954	Tests of New Chelating Agents for Removal of Systemically-Bound Heavy Metals	H-4	Harry Foreman and Camille Finnegan	
1954	The Clinical Significance of Red Cell Cholinesterase	H-4	Jean Sabine and Helen Miller	
1954	The Effect of Ionizing Radiations upon Achromobacter fischeri	H-4	Lora Hughes and Clarence Lushbaugh	
1954	The Effect of Lethal Doses of X Rays on the Maturation of the Rat and its Modification by Gonadotropism	H-4	John Spalding and Julie Wellnitz	
1954	The Effects of Whole Body X Irradiation on Intestinal Transport of Tritium Water and Na22 in the Fasted Rat	H-4	W. D. Armstrong; Charles Goodner; and Robert Thomas Moore, Jr.	
1954	The Fava Bean Root as a Test System for Studying Biological Effectiveness of Ionizing Radiations	H-4	John Spalding, Wright Langham, and Ernest Anderson	
1954	The Pathology of Monkeys Exposed to Massive Doses of Total Body Gamma Radiation	H-4	Clarence Lushbaugh, Julie Wellnitz, and Dorothy Hale	Carl Hoak, U.S. Air Force
1954	The Pharmacology of Quaternary Salts of Oxazoles	H-4	Phyllis Sanders, Donald Ott, F. Newton Hayes, and Clarence Lushbaugh	
1954	The Relative Biological Effectiveness of Fission Fragments	H-4	Payne Harris, John Furchner, L. Edward Ellinwood, Phyllis Sanders, Verda Strang, and William Schweitzer	
1954	The Use of T-Cholesterol and C14-Acetate in Studying the Origin of Steroid Hormones and Their Metabolism	H-4	R. Gordon Gould and Virginia Lotz	surnames of LeRoy, Werbin, and Davison, Argonne Cancer Research Hospital, Chicago, Illinois
1954	Theoretical Consideration of the Hazards Associated with Acute Exposure to High Concentrations of Tritium Gas	H-4	Ernest Anderson and Wright Langham	
1954	Therapeutic Attempts at the Intestinal Effects of Radiation	H-4	Kent Woodward, Sam Rothermel, and William Schweitzer	
1954	Tissue-Equivalent Ion Chambers	H-4	Joseph Sayeg and John Larkins	

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1954	Trial of B.A.L. in Po Excretion	H-4	Harry Foreman and M. Chain Robbins	
1954	Uptake of C14-Labeled Isoniazid by Mycobacterium in the Presence of Reported Antimetabolites	H-4	Betty Rogers and Irene Boone	
1954	Analytical Method for Americium in Urine	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	
1954	Determination of Lithium in Air by the Flame Photometer	H-5	Evan Campbell, Billey Head, and Jean McClelland	
1954	Determination of Tritium in Urine and Water	H-5	Barbara Bayhurst, Bernard Eutsler, W. W. Foreman, Billey Head, Jean McClelland, Morris Milligan, Richard Watts, and William Wilson	Richard Hiebert, P-1 Group
1954	The Analytical Determination of Beryllium in Air or Swipe Samples	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	
1954	The Calibration of Tritium Monitoring Devices	H-5	Bernard Eutsler, R. N. Mitchell, and M. Chain Robbins	H-1 Group
1954	The Determination of Acetone in Air	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	
1954	The Determination of Anthracene in Air	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	
1954	The Determination of Arsenic (General)	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	
1954	The Determination of Arsenic in Air	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	

Year(s)	Investigation Title	Lead Group	HRL Personnel/Author(s)	Collaborator(s)
1954	The Determination of Arsenic in Urine	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	
1954	The Determination of Arsine in Air	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	
1954	The Determination of Barium in Air	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	
1954	The Determination of Boric Acid and Boric Acid Salts in Air	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	
1954	The Determination of Cadmium (General)	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	
1954	The Determination of Cadmium in Air	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	
1954	The Determination of Cadmium in Urine	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	
1954	The Determination of Chlorinated Hydrocarbons in Air by the Fujiwara Reaction	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	

Year(s)	Investigation Title	Lead Group	HRL Personnel/Author(s)	Collaborator(s)
1954	The Determination of Chlorinated Hydrocarbons in Air Using the Willson Chlorinated Hydrocarbon Sampling Apparatus (Combustion Analyzer)	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	
1954	The Determination of Chlorinated Hydrocarbons with the Mohr Method	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	
1954	The Determination of Cutting Oil Mists in Air	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	
1954	The Determination of Cyanide in Air	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	
1954	The Determination of Fluorides in Air	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	
1954	The Determination of Iron in Air	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	
1954	The Determination of Lead (General)	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	
1954	The Determination of Lead in Air	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	

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1954	The Determination of Lead in Urine	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	
1954	The Determination of Lithium in Air	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	
1954	The Determination of Mercury in Air	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	
1954	The Determination of Mercury in Urine	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	
1954	The Determination of Methanol in Air	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	
1954	The Determination of Naphthalene in Air	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	
1954	The Determination of Nitrogen Oxides	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	
1954	The Determination of Phosphorus in Air	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	

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1954	The Determination of Plutonium in Urine	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	
1954	The Determination of Polonium-210 in Urine	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	
1954	The Determination of Sodium Hydroxide in Air	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	
1954	The Determination of Sodium Hydroxide in Air Using the Flame Photometer	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	
1954	The Determination of the Sulfate Ratio in Urine	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	
1954	The Determination of Trinitrotoluene in Air	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	
1954	The Determination of Tritium in Urine and Water	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	
1954	The Estimation of Zinc in Air	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	

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1954	The Fluorophotometric Determination of Uranium in Urine and Air	H-5	Evan Campbell, Bernard Eutsler, Billey Head, Victoria Johnson, Jean McClelland, Morris Milligan, William Moss, M. Chain Robbins, and Clarence Skillern	
1954	Relative Biological Effectiveness of Fission Neutrons from Godivs using Spleen-Thymus Weight Loss and Lethality in Mice		Payne Harris and Radiobiology Section	
1955	Biological Effects of Inhalation of High Concentrations of Tritium Gas	H-4	Ted Trujillo, Ernest Anderson, and Wright Langham	
1955	Whole Body Gamma Counter for Human Subject	H-4	Ernest Anderson, Robert Schuch, James Perrings, and Wright Langham	
1955	Determination of Mercury by Single Extraction	H-5	Evan Campbell and Billey Head	
1955	Extraction Method for the Determination of Uranium Alpha Activity in Urine	H-5	Evan Campbell, Billey Head, and Morris Milligan	
1955	Lithium Hydride Fabrication: Health Hazard Evaluation and Control	H-5	R. N. Mitchell and Edwin Hyatt	
1955	Plutonium Dispersal by Accidental or Experimental Low-Order Detonation of Atomic Weapons	H-8	Wright Langham, Payne Harris, and Thomas Shipman	
1956	Contamination Hazard from Accidental Non-Critical Detonation of Small Atomic Devices	H-4	Payne Harris, Ernest Anderson, and Wright Langham	
1956	Effects from Massive Doses of High Dose Rate Gamma Radiation on Monkeys	H-4	Wright Langham	CMR-10 Group; John Pickering and Walter Rambach, School of Aviation Medicine, Randolph Air Force Base, Texas; Armed Forces Institute of Pathology, Washington, D.C.; and National Institute of Health, Bethesda, Maryland
1956	Survey of Organic Compounds as Primary Scintillation Solutes	H-4	F. Newton Hayes, Vernon Kerr, Donald Ott, E. Hansbury, and Betty Rogers	
1957	Application of Low Level in vivo Counting Techniques to Clinical Investigations	H-4	Radiopathology Section	
1957	Determination of Body Water and Fat in Steers by Means of the Tritium Dilution Technique	H-4	Radiobiology Section	
1957	Effect of Irradiation of Each Generation of Mice on the Vigor and Reproductive Potential of the Line	H-4	Radiobiology Section	

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1957	Effect of Partial Body Radiation on the Life Span of Mice	H-4	Radiobiology Section	
1957	Effect of Preprotection with Glutathione on Life Shortening by X Rays	H-4	Radiobiology Section	
1957	Effect of Radiation on Serum Enzyme Levels	H-4	Radiobiology Section	
1957	Irradiation of Transforming Principle (DNA) of Hemophilus Influenzae	H-4	Radiobiology Section	
1957	Low Level Counting Activities and Monitoring of People and Foodstuffs for Uptake of Cs137 from Fallout	H-4	Biophysics Section	
1957	Metabolism of the Alkali Metals in Five Mammalian Species	H-4	Radiobiology Section	
1957	Methods of Evaluating Scintillators for Radiation Detection	H-4	Organic Chemistry Section	Argonne National Laboratory, Lemont, Illinois
1957	Mouse Production	H-4	Veterinary Section	
1957	Organic Syntheses with Isotopes	H-4	Organic Chemistry Section	
1957	Other Animal Stocks	H-4	Veterinary Section	
1957	Radioactive Tracer Studies of Protein and Lipid Metabolism of the Human Fetus	H-4	Biochemistry Section	Argonne Cancer Hospital, Chicago, Illinois
1957	Rate of Repair of Radiation Damage in Mice	H-4	Radiobiology Section	
1957	Relation between Age at the Time of Radiation and Shortening of Life Span in Mice	H-4	Radiobiology Section	
1957	Renal Hypertrophy as an Index of Physiological Age	H-4	Radiobiology Section	
1957	Service Program	H-4	Radiopathology Section	Pathology Department, Los Alamos Medical Center, New Mexico
1957	Studies with Transplantable Leukemia	H-4	Radiobiology Section	
1957	Survey of World-wide Contemporary C14 Activity in Plant Life	H-4	Organic Chemistry Section	
1957	Testing of Scintillators for the Detection of Radiation	H-4	Organic Chemistry Section	
1957	The Effect of Nitrogen Mustard and Whole Body Irradiation on Life Span and Tumor Incidence in the Swiss Strain of Mice	H-4	Radiobiology Section	
1957	Toxicity, Excretion, and Tissue Distribution of Ionium (Th230) in Rats	H-4	Radiobiology Section	

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1957	Toxicity, Tissue Distribution, and Metabolism of C14-Thio-TEPA in Rats	H-4	Radiobiology Section	
1957	Beryllium Air Sampling, Ventilation Control, and Good Housekeeping	H-5		CMB-6 Group; P-9 Group; W-1 Group; GMX-4 Group; N-2 Group; and SP-3 Group
1957	Evaluation of Respirators	H-5		
1957	Health Problems Caused by Plastics	H-5		
1957	New Plutonium Analysis	H-5		
1957	Toxicity Determinations for Trade Name Products	H-5		
1957	Trichloroethylene Air Sampling for Graphic Arts	H-5		Graphic Arts Group
1957	Ventilation Assessments and Improvement Projects	H-5		ENG-2 Group and H-1 Group
1957–1958	Experimental Determination of Fast and Thermal Neutron Tissue Dose	H-4	Joseph Sayeg, John Larkins, and Payne Harris	
1958	Health Hazards Associated with Rolling Normal and Enriched Uranium-Evaluation and Control	H-5	Edwin Hyatt; R. N. Mitchell; Harry Jordan, Jr.; D. D. Blackwell; and Carl Buckland	
1959	A Life Span Study of First and Second Generation Offspring from Irradiated Spermatids and/or Sperm Cells, and from Irradiated Type A Spermatogonia of Sires and Grandsires	H-4	John Spalding and Verda Strang	
1959	A Simple Intensification Screen for Ultraviolet Scanner Cameras	H-4	Donald Petersen and Arthur Murray III	
1959	A Stain Modification for Precise Identification of Three Connective Tissues	H-4	G. L. Humason and Clarence Lushbaugh	
1959	Acute End Points as Indicators of Aging Induced by Radiation	H-4	John Furchner and G. A. Trafton	
1959	Additional Observations on Electrolyte and Water Loss in Radiation Damage: Potassium-42 and HTO	H-4	Clarence Lushbaugh, Dorothy Hale, and Ted Trujillo	
1959	Analytical and Separation Methods of Special Use in Multisite Destructive Labeling Methods	H-4	Arthur Murray III	
1959	Assembly of Spectrophotometric Facility	H-4	Donald Ott	
1959	Batyl Alcohol and Radiation Damage	H-4	Harry Foreman, M. B. Roberts, and Marguerite Magee	
1959	Biological Sulfur Activation Dosimetry	H-4	Donald Petersen and Wright Langham	
1959	Calibration of Large Volume Detectors for Absolute Measurement of Cs137	H-4	Ernest Anderson and Marvin Van Dilla	

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1959	Carbon-14 in Citrus Fruit Oils	H-4	Vernon Kerr, F. Newton Hayes, and E. Hansbury	
1959	Carbon-14 in Lemongrass Oil	H-4	F. Newton Hayes, E. Hansbury, and David Williams	
1959	Carbon-14 in Old Essential Oils	H-4	F. Newton Hayes, Vernon Kerr, E. Hansbury, and David Williams	
1959	Carbon-14 in Turpentine	H-4	Vernon Kerr, F. Newton Hayes, and E. Hansbury	N. T. Mirov, Forestry Service, Department of Agriculture, Berkeley, California
1959	Conjugation of Taurine and Cholic Acid in Irradiated Animals	H-4	Donald Petersen and R. Gordon Gould	
1959	Construction of a Preparative-Scale Gas Chromatographic Column	H-4	David Williams	
1959	Contemporary C14 in the Zoosphere	H-4	Vernon Kerr, E. Hansbury, and F. Newton Hayes	
1959	Correlation between Cs137 Levels in People and Milk from a Specific Area	H-4	B. E. Clinton and Ernest Anderson	
1959	Correlation of Cs137 and Sr90 Levels in Milk	H-4	Ernest Anderson	A. R. Schulert, Lamont Geological Observatory, Columbia University, New York, New York
1959	Deoxynucleosides in the Urine of Irradiated Animals and Man	H-4	Donald Petersen, Marguerite Magee, and Arthur Murray III	
1959	Development of a Liquid Scintillation Counter for Small Animal Studies	H-4	Robert Schuch	
1959	Development of Large Volume Liquid Scintillation Detectors	H-4	Robert Schuch, James Perrings, and Ernest Anderson	
1959	Dose and Flux Measurements on Godiva Radiation Effects Experiments	H-4	Payne Harris, E. Frank Montoya, and William Schweitzer	
1959	Effect of Adrenalectomy, Hypophysectomy, and Cholesterol Feeding on the Radiation-Induced Increase in Hepatic Cholesterol Biosynthesis	H-4	R. Gordon Gould, Edith Lilly, and V. L. Bell	
1959	Effect of Graded Acute Exposures of Gamma Rays and Fission Neutrons on Recovery from Subsequent Protracted Gamma Ray Exposures	H-4	John Spalding, Verda Strang, and Fred Worman	
1959	Effect of Preirradiation Treatment with Glutathione on Life Span and Tumor Incidence of CF1 Mice	H-4	Irene Boone, G. A. Trafton, L. M. Conklin, and D. C. White	

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1959	Effect of Single Sublethal Doses of Nitrogen Mustard (HN2) on Life Span and Tumor Incidence as Compared to Whole Body X Irradiation	H-4	Irene Boone, G. A. Trafton, L. M. Conklin, and D. C. White	
1959	Effects of MER-29 (1-[p-(β-diethylaminoethoxy)-phenyl]-1-(P-tolyl)-2-(P-chlorophenyl)ethanol) on Cholesterol Concentration in Plasma and Tissues and on Cholesterol Biosynthesis in vivo and in vitro in Rats	H-4	R. Gordon Gould, V. E. Mitchell, and Edith Lilly	
1959	Effects of MER-29 (1-[p-(β-diethylaminoethoxy)-phenyl]-1-(P-tolyl)-2-(P-chlorophenyl)ethanol) on Plasma Cholesterol Levels and Steroid Hormone Metabolism in Humans	H-4	R. Gordon Gould	B. Bloom, W. Hentel, R. G. Schoenfeld, and W. Taylor, Veterans Hospital, Albuquerque, New Mexico
1959	Effects of Partial and Whole Body X Irradiation on Life Span and Tumor Incidence of CF1 Mice	H-4	Irene Boone, G. A. Trafton, L. M. Conklin, and D. C. White	
1959	Feasibility Studies of an Adjustable Plastic Scintillator Counting System	H-4	Marvin Van Dilla and Robert Schuch	
1959	Heritability of Radiation Damage in Mice	H-4	John Spalding and Verda Strang	
1959	Iodine-131 Retention in Normal and Starved Rats	H-4	Clarence Lushbaugh and Dorothy Hale	
1959	Liquid Scintillation Counting of Tritium	H-4	Donald Ott, F. Newton Hayes, and Ted Trujillo	
1959	Liquid Scintillation Solutes	H-4	F. Newton Hayes, E. Hansbury, Vernon Kerr, and Donald Ott	
1959	Measurements on Irradiated Meat	H-4	Marvin Van Dilla and Ernest Anderson	R. A. Glass and H. Smith, Stanford Research Institute, Menlo Park, California
1959	Metabolism of C14-Isoniazid in Humans	H-4	Irene Boone, L. M. Conklin, and G. A. Trafton	R. Des Prez, U.S. Public Health Service Hospital, Fort Defiance, Arizona; Department of Public Health and Preventive Medicine, Washington, D.C.; Cornell University, Ithaca New York; and New York Hospital Medical Center, New York
1959	Metabolism of Zinc-65 in Mammals	H-4	Chester Richmond, John Furchner, and G. A. Trafton	
1959	Metabolism of Zirconium-95 and Ruthenium-106 in Mammals	H-4	Chester Richmond, John Furchner, and G. A. Trafton	
1959	Neoplasms Occurring in a Series of Irradiated Mix	H-4	D. C. White	

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1959	Nephrotoxicity of Diethylenetriamine Pentaacetic Acid (DTPA)	H-4	Harry Foreman, Clarence Lushbaugh, Marguerite Magee, and G. L. Humason	
1959	New Liquid Scintillators for Large Volume Applications	H-4	Vernon Kerr, F. Newton Hayes, Donald Ott, and Robert Schuch	
1959	Nuclear Phosphorylation in Hematopoietic Tissues	H-4	Donald Petersen and L. B. Cole	
1959	Preparation of Linear Alpha Source	H-4	Ted Trujillo, James Perrings, and Julie Wellnitz	
1959	Retention and Excretion of Radionuclides of the Alkali Metals by Five Mammalian Species	H-4	Chester Richmond	
1959	Serum Enzymes after X-Ray and Gamma-Neutron Irradiation	H-4	Donald Petersen and L. B. Cole	
1959	Studies of the Feasibility of Designing a Lunar Gamma Ray Spectrometer	H-4	Marvin Van Dilla and Ernest Anderson	J. R. Arnold, University of California, La Jolla
1959	The Effect of Diethylenetriamine Pentaacetic Acid (DTPA) on Acceleration of Plutonium Excretion	H-4	Harry Foreman, M. B. Roberts, and Marguerite Magee	
1959	The Effect of MER-29 on Thiopental Sleep Time	H-4	Donald Petersen, R. Gordon Gould, and Edith Lilly	
1959	The Metabolism of Diethylenetriamine Pentaacetic Acid (DTPA)	H-4	Harry Foreman and Marguerite Magee	
1959	The Question of Sodium Loss in the Intestinal Death Syndrome of Radiation Damage	H-4	Clarence Lushbaugh, J. Sutton, and Chester Richmond	
1959	Toxicity, Metabolism, and Tissue Distribution of C14-Labeled Triethylene Thiophosphoramide (thio-TEPA) in Rats	H-4	Irene Boone and David Williams	
1959	Volume and Turnover of Body Water in Various Mammalian Species Using Tritiated Water as a Tracer	H-4	Chester Richmond, Ted Trujillo, and Wright Langham	
1959	Zinc-65 and Zirconium-95 in Food	H-4	Marvin Van Dilla	
1959	Zinc-65 in Cyclotron Workers	H-4	Marvin Van Dilla	M. J. Engelke, H-1 Group
1959, 1961	Radioactivity of Nevada Cattle	H-4	Marvin Van Dilla	Harvey Israel, H-6 Group, and G. R. Farmer, U.S. Atomic Energy Commission, Washington, D.C.
1959–1960	Chemical Systems for Liquid Scintillation Dosimetry	H-4	David Williams and F. Newton Hayes	
1959–1960	Comparison of Natural and Radiation Aging Mechanisms: Response of Irradiated and Nonirradiated Mice to Cold Stress	H-4	Ted Trujillo and John Spalding	

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1959–1960	Effect of Sublethal Whole Body Irradiation at Different Age Levels in CF1 Mice	H-4	Irene Boone, G. A. Trafton, L. M. Conklin, and D. C. White	
1959–1960	Giant Cell Formation in HeLa Cells as a Function of Co60 Gamma and X Irradiation	H-4	D. C. White and Phyllis Sanders	
1959–1960	Labeling of Biologically Important Compounds with Radioactive Isotopes	H-4	Arthur Murray III	
1959–1960	Monitoring of Milk for K40, Cs137, and Ba140/La140	H-4	B. E. Clinton, J. M. Allen, and Ernest Anderson	
1959–1960	Photodetectors for Liquid Scintillation Dosimetry in the Field	H-4	David Williams, F. Newton Hayes, and Robert Schuch	
1959–1960	Radiation Dose Rates above the Atmosphere	H-4	Marvin Van Dilla, John Larkins, James Perrings, M. W. Rowe, and Joseph Sayeg	Richard Hiebert, P-1 Group, and U.S. Air Force Special Weapons Center, Kirtland Air Force Base, Albuquerque, New Mexico
1959–1960	Total Body Potassium in Man	H-4	B. E. Clinton, Wright Langham, and Ernest Anderson	
1959–1961	Clinical Applications of Whole-Body Scintillometry	H-4	Clarence Lushbaugh, Dorothy Hale, P. S. New, and Chester Richmond	
1960	A Convenient Flash Drying Apparatus for Small Volumes	H-4	Donald Petersen and Marguerite Magee	
1960	Absorption of Radioisotopes through the Skin: Feasibility Study	H-4	Marvin Van Dilla and M. W. Rowe	
1960	Advances in the Threshold Detector Technique of Measuring Neutron Flux, Spectra, and Tissue Dose	H-4	Joseph Sayeg	
1960	Body Sodium-24 Measurement for Personnel Monitoring and Casualty Assessment	H-4	E. R. Ballinger and Payne Harris	
1960	Cesium-137 Levels in People	H-4	Ernest Anderson and B. E. Clinton	Division of Biology and Medicine, U.S. Atomic Energy Commission, Washington, D.C., and Oak Ridge National Laboratory, Tennessee
1960	Characteristics of the Large H-4 Fission Gamma Counter	H-4	Joseph Sayeg, John Larkins, and E. Leo Carr	
1960	Chromatography of Deoxyribonucleic Acids	H-4	Arthur Murray III	
1960	Contemporary Carbon-14 in the Biosphere	H-4	E. Hansbury, Vernon Kerr, David Williams, and F. Newton Hayes	

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1960	Correlation of Viability Plate Counts and Optical Density Measurements with Bacterial (Hemophilus) Cell Counts Using the Coulter Counter	H-4	Irene Boone, L. T. Rivera, and Clarence Lushbaugh	
1960	Cutaneous Absorption of Radionuclides by Human Subjects: Studies with Sodium24 and Iodine131	H-4	Marvin Van Dilla, Chester Richmond, and John Furchner	
1960	Deoxypolynucleotide Synthesis in Phosphorylating Rat Thymus Nuclei	H-4	Donald Petersen, L. B. Cole, and V. E. Mitchell	
1960	Dependence of Recovery Half-Time on Magnitude of Conditioning Dose of Cobalt-60 Gamma Rays	H-4	John Spalding and Ted Trujillo	
1960	Dependence of Recovery Half-Time on Magnitude of Gamma Ray Exposure	H-4	John Spalding and Ted Trujillo	W. L. LeStourgeon, T-1 Group
1960	Determination of Strontium-90 in Bone	H-4	Harry Foreman and M. B. Roberts	
1960	Determination of the Hydrolysis Rate of Hafnium Tritide	H-4	Ted Trujillo and Wright Langham	
1960	Determination of Tritium Beta Activity in Microgram Amounts of Nucleic Acids from HeLa Cells Cultured in Agitated Fluid Medium	H-4	Donald Petersen, L. B. Cole, and Phyllis Sanders	
1960	Effect of a Carbonic Anhydrase Inhibitor (Diamox) on Cesium-137 Excretion in Rats	H-4	Chester Richmond, John Furchner, and G. A. Trafton	
1960	Effect of Chronic Gamma Irradiation on Life Span of RF Mice	H-4	Irene Boone, L. T. Rivera, and Ted Trujillo	
1960	Effect of Cobalt-60 Gamma Rays, X Rays, and Fast Neutrons on Total Cell Population of HeLa Cells in Tissue Culture	H-4	D. C. White and Phyllis Sanders	
1960	Effect of Diethyltriamine Pentaacetic Acid (DTPA) on Elimination of Americium-241 Administered Intratracheally to Rats	H-4	Harry Foreman and M. B. Roberts	
1960	Effect of Preirradiation Treatment with Glutathione on the Age Specific Log Rates of Mortality (Gompertz Function)	H-4	Irene Boone, G. A. Trafton, and L. M. Conklin	
1960	Effect of Single Doses of Whole Body X Irradiation on the Life Span and Tumor Incidence of C57Black Mice	H-4	Irene Boone, L. M. Conklin, and L. T. Rivera	

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1960	Effect of Single Sublethal Doses of Nitrogen Mustard (HN2) on the Age Specific Log Rates of Mortality (Gompertz Function) as Compared to Whole Body X Irradiation	H-4	Irene Boone, G. A. Trafton, and L. M. Conklin	
1960	Effect of Stable Cesium on the Retention of Cesium-137 by Rats	H-4	John Furchner, Chester Richmond, B. E. Cummins, and G. A. Trafton	
1960	Effects of Age, Sodium Depletion, and Sodium Repletion on the Retention of Sodium-22 by Rats	H-4	Chester Richmond, John Furchner, B. E. Cummins, and G. A. Trafton	
1960	Electronic Measurement of Cellular Volumes: Calibration of the Apparatus	H-4	Clarence Lushbaugh, J. A. Maddy, and N. J. Basmann	
1960	Electronic Measurement of Cellular Volumes: Frequency Distribution of Erythrocyte Volumes	H-4	Clarence Lushbaugh, N. J. Basmann, and B. Glascock	Harvey Israel, H-6 Group
1960	Electronic Measurement of Cellular Volumes: Volumetric Change of Circulating Erthrocytes in WW-v Genetically Anemic Mice Implanted with w+w+ Fetal Liver	H-4	Clarence Lushbaugh	E. S. Russell, Roscoe B. Jackson Memorial Laboratory, Bar Harbor, Maine
1960	Enhancement of Cesium-137 Excretion by Rats Fed Potassium-Supplemented Diets	H-4	Chester Richmond, John Furchner, B. E. Cummins, and G. A. Trafton	
1960	Establishment and Maintenance of Cells Grown in Agitated Fluid Medium	H-4	Phyllis Sanders and D. C. White	
1960	Excretion of Cesium-137 as a Function of Age in Mice	H-4	John Furchner, Chester Richmond, and G. A. Trafton	
1960	Gamma and Neutron Dose Measurements of B-57 Sampler Aircrews during Kiwi-A Three Operation	H-4	E. R. Ballinger	Wright-Patterson Air Force Base, Ohio
1960	Humco II: A New 4π Liquid Scintillation Counter	H-4	Ernest Anderson, Robert Schuch, and Vernon Kerr	
1960	Influence of Extraterrestrial Gravitational Fields upon Plant Growth	H-4	E. R. Ballinger and E. Frank Montoya	
1960	Inheritance of Radiation-Induced Decrement in Ability of Mice to Withstand Protracted Gamma Radiation Stress	H-4	John Spalding and Verda Strang	
1960	Integral Neutron and Gamma Dose Measurements on Kiwi-A Prime and Kiwi-A Three	H-4	Payne Harris, Fred Worman, E. Frank Montoya, and Donald Ott	

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1960	Intercomparison of Fast Neutron and Gamma Ray Dosimetry at AEC Installations	H-4	Joseph Sayeg and Donald Ott	Gene Tochilin, Radiological Physics Branch, U.S. Naval Radiological Defense Laboratory, San Francisco, California
1960	Lethality Studies with Fission Neutrons: Burst versus Steady State Exposures	H-4	John Spalding, Joseph Sayeg, and Ted Trujillo	
1960	Long-Term Retention of Ruthenium-106 by Rats	H-4	John Furchner, Chester Richmond, and G. A. Trafton	
1960	Long-Term Retention of Zinc-65 by Man	H-4	Chester Richmond, John Furchner, and Wright Langham	
1960	Metabolism of Ruthenium-106 Chloride in Mammals Studied with the Acid of Whole Body Gamma Ray Assay Techniques: Mice and Rats	H-4	Chester Richmond, John Furchner, and G. A. Trafton	
1960	Metabolism of Tritium-Labeled Pyridoxine in Rats	H-4	Irene Boone, Summers Cox, and Arthur Murray III	
1960	Modification of Zinc-65 Absorption by Dietary Zinc Intake	H-4	John Furchner, Chester Richmond, and G. A. Trafton	
1960	Nephrotoxicity of Chelating Agents: A Continuing Study	H-4	Harry Foreman, Clarence Lushbaugh, M. B. Roberts, and G. L. Humason	
1960	Neutron and Gamma Integral Dose Measurements on Kiwi-A Prime	H-4	Payne Harris	
1960	Neutron Flux, Spectra, and Neutron and Gamma Tissue Dose Evaluations at the Little Eva Critical Assembly	H-4	Joseph Sayeg, Donald Ott, and Payne Harris	
1960	Neutron Flux, Spectrum, and Tissue Dose Evaluations for the Sandia Port of the Omega West Reactor Facility	H-4	Joseph Sayeg	
1960	Neutron Response of Trichloroethylene-Saturated Water and Tetrachloroethylene Chemical Dosimeters	H-4	Donald Ott, Joseph Sayeg, and Payne Harris	
1960	Neutron-Induced Activity in Humans as a Dosimetric Procedure	H-4	E. R. Ballinger, Payne Harris, and John Larkins	
1960	On the Radioactivity of Cesium Iodide (Thallium) Scintillation Crystals	H-4	Marvin Van Dilla	
1960	Paper Chromatography of Nucleotides in Mildly Alkaline Aqueous Solvents	H-4	Donald Petersen and Marguerite Magee	
1960	Potassium Concentration as a Function of Age in Rats	H-4	Chester Richmond, John Furchner, and Marvin Van Dilla	

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1960	Potassium Content of Dogs, Calculated from Natural Potassium-40 Levels	H-4	Chester Richmond and John Furchner	
1960	Preliminary Studies on the Chemistry of Nucleic Acids	H-4	F. Newton Hayes, Arthur Murray III, and Donald Ott	
1960	Radiation Dose Rate Measurements from the Kiwi-A Series of Nuclear Reactors	H-4	David Williams	
1960	Radioactivity in Cervidae Antlers	H-4	Harry Foreman, M. B. Roberts, and Edith Lilly	
1960	Radioactivity of Tektites	H-4	M. W. Rowe, Marvin Van Dilla, and Ernest Anderson	
1960	Radiochemical Neutron Dosimetry by Induced P32 Activity in Sulfur-Rich Biological Materials	H-4	Donald Petersen, V. E. Mitchell, and Wright Langham	
1960	Relative Effectiveness (RBE) of Various Ionizing Radiations on the Transforming Principlé (DNA) of Hemophilus Influenzae	H-4	Irene Boone and Joseph Sayeg	
1960	Retention and Excretion of Cesium-137 by Mice during Chronic Oral Administration: Prediction of Equilibrium Level from Acute Exposure Parameters	H-4	John Furchner, Chester Richmond, and G. A. Trafton	
1960	Retention of Barium-133 in Mice, Rats, and Dogs	H-4	Chester Richmond, John Furchner, and G. A. Trafton	
1960	Retention of Iridium-192 in Mice and Rats following Oral Administration	H-4	John Furchner, Chester Richmond, and G. A. Trafton	
1960	Search for Zinc-65 in General Population	H-4	Marvin Van Dilla and M. W. Rowe	
1960	Silver Phosphate and Cobalt Glass Systems for Gamma Dosimetry in Mixed Radiation Fields	H-4	E. R. Ballinger, Donald Ott, and John Enders	
1960	Survey of Local Conditions at Each Major Station in the LASL Milk Sampling Network	H-4	G. M. Ward	
1960	Testing of Multiplier Phototubes for Humco II	H-4	Ernest Anderson	
1960	The Inheritance of Radiation-Induced Mutations Deleterious to the Reproductive Efficiency in the Mouse: The Reproductive Performance of the Eleventh Filial Generation from Ten Genreations of X-Irradiated Male Mice	H-4	John Spalding and Verda Strang	

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1960	The Inheritance of Radiation-Induced Mutations Deleterious to the Reproductive Efficiency in the Mouse: The Reproductive Performance of the Sixth Filial Generation from Five Genreations of X-Irradiated Male Mice	H-4	John Spalding and Verda Strang	
1960	The Use of Graphite-CO2 Ionization Chambers for the Determination of Gamma Flux and the Effective Transmission of the Front Penthouse Face of Test Cell “C” during Kiwi-A Prime and Kiwi-A Three	H-4	Fred Worman	
1960	The Use of the Arm Counter to Determine the Degree of Hepatic Function	H-4	Clarence Lushbaugh, Dorothy Hale, and R. McGill	
1960	Variation of Human Potassium Concentration with Age	H-4	Ernest Anderson and B. E. Clinton	
1960	Whole Body Retention of Iodine-131 from Various Labeled Organic Compounds in Starving and Irradiated Rats	H-4	Clarence Lushbaugh and Dorothy Hale	
1960	World-Wide Biospheric Carbon-14	H-4	F. Newton Hayes, Vernon Kerr, E. Hansbury, and David Williams	
1960	Study of Two-Stage Air Samplers Designed to Simulate the Upper and Lower Respiratory Tract	H-5	Edwin Hyatt, Harry Schulte, R. N. Mitchell, and Gilbert Ferran	GMX-1 Group and C. R. Jensen, Industrial Hygiene Section, New Mexico State Health Department, Santa Fe
1960, 1962	Moonspec: Measurement of Radioactivity of the Lunar Surface	H-4	Marvin Van Dilla, Ernest Anderson, and Robert Schuch	Physics Division; GMX Division; California Institute of Technology, Jet Propulsion Laboratory, Pasadena, California; National Aeronautics and Space Administration; and J. R. Arnold and H. C. Urey, University of California, La Jolla
1960, 1962–1964	Progress Report on LASL Human Counter (Humco II)	H-4	Ernest Anderson, Robert Schuch, Vernon Kerr, Philip Dean, and James Perrings	
1960, 1964	The Los Alamos Small-Animal Counter III (LASAC III)	H-4	Robert Schuch, Chester Richmond, Jerry London, Jean Findlay, and John Furchner	
1960–1961	Estimation of Maximum Permissible Concentrations of Radioisotopes in Water (MPC)W from Interspecies Correlations	H-4	Chester Richmond, John Furchner, and Wright Langham	

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1960–1961	Protection of CFW Swiss Mice from Post Irradiation Transplantable AK Leukemia by Preirradiation Immunization	H-4	Irene Boone, L. M. Conklin, and L. T. Rivera	
1960–1963	Nucleic Acid Chromatography	H-4	Arthur Murray III, Edith Lilly, L. B. Cole, V. E. Mitchell, Donald Petersen, and Ted Trujillo	
1961	A Double Sodium Iodide (Thallium) Crystal Gamma Ray Detector	H-4	Marvin Van Dilla and M. W. Rowe	
1961	Advancements in the Electronic Circuitry for the Large H-4 Fission Gamma Counter	H-4	Joseph Sayeg, John Larkins, and E. Leo Carr	
1961	Calculation of the Uncertainties Involved in the Evaluation of Neutron Tissue Dose by the Threshold Detector Technique	H-4	Joseph Sayeg	
1961	Determination of Beta Activity in Nucleic Acids	H-4	L. B. Cole and Donald Petersen	
1961	Effect of Age on Ability of Mice to Survive Fractionated Radiation Exposure	H-4	John Spalding and Ted Trujillo	
1961	Experimental Iodide Blockade of Iodine-131 Thyroid Uptake in Rats	H-4	Dorothy Hale and Clarence Lushbaugh	
1961	Fallout Levels of Cesium-137 in United States Milk as Influenced by Feeding Practices	H-4	G. M. Ward	
1961	Kinetics of the Degradation of Polymers by Successive Enzymatic Hydrolysis to Monomer Units	H-4	Ernest Anderson	
1961	Kiwi-A Three Gamma Ray Dose Rate Measurements	H-4	David Williams	
1961	Long-Term Retention of Radiocesium by Man	H-4	Chester Richmond, John Furchner, and Wright Langham	
1961	Maintenance at Low Temperature of Several Transplantable Tumors	H-4	Irene Boone and L. T. Rivera	
1961	Mechanical Bottle Washer and Filler	H-4	John Larkins and James Perrings	
1961	Metabolism of Zinc-65 in a Terminal Leukemia Case	H-4	Chester Richmond, Clarence Lushbaugh, M. W. Rowe, and Marvin Van Dilla	
1961	Methods for Routine Phosphorus Analysis of Effluents from Chromatographic Columns	H-4	Donald Petersen, V. E. Mitchell, and Arthur Murray III	
1961	Neutron Calibration Procedures Employed by the Biomedical Research Group	H-4	Joseph Sayeg	

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1961	Neutron Dose Estimates in the SL-1 Accident Utilizing Biological Sulfur Activation	H-4	Donald Petersen	R. J. Prestwood, J-11 Group and Nuclear Reactor Testing Station, Idaho Falls, Idaho
1961	On the Significance of Radiolytic Degradation of Purine and Pyrimidine Nucleosides	H-4	Donald Petersen, Arthur Murray III, F. Newton Hayes, and Marguerite Magee	
1961	Preliminary Data on Neutron and Gamma Depth Dose Relations with Fission Neutrons Using a Plastic Man Phantom	H-4	Joseph Sayeg, James Perrings, and E. R. Ballinger	E. Bemis, H-6 Group
1961	Preparation and Purification of Tritium-Labeled Thymidine, Deoxycytidine, and Adenosine	H-4	Arthur Murray III and Donald Petersen	
1961	Progress in Refinement of the Whole Body Counting Technique for Determining Thyroid Uptake	H-4	Clarence Lushbaugh	
1961	Radiocarbon in Contemporaneous Plant Products	H-4	Vernon Kerr, F. Newton Hayes, E. Hansbury, and David Williams	
1961	Reduced Life Expectancy in Descendants of Five Generations of X-Irradiated Sires	H-4	John Spalding and Verda Strang	
1961	Retention and Excretion of Iodine-131: In dogs after Oral Administration	H-4	John Furchner, Chester Richmond, and G. A. Trafton	
1961	Retention and Excretion of Iodine-131: In mice after Oral and Intraperitoneal Administration	H-4	John Furchner, Chester Richmond, and G. A. Trafton	
1961	Retention and Excretion of Iodine-131: In Monkeys after Oral Administration	H-4	John Furchner, Chester Richmond, and G. A. Trafton	
1961	Retention and Excretion of Iodine-131: In Rats after Oral and intraperitoneal Administration	H-4	John Furchner, Chester Richmond, and G. A. Trafton	
1961	Retention and Excretion of Iodine-131: Interspecific Correlations and Maximum Permissible Concentrations	H-4	John Furchner, Chester Richmond, and G. A. Trafton	
1961	Retention and Excretion of Ruthenium-106 by Mice	H-4	John Furchner, Chester Richmond, and G. A. Trafton	
1961	The Effect of Dose Rate on the Incidence of Leukemia in Several Strains of Mice	H-4	Irene Boone and L. T. Rivera	
1961	The Effect of Physical Factors on Transforming Principle (DNA) of Hemophilus Influenzae	H-4	Irene Boone and L. T. Rivera	
1961	The Influence of Intracellular Tritium Beta Irradiation on the Growth of Hemophilus Influenza	H-4	Donald Petersen, Irene Boone, Phyllis Sanders, L. B. Cole, and L. T. Rivera	

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1961	Uptake of Tritiated Deoxynucleaside Precursors by HeLa S-3 Cells	H-4	Donald Petersen, L. B. Cole, P. A. Hopkins, and Phyllis Sanders	
1961	Variation of the Cesium-137 Content of New Mexico Residents as a Function of Time	H-4	Ernest Anderson	C. O. Onstead, USA Medical Research Unit, Europe
1961	Heat Treatment Which Extends the Usable Range of Silver Polonium 3 Glass Dosimeters	H-8	Philip Lee, E. R. Ballinger, and William Schweitzer	H-6 Group
1961	Integral Neutron and Gamma Dose Measurements on Kiwi-A-Three	H-8	Fred Worman, E. R. Ballinger, E. Frank Montoya, John Enders, and Payne Harris	
1961, 1963	Chemical Detectors: The Industrial Hygienist with Abstracts and Annotations	H-5	Evan Campbell, Helen Miller, and Harry Schulte	
1961–1962	Studies on Detection of Biological Effects of Magnetic Fields	H-4	Harry Foreman and M. C. Brooks	
1962	A Modified Method for Combustion and Calorimetric Analysis of Submicrogram Amounts of Organic Phosphorus	H-4	Donald Petersen, L. B. Cole, Edith Lilly, and V. E. Mitchell	
1962	A Positive-Pressure Gradient-Elution Device	H-4	Donald Petersen; Arthur Murray III; Walter Goad, Jr.; and John Larkins	
1962	A Possible Mutation Causing Internal Hydrocephaly in Offspring of an Irradiated Line of Male Mice	H-4	Clarence Lushbaugh and John Spalding	
1962	A Study of Radiation-Induced Aging: Comparison of Survival Time of Preirradiated and Nonirradiated Mice Exposed to Continuous Gamma-Ray Stress	H-4	Ted Trujillo and John Spalding	
1962	Application of Thin-Layer Chromatography to Nucleic Acid Chemistry	H-4	E. Hansbury and Donald Ott	
1962	Attempts to Obtain Synchronous Division of Escherichia Coli B and Hemophilus Influenzae	H-4	L. T. Rivera and Irene Boone	
1962	Breeding Characteristics of Mice from Ancestry with Ten Generations of X Irradiation to the Sires	H-4	John Spalding, Verda Strang, and Ruben Archuleta	
1962	Calibration of an Electronic Particle Counter for Bacterial Measurements	H-4	Irene Boone and Summers Cox	
1962	Cesium-137 Retention by One Human Subject	H-4	M. W. Rowe and Marvin Van Dilla	

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1962	Clinical Applications of Whole-Body Counting: A Clinical Comparison of the Absorbability of Ferrous versus Ferric Salts in Normal Human Subjects	H-4	Clarence Lushbaugh and Dorothy Hale	
1962	Clinical Applications of Whole-Body Counting: Determination of Thyroidal Activity from Sodium Iodide-131 Retention Measurements with Humco II	H-4	Clarence Lushbaugh and Dorothy Hale	
1962	Clinical Applications of Whole-Body Counting: Retention of Raovin Iodine-131 as a Measure of Serum or Blood Loss	H-4	Clarence Lushbaugh and Dorothy Hale	
1962	Comparative Radiosensitivity of Three Lines of Mice with Different Ancestral Histories of Exposure to Ionizing Radiation: Resistance to Fractionated X Irradiation	H-4	John Spalding and Ruben Archuleta	
1962	Comparative Radiosensitivity of Three Lines of Mice with Different Ancestral Histories of Exposure to Ionizing Radiation: Resistance to protracted Gamma Irradiation	H-4	John Spalding and Verda Strang	
1962	Comparative Radiosensitivity of Three Lines of Mice with Different Ancestral Histories of Exposure to Ionizing Radiation: Resistance to Single Acute X-Ray Exposures (LD30/50)	H-4	John Spalding and M. C. Brooks	
1962	Contamination of Steel by Ruthenium-103	H-4	Ernest Anderson and M. W. Rowe	
1962	Correlation of Cesium-137 in Milk with Rainfall	H-4	Ernest Anderson	
1962	Cultivation of Pleuropneumonia-Like Organisms (PPLO) from Tissue Cultures	H-4	S. Goldstein, Phyllis Sanders, and Irene Boone	
1962	Cutaneous Absorption of Radionuclides by Human Subjects: Strontium-85	H-4	Marvin Van Dilla, Chester Richmond, John Furchner, and M. W. Rowe	
1962	Effect of Calcium Ethylenediamine Tetraacetic Acid (Ca EDTA) on Thyroid Function	H-4	Harry Foreman and M. C. Brooks	
1962	Effect of Dose Rate on Survival Time of Mice during Continuous Gamma-Ray Exposure	H-4	Ted Trujillo and John Spalding	
1962	Electronically Determined Erythrocyte Volumes: Further Observations on the Skewed Population Profile	H-4	Clarence Lushbaugh and N. J. Basmann	Harvey Israel, H-6 Group
1962	Growth Characteristics of HeLa Cells in Agitated Fluid Medium	H-4	Phyllis Sanders, S. Goldstein, and T. M. Gragg	

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1962	Metabolism of Ruthenium-106 Chloride in Mammals: Progress Report on Dogs	H-4	John Furchner, Chester Richmond, and G. A. Trafton	
1962	Metabolism of Zinc-65 in Humans: Cases HFZn-3 and HMZn-4	H-4	John Furchner, Chester Richmond, and G. A. Trafton	
1962	Methodology in Lethality Studies	H-4	John Spalding and Ruben Archuleta	
1962	Oligonucleotides: Studies toward Chemical Synthesis of 3':5'-Linked Oligouridylic Acid	H-4	Donald Ott	
1962	Potassium and Cesium-137 in an Individual: Interlaboratory Comparison	H-4	Marvin Van Dilla	
1962	Preparative-Scale Chromatographic Separation of Purine and Pyrimidine Bases and Their Deoxyribonucleosides	H-4	E. Hansbury and David Williams	
1962	Quaternary Ammonium Nucleates with Possible Use in Countercurrent Distribution of Nucleic Acids	H-4	Vernon Kerr	
1962	Radiation-Induced Aging as a Function of Dose Rate, Measured by the Survival of Irradiated Mice to Cold Stress	H-4	Ted Trujillo and John Spalding	
1962	Radiolytic Degradation Products of Tritiated Pyrimidine Deoxynucleosides	H-4	Donald Petersen, Marguerite Magee, and Arthur Murray III	
1962	Retention and Excretion of Orally Administered Barium-133 by Mice	H-4	Chester Richmond, John Furchner, and G. A. Trafton	
1962	Retention and Excretion of Orally Administered Barium-133 by Rats	H-4	Chester Richmond, John Furchner, and G. A. Trafton	
1962	Retention of Radiostrontium by Normal and Tetracycline-Treated Mice	H-4	Chester Richmond, John Furchner, and G. A. Trafton	
1962	Retention of Strontium-85 by Man	H-4	John Furchner, Marvin Van Dilla, M. W. Rowe, and Chester Richmond	
1962	Steel Room: Airborne Radioactivity Problems	H-4	Marvin Van Dilla and M. W. Rowe	
1962	Sterilization of Components for Lunar Spectrometer	H-4	Irene Boone, L. T. Rivera, and Ernest Anderson	
1962	Survival Time of Mice Exposed to Fission Neutrons and 250 KVP X Rays	H-4	John Spalding and Ted Trujillo	
1962	The Differential Sensitivity of HeLa Cells to Specific and Nonspecific Intranuclear Tritium Beta Irradiation	H-4	Donald Petersen, Phyllis Sanders, L. B. Cole, and S. Goldstein	

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1962	The Distribution of Certain Proteins and Polypeptides in the Kirby Water-Phenol System	H-4	George Shepherd and P. A. Hopkins	
1962	The Gamma-Ray Spectrum of the Moon: Theoretical Computations	H-4	Marvin Van Dilla and Ernest Anderson	Harvey Israel, H-6 Group
1962	Use of Whole Body Counting to Investigate Effects of Whole Body X Irradiation on Metabolic Parameters	H-4	Chester Richmond, John Furchner, and G. A. Trafton	
1962	Whole Body Retention of Cesium-137 by Dogs during Chronic Oral Exposure: Progress Report	H-4	John Furchner and Chester Richmond	
1962	Examination of Gross Particles from Kiwi-A3 Nuclear Rocket Propulsion Reactor at Nevada Test Site	H-5	Harold Ide, Jean McClelland, William Moss, and Evan Campbell	H-8 Group
1962	Kiwi-B1A Gamma Dose Rate Measurements	H-8	Philip Lee, William Schweitzer, and Payne Harris	Reynolds Electric and Engineering Company, Nevada Test Site
1962–1974, 1976	Cesium-137 Content of New Mexico Control Subjects	H-4	Ernest Anderson, A. E. Hargett, Philip Dean, Roxye DePriest, Chester Richmond, Jerry London, Jean Findlay, Julie Wilson, John Furchner, and Robert Thomas	
1963	Absolute Calibration of Whole-Body Gamma-Ray Spectrometer for Potassium and Cesium-137	H-4	Philip Dean and Marvin Van Dilla	
1963	Acute Radiosensitivity as a Function of Age in Mice	H-4	John Spalding, Ogden Johnson, and Ruben Archuleta	
1963	Application of Automatic Computational Techniques to the Analysis of Ultracentrifugal Sedimentation-Velocity Molecular Weight Data for Deoxyribonucleic Acid	H-4	George Shepherd, Philip Dean, and Billie Noland	
1963	Breeding Characteristics of Offspring from Mice with Fifteen Generations of X Irradiation to the Males	H-4	John Spalding and Mary Brooks	
1963	Cellular Elements in the Peripheral Blood of Macaca mulatta and Macaca speciosa Monkeys	H-4	Chester Richmond and Jerry London	
1963	Chromosome Observations in Nonirradiated Progeny from Several Lines of Irradiated RF Males	H-4	Irene Boone, Patricia LaBauve, and John Spalding	
1963	Chromosomes in Transplanted Leukemia of AKR Mice	H-4	Irene Boone and Patricia LaBauve	

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1963	Cold Stress as a Test for Rate of Aging in Three Lines of Mice with Different Histories of Ancestral X-Ray Exposure	H-4	John Spalding and Ted Trujillo	
1963	Comparative Fundamental Physiological Parameters of Macaca mulatta and a New Laboratory Primate, Macaca speciosa	H-4	J. Coleman Hensley and Chester Richmond	
1963	Distribution of Cesium-137 in Mice and Dogs after Chronic Exposure	H-4	John Furchner, Chester Richmond, and G. A. Trafton	
1963	Effect of Ashing Temperature on Cesium and Potassium Content of Bone	H-4	Marvin Van Dilla, M. W. Rowe, and Mack Fulwyler	J. L. Kulp, Lamont Geological Observatory, Columbia University, New York, New York
1963	Effective Retention of Intravenously Administered Beryllium-7 by Rats	H-4	Chester Richmond, John Furchner, and Jerry London	
1963	Electronic Measurement of Cellular Volumes: Biologic Evidence for Two Volumetrically Distinct Subpopulations of Red Blood Cells	H-4	Clarence Lushbaugh and Dorothy Hale	
1963	Electronic Measurement of Cellular Volumes: Change in Red Blood Cells Resulting from Non-Physiologic pH	H-4	Clarence Lushbaugh, Ernest Anderson, Harvey Israel, Dorothy Hale, and N. J. Basmann	
1963	Electronic Measurement of Cellular Volumes: Electronic Improvement of Coulter Counter Resolution	H-4	Clarence Lushbaugh, N. J. Basmann, and Dorothy Hale	
1963	Evaluation of the Potassium-40 Continuum Contribution to the Cesium-137 Photopeak in a Sodium Iodide Crystal Spectrometer	H-4	Ernest Anderson, Philip Dean, and Marvin Van Dilla	
1963	Inability of the Mouse to Recognize Gamma Radiations: Variable Low Dose Rate Studies in RF Mice	H-4	J. Coleman Hensley, John Spalding, William Schweitzer, and Ruben Archuleta	
1963	Lack of Effect of Exercise on the Excretion of Cesium-137 in Mice	H-4	John Furchner, Chester Richmond, and G. A. Trafton	
1963	Longevity of First and Second Generation Offspring from Male Mice Exposed to Fission Neutrons and Gamma Rays	H-4	John Spalding and Ruben Archuleta	
1963	Metabolism of Manganese-54 in Rats and Mice	H-4	John Furchner, Chester Richmond, and G. A. Trafton	
1963	Metabolism of Radioiodine in Children and Adults Using Small (Nanocurie) Doses	H-4	Marvin Van Dilla and Mack Fulwyler	
1963	Nucleic Acids: A Technique for Automated Base Analysis	H-4	George Shepherd, Donald Ott, and P. A. Hopkins	

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1963	Oligonucleotide Synthesis	H-4	Donald Ott, David Williams, Vernon Kerr, Georgia Fritz, E. Hansbury, R. E. Hine, and F. Newton Hayes	
1963	Potassium-40 and Cesium-137 Levels of Beagle Hounds	H-4	Chester Richmond, John Furchner, and Jerry London	
1963	Preparation of Bacterial Deoxyribonucleic Acids	H-4	Irene Boone and Evelyn Campbell	
1963	Progress in the Establishment of Karyographic Methods as a Tool in Radiopathology	H-4	G. L. Humason and Phyllis Sanders	
1963	Purification and Concentration of T-4 Bacteriophage on DEAE-Cellulose Columns for DNA Isolation	H-4	Irene Boone and Evelyn Campbell	
1963	Radiation-Induced Irreparable Biological Damage in Three Genetic Lines of Mice with Different Ancestral Histories of Radiation Exposure	H-4	John Spalding and Ruben Archuleta	
1963	Retention of Cesium-137 by Adults	H-4	Marvin Van Dilla and Mack Fulwyler	Lovelace Foundation, Albuquerque, New Mexico
1963	Retention of Intravenously Administered Cesium-132 by Man	H-4	Chester Richmond, Jerry London, and John Furchner	
1963	Retention of Zirconium-95 after Oral and Intraperitoneal Administration t o Mice	H-4	John Furchner, Chester Richmond, and G. A. Trafton	
1963	The Effect of Environmental Temperature on the Retention of Strontium in Mice	H-4	John Furchner, Chester Richmond, and G. A. Trafton	
1963	The Representation of Oligonucleotides: A Sub-Nomenclature Problem	H-4	F. Newton Hayes and Donald Ott	
1963	Thermoluminescent Dosimetry with Activated Lithium Fluoride	H-4	Philip Dean and John Larkins	
1963	Volume and Turnover of Body Water in Male Macaca mulatta and Macaca speciosa Monkeys	H-4	Chester Richmond and Jerry London	
1963	Dose-Rate Measurements for Kiwi B-1B and Kiwi B-4A	H-8	F. M. Cox, Philip Lee, and William Schweitzer	Richard Hill, Reynolds Electric and Engineering Company, Nevada Test Site
1963	Integral Gamma and Neutron Measurements on Kiwi B-4A	H-8	F. M. Cox, Richard Henderson, Philip Lee, E. Frank Montoya, William Schweitzer, and Fred Worman	
1963	Integral Neutron and Gamma Dose Measurements on the Kiwi B-1 Reactors, Part I Kiwi B-1A, Part II Kiwi B-1B	H-8	F. M. Cox, Richard Henderson, Philip Lee, E. Frank Montoya, William Schweitzer, T. R. Williams, and Fred Worman	

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1963	Radiation Measurements of the Effluent from the Kiwi B-1A, B-1B, and B-4A Reactors	H-8	J. W. T. Meadows; Harold Ide; Evan Campbell; Carl Cuntz; D. J. Yeager; William Schweitzer; F. M. Cox; Philip Lee; and Harry Jordan, Jr.	Reynolds Electric and Engineering Company, Nevada Test Site
1963	Test Cell: A Shielding Study; Kiwi B-4A	H-8	Philip Lee, F. M. Cox, and William Schweitzer	
1963–1964	Data Analysis by Computer	H-4	Philip Dean	
1964	A Stable Protein Fraction Associated with the Mitotic Apparatus	H-4	Donald Petersen, Fannie Sapir, and Ernest Anderson	
1964	A Two-Crystal Gamma-Ray Spectrometer	H-4	Mack Fulwyler	
1964	Cesium Calibration Committee	H-4	Philip Dean	Committee on Intercomparison of Human Cesium-137 Measurements, Division of Biology and Medicine, U.S. Atomic Energy Commission, Washington, D.C.
1964	Chemical Polymerization of a Trinucleotide	H-4	Vernon Kerr	
1964	Comparative Metabolic Data for Macaca mulatta and Macaca speciosa Monkeys	H-4	Chester Richmond, Jerry London, and John Furchner	
1964	Contamination of Materials of Construction	H-4	Ernest Anderson, Philip Dean, and M. W. Rowe	Subcommittee on Low-Level Contamination of Materials and Reagents, National Research Council, National Academy of Sciences, Washington, D.C.
1964	Effect of Specific Activity on Stable Cesium Turnover by Man: Studies with Cesium-132 and Cesium-137	H-4	Chester Richmond, Jerry London, Jean Findlay, and John Furchner	
1964	Effective Retention of Parenterally Administered Carrier-Free Beryllium-7 by Mice: Comparison of Intraperitoneal and Intravenous Administrations	H-4	Chester Richmond, Jerry London, and John Furchner	
1964	Electronic Cell Sizing: Effect of Aperture Current	H-4	Marvin Van Dilla, N. J. Basmann, and Mack Fulwyler	
1964	Electronic Cell Sizing: Erythrocytes	H-4	Marvin Van Dilla, N. J. Basmann, and Mack Fulwyler	
1964	Electronic Cell Sizing: Influence fo Physical Phenomena on Measured Spectra	H-4	Marvin Van Dilla, N. J. Basmann, and Mack Fulwyler	
1964	GRADPRO: An Equilibrium Density Gradient Ultracentrifugal Computer Program	H-4	George Shepherd, Philip Dean, and Billie Noland	

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1964	Nuclear Magnetic Resonance Studies on Nucleotides	H-4	Charles Gregg	
1964	Purification of DNA Polymerase from Escherichia Coli	H-4	Robert Ratliff and Ted Trujillo	
1964	Replication of Mengovirus in Chinese Hamster Ovary Cells	H-4	Robert Tobey and Evelyn Campbell	
1964	Retention of Silver-110 by Rats after Oral, Intraperitoneal, and Intravenous Administration	H-4	John Furchner, Glessie Drake, and Chester Richmond	
1964	Ruthenium-106 in Mice, Rats, and Dogs: Interspecific Comparisons	H-4	John Furchner, Chester Richmond, and Glessie Drake	
1964	Simultaneous Measurement of Gamma-Emitting Radionuclides by Liquid Scintillation Counters: Whole-Body Retention of Strontium-85 and Zinc-65 by Rats	H-4	Chester Richmond, Jerry London, and John Furchner	
1964	Spectrophotometric Analysis of Nucleic Acid Derivatives	H-4	Georgia Fritz	
1964	Studies of X-Irradiated Mouse Populations: Breeding Characteristics of Mice from 5, 10, 15, and 20 Generations of X-Irradiated Sires	H-4	John Spalding and Mary Brooks	
1964	Studies of X-Irradiated Mouse Populations: Life Span Studies on Mice from 5, 10, and 15 Generations of X-Irradiated Sires	H-4	John Spalding and Mary Brooks	
1964	Studies of X-Irradiated Mouse Populations: Physiological Capacitance as an Index of Activity of Mice of Irradiated and Normal Ancestry	H-4	J. Coleman Hensley; Glenna Oakley; and R. I. Howes, Jr.	
1964	Studies of X-Irradiated Mouse Populations: Physiological Response of Mice of Irradiated and Normal Ancestry to a Nontraumatic Stress	H-4	J. Coleman Hensley and Glenna Oakley	
1964	Studies of X-Irradiated Mouse Populations: Radiation Sensitivity in Mice from 25 Generations of X-Irradiated Sires	H-4	John Spalding, Ogden Johnson, and Ruben Archuleta	
1964	Studies of X-Irradiated Mouse Populations: Structural and Functional Studies on Hemoglobins of Mice of the 27th Filial Generation	H-4	J. Coleman Hensley and Nancy Brown	
1964	Studies of X-Irradiated Mouse Populations: The Comparative Hematology and Clinical Blood Chemistry of Mice of the F27 Generation	H-4	J. Coleman Hensley and Glenna Oakley	

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1964	Synthesis of Labeled Deoxynucleotide Dimers	H-4	David Williams	
1964	The Conversion of Mono- and Oligodeoxyribonucleotides to Their 5'-Triphosphates	H-4	Donald Hoard and Donald Ott	
1964	The Effect of Actinomycin D on Premitotic Cells	H-4	Robert Tobey and Donald Petersen	
1964	The Effect of Temperature on the Retention of Ruthenium-106 and Manganese-54 by Mice	H-4	John Furchner, Chester Richmond, and Glessie Drake	
1964	The Energy Metabolism of Synchronized Cells	H-4	Charles Gregg	
1964	The Lack of Effect of Water Loading on the Retention of Cesium-137 by Rats	H-4	John Furchner, Glessie Drake, and Chester Richmond	
1964	The Retention of Manganese-54 by Mice, Rats, Dogs, and Monkeys	H-4	John Furchner, Glessie Drake, and Chester Richmond	
1964	Veterinary Medicine and Surgery in the Biological and Medical Research Group	H-4	J. Coleman Hensley, Glenna Oakley, and Ernesto Vigil	
1964	Whole-Body Retention of Orally and Intravenously Administered Beryllium-7 by Beagles	H-4	Chester Richmond, Jerry London, Glessie Drake, and John Furchner	
1964	Particle Size Distribution from A One-Ninth-Scale Rover Reactor Axial-High Explosives Destruct	H-5	Evan Campbell, Harold Ide, and William Moss	Space Nuclear Propulsion Office, Washington, D.C.
1964, 1966	Purification of RNA Polymerase from Escherichia Coli	H-4	Robert Ratliff, Ted Trujillo, and David A. Smith	
1964–1965	Chemical Studies on Nucleotide Polymerization	H-4	Arthur Murray III	
1964–1965	Oligodeoxyribonucleotide Synthesis	H-4	David Williams, Vernon Kerr, R. E. Hine, Donald Hoard, E. Hansbury, Edith Lilly, and Donald Ott	
1964–1965, 1967	Genetic Effects of X Irradiation to Consecutive Generations of Male Mice	H-4	John Spalding, Mary Brooks, and Ruben Archuleta	
1965	A Procedure for Automatic Amino Acid Analysis on the Nanomolar Level	H-4	George Shepherd and Carol Roberts	Richard Hiebert, P-1 Group
1965	An Electronic Particle Separator with Potential Biological Application	H-4	Mack Fulwlyer	
1965	Chemical synthesis of Oligodeoxyribonucleotides: Protective Groups for 5'-Phosphate	H-4	David Williams	

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1965	Comparative Extraction Techniques for Mandibular and Maxillary Canine Teeth (Cuspids): Dentitious and Gingival Morphology of Macaca mulatta and Macaca speciosa	H-4	R. I. Howes, Jr.; and J. Coleman Hensley	
1965	Concentrations of Metallic Elements at Various Times in the Life Cycle of Cultured Mammalian Cells	H-4	Rowand Chaffee and Donald Petersen	C. F. Metz, CMB-1 Group
1965	Correction of Metabolic Data for Changes in Fallout Cesium-137	H-4	Chester Richmond, Jean Findlay, and Jerry London	
1965	Distribution of Manganese-54 in Rats	H-4	John Furchner, Glessie Drake, and Chester Richmond	
1965	Effect of Conditioning to Temperature Stress on the Excretion of Cesium by Mice	H-4	John Furchner, Glessie Drake, and Chester Richmond	
1965	Effect of Single Acute and Second Gamma-Ray Exposures on Erythropoiesis in the Mouse	H-4	John Spalding, N. J. Basmann, Ogden Johnson, and Ruben Archuleta	
1965	Effective Residual Dose Studies with Mice	H-4	John Spalding	
1965	Enhancement of Cesium-137 Excretion by Rats Given Ferric Ferrocyanide Chronically	H-4	Chester Richmond, Jean Findlay, and Jerry London	D. E. Bunde, Rocky Mountain Universities, Inc., Idaho State University, Pocatello
1965	Enzymatic Synthesis of Polydeoxyribonucleotides 5‘-terminated with Chemically Synthesized Oligodeoxyribonucleotides	H-4	F. Newton Hayes and V. E. Mitchell	
1965	Erythrocyte Volume Distributions during Recovery from Bone Marrow Arrest	H-4	Marvin Van Dilla, N. J. Basmann, Julia Hardin, and John Spalding	
1965	Flow of Particles through a Coulter Aperture: Hydrodynamic Considerations	H-4	Marvin Van Dilla	F. H. Harlow, Theoretical Division
1965	Genetic Effects of X Irradiation to Consecutive Generations of Male Mice: A Spontaneous Mutation for a Recurring Hairless Condition	H-4	John Spalding, Mary Brooks, and Ruben Archuleta	
1965	Genetic Effects of X Irradiation to Consecutive Generations of Male Mice: Comparative Breeding Characteristics of Offspring of the 25th Generation	H-4	John Spalding, Mary Brooks, and Ruben Archuleta	
1965	Genetic Effects of X Irradiation to Consecutive Generations of Male Mice: Comparative Hematology and Clinical Blood Chemistry of Mice of the 32 Generation	H-4	J. Coleman Hensley, C. F. Bidwell, and Aaron Martinez	

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1965	Genetic Effects of X Irradiation to Consecutive Generations of Male Mice: Hemoglobin Molecular Characteristics of Mice Exposed to 32 Consecutive Generations of X Irradiation	H-4	J. Coleman Hensley, R. O. Eikelberry, and Carol Roberts	
1965	Genetic Effects of X Irradiation to Consecutive Generations of Male Mice: Radiation Resistance, LD30/50, and Continuous Exposure (4 to 5 rads/hr) Studies in Mice from 30 Generations of X-Irradiated Sires	H-4	John Spalding, Mary Brooks, and Ruben Archuleta	
1965	High Resolution Disc Electrophoresis of Histones: A Survey of Histones from Various Laboratories	H-4	Lawrence Gurley, George Shepherd, and Billie Noland	
1965	High Resolution Disc Electrophoresis of Histones: An Improved Method	H-4	George Shepherd, Lawrence Gurley, and Billie Noland	
1965	Isolation of Nuclei from Chinese Hamster Ovary and Mouse Lymphoma L-5178Y Cells in Tissue Culture	H-4	Elva Hyatt	
1965	Mechanism of Infection of Escherichia Coli by Phage A-deoxyribonucleic Acid	H-4	Benjamin Barnhart	
1965	Oxygen Consumption and the Retention of Cesium-137 in Mice	H-4	John Furchner, Glessie Drake, and Chester Richmond	
1965	Phencyclidine Hydrochloride as a General Anesthetic for Laboratory Primates	H-4	J. Coleman Hensley	
1965	Purification of Polydeoxyribonucleotide Polymerases from Calf Thymus	H-4	Robert Ratliff and Ted Trujillo	
1965	RNA Synthesis in Cultured Mammalian Cells during Thymidine Inhibition of DNA Synthesis and during Synchronous Growth Following Release	H-4	Arthur Saponara and M. Duane Enger	
1965	Sephadex Chromatography of Nucleic Acid Derivatives	H-4	Georgia Fritz and F. Newton Hayes	
1965	Studies on the Ribonucleotide Polymerases	H-4	David A. Smith, Robert Ratliff, and Ted Trujillo	
1965	Support Activities of the LASL Whole-Body Counting Facility	H-4	Chester Richmond, Jerry London, and Jean Findlay	
1965	Synthesis of 2’-decoy-5’-nucleotide p1, p2-pyrophosphates	H-4	Alan Schwartz and Vernon Kerr	

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1965	Synthesis of Nucleic Acids by Nuclei from Chinese Hamster Ovary and Mouse Lymphoma (L-5178Y) Cells	H-4	Elva Hyatt	
1965	The Energy Metabolism of Cultured Mammalian Cells: Respiratory Properties of Chinese Hamster Ovary Cells	H-4	William Currie and Charles Gregg	
1965	The Energy Metabolism of Cultured Mammalian Cells: The Incorporation of Orthophosphate	H-4	Charles Gregg	
1965	The Energy Metabolism of Cultured Mammalian Cells: The Nature of the Phospholipid Fraction	H-4	Charles Gregg	
1965	Time of Synthesis of RNA and Protein Species Essential to Division in Four Cell Lines	H-4	Robert Tobey, Donald Petersen, and Ernest Anderson	
1965	Kiwi TNT Particle Study	H-5	Evan Campbell	H-8 Group; GMX-1 Group; and N-1 Group
1965	Integral Gamma and Neutron Measurements on the Kiwi B4D-202 and Kiwi B4E-301 Reactors	H-8	Philip Lee, E. Frank Montoya, William Schweitzer, and Fred Worman	
1965	Integral Gamma and Neutron Measurements on the Kiwi TNT	H-8	Philip Lee, G. Littlejohn, E. Frank Montoya, William Schweitzer, and Fred Worman	
1965	Integral Gamma and Neutron Measurements on the NRX A-2 Reactor	H-8	Philip Lee, E. Frank Montoya, William Schweitzer, and Fred Worman	
1965–1966	Computer Analysis of Multicomponent Ultraviolet Spectra	H-4	Georgia Fritz	
1965–1966	In vivo Measurement of Plutonium-239 Lung Burdens in Humans	H-4	Philip Dean and John Larkins	
1965–1966	Oligonucleotide Chromatography	H-4	Arthur Murray III	
1966	A Test of the Effective Residual Dose Concept of Radiation Injury in Mice	H-4	John Spalding, N. J. Basmann, and Ruben Archuleta	
1966	Amino Acid Analysis by Computer	H-4	Philip Dean and Carol Roberts	
1966	Automatic Cell Counter for Mammalian Cells in Suspension Culture	H-4	Ernest Anderson, D. L. Carlson, John Larkins, and James Perrings	R. B. Glascock, P-1 Group and Ronald Walters, Rocky Mountain Universities, Inc., Colorado State University, Fort Collins
1966	Chemical Synthesis of Oligodeoxyribonucleotides	H-4	David Williams	
1966	Comparative Aftersurvival Times of Mice Following Graded First and Graded but Reversed Second Exposures	H-4	John Spalding and Ogden Johnson	

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1966	Deoxyribonucleoside Triphosphate Derivatives	H-4	E. Hansbury and Donald Ott	
1966	Detection of Biological Cells by Light-Scattering	H-4	Marvin Van Dilla	
1966	Dose Rate-Total Dose Effect on Survival in Mice	H-4	John Spalding, Ogden Johnson, and Ruben Archuleta	
1966	Effective Retention of Silver-110 by Dogs after Oral Administration	H-4	John Furchner, Glessie Drake, and Chester Richmond	
1966	Effects of Inhibitors of Protein and RNA Synthesis on Regeneration of Surface Sialic Acid of Cells in Culture	H-4	Paul Kraemer	
1966	Energy Metabolism of Cultured Mammalian Cells	H-4	William Currie and Charles Gregg	
1966	Enzymatic Synthesis of Short Polydeoxyribonucleotides	H-4	F. Newton Hayes and V. E. Mitchell	
1966	Evaluation of Detector Variance	H-4	John Furchner and Glessie Drake	P. C. McWilliams, T-1 Group
1966	Further Development of the Cell Separator	H-4	Mack Fulwyler	
1966	Injury and Recovery of Bone Marrow during and Following Continuous Low-Intensity Gamma Irradiation	H-4	John Spalding, N. J. Basmann, and Ruben Archuleta	
1966	Intercellular Control of Development of Competence in Cultures of Hemophilus Influenzae by a Cell-Free Product of Cell Metabolism	H-4	Benjamin Barnhart and Summers Cox	
1966	Investigation of the Mode of Action of Nucleases Using Defined Polydeoxynucleotide Substrates	H-4	Donald Hoard	
1966	Loss of Whole-Body Cesium-137 in Humans	H-4	John Furchner, Jerry London, Glessie Drake, and Chester Richmond	
1966	Methylation of Mammalian RNA	H-4	Arthur Saponara, M. Duane Enger, and John Hanners	
1966	Organometallic Compounds in Nucleic Acid Chemistry	H-4	Vernon Kerr	
1966	p1,p2-pyrophosphates as Initiators in the Terminal Deoxyribonucleotide Transferase Reaction	H-4	Alan Schwartz	
1966	Premitotic Radiosensitivity of Mammalian Cells: Radiation Effects on Terminal Protein Synthesis Essential for Division	H-4	Donald Petersen	Ronald Walters, Rocky Mountain Universities, Inc., Colorado State University, Fort Collins

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1966	Premitotic Radiosensitivity of Mammalian Cells: Timing and Dose Dependency of the Radiation-Induced G2 Delay	H-4	Donald Petersen	Ronald Walters, Rocky Mountain Universities, Inc., Colorado State University, Fort Collins
1966	Residence Time of Fallout Cesium-137 in a Control Population Following the July 1964 Peak	H-4	Chester Richmond and Jerry London	
1966	Retention of Cesium-137 by the White-Tailed Rat	H-4	John Furchner, Glessie Drake, and Chester Richmond	
1966	Retention of Silver-110 by Mice	H-4	John Furchner, Glessie Drake, and Chester Richmond	
1966	Simultaneous Use of Two or More Deoxynucleotide 5'-triphosphates for Polydeoxynucleotide Synthesis with Terminal Deoxynucleotidyl Transferase from Calf Thymus Glands	H-4	Robert Ratliff, Ted Trujillo, Donald Ott, and Donald Hoard	
1966	Studies of Horse Liver Alcohol Dehydrogenase: Structural Changes during Acid Inactivation	H-4	Charles Blomquist	
1966	Synthesis of Oligo- and Polydeoxynucleotides by Enzymatic Means	H-4	Donald Hoard	W. B. Goad, T-4 Group
1966	Volume Distribution of Mouse Bone Marrow Cells	H-4	Marvin Van Dilla, Julia Hardin, and C. F. Bidwell	
1966	Volume Distribution of Normal Human Erythrocytes and Leukocytes	H-4	Marvin Van Dilla and Julia Hardin	
1966	Whole-Body Retention of Barium-133 by Monkeys	H-4	Chester Richmond and Jerry London	
1966	Whole-Body Retention of Cadmium-109 by Mice Following Oral, Intraperitoneal, and Intravenous Administration	H-4	Chester Richmond, Jean Findlay, and Jerry London	
1966	Characteristics of the Aerosol Produced from Burning Sodium and Plutonium	H-5	Harry Ettinger and William Moss	CMB-11 Group and Harold Busey, Douglas Aircraft Company, Santa Monica, California
1966	Fragmentation Studies of One-Inch Rover Fuel Elements	H-5	Harry Schulte, Evan Campbell, Harold Ide, William Moss, J. E. Lindsey, and R. J. Reithel	
1966	Kiwi Transient Nuclear Test Dose Rate Survey	H-8	Carles Blackwell, A. J. Montoya, H. C. Craig, T. H. Garcia, Earl Cox, Philip Lee, Harvey Israel, and Robert Fultyn	
1966	Radiation Measurements of the Effluent from the NRX A-2 and NRX A-3 Reactors	H-8	C. J. Boasso; Carl Cuntz; Robert Fultyn; Richard Henderson; Harry Jordan, Jr.; and Oliver Larson	Reynolds Electric and Engineering Company, Nevada Test Site

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1966	Radiation Measurements of the Effluent from the NRX A-4 Reactor	H-8	A. John Ahlquist, Carl Cuntz, Robert Fultyn, Richard Henderson, Oliver Larson, G. Littlejohn, William Schweitzer, and Richard Smale	Reynolds Electric and Engineering Company, Nevada Test Site
1966	Radiation Measurements of the Effluent from the Phoebus 1A-321 Reactor	H-8	Richard Henderson, Oliver Larson, and Robert Fultyn	Reynolds Electric and Engineering Company, Nevada Test Site
1967	A Model for Cesium-137 Body Burdens in Man	H-4	John Furchner and Glessie Drake	
1967	A Radiation Protection Guide for Silver-110 Estimated from Retention in Small Mammals	H-4	John Furchner and Glessie Drake	
1967	Amino Acid Analysis at the Nanomole Level	H-4	George Shepherd and Carol Roberts	
1967	An Automatic Cell Counter	H-4	John Larkins, James Perrings, and Ernest Anderson	
1967	Analysis of Acetyl Groups in Biological Materials by Gas Chromatography	H-4	George Shepherd and Billie Noland	
1967	Characterization of Chinese Hamster Ovary Histone Fractions	H-4	Lawrence Gurley, Julia Hardin, and Carol Roberts	
1967	Characterization of Enzymatically-Synthesized Heteropolydeoxynucleotides after Diphenylamine-Formic Acid Degradation	H-4	Donald Hoard	
1967	Effective Residual Dose Studies on Monkeys and Dogs	H-4	John Spalding, Laurence Holland, and Ogden Johnson	
1967	Enzymatic Synthesis of Homo-Oligodeoxyribonucleotides	H-4	David Williams; Elmo Martinez, Jr.; V. E. Mitchell; and F. Newton Hayes	
1967	Lack of Effect of Pilocarpine Nitrate on the Excretion of Strontium-85 by Mice	H-4	John Furchner and Glessie Drake	
1967	Long-Term Retention of Cobalt-60 by Rats	H-4	Chester Richmond and Jerry London	
1967	Long-Term Whole-Body Potassium Levels	H-4	John Furchner and Glessie Drake	
1967	Micro-Preparative Polyacrylamide Gel Electrophoresis of Basic Proteins	H-4	George Shepherd and Billie Noland	
1967	Observations on Progeny from Consecutive Generations of X-Irradiated Progenitors: Life Span Investigations of F31 Male and Female Breeders and F32 Virgin Females	H-4	John Spalding, Mary Brooks, and Ruben Archuleta	

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1967	Observations on Progeny from Consecutive Generations of X-Irradiated Progenitors: Radioresistance in F43 Mice from Irradiated and Nonirradiated Progenitor Males	H-4	John Spalding, Mary Brooks, and Ruben Archuleta	
1967	Observations on Progeny from Consecutive Generations of X-Irradiated Progenitors: Reproductive Fitness and Litter Characteristics F35 Progeny	H-4	John Spalding, Mary Brooks, and Ruben Archuleta	
1967	Observations on Progeny from Consecutive Generations of X-Irradiated Progenitors: Reproductive Fitness and Litter Characteristics of F30 Progeny	H-4	John Spalding, Mary Brooks, and Ruben Archuleta	
1967	Performance of Rhesus Monkeys during Exposure to Low Dose-Rate Gamma Rays	H-4	John Spalding, Ogden Johnson, and James Perrings	
1967	Protracted Feeding of Plutonium-238 Microspheres to Beagles: Macro- and Microscopic Observations of the Gastrointestinal Tract and Estimates of Deposition in Liver, Spleen, and Lympn Nodes	H-4	Chester Richmond, Wright Langham, Julie Wilson, and Jerry London	
1967	Resistance to Continuous (23 to 24 Hours/Day) Low-Intensity Gamma-Ray Exposure as a Function of Age in Mice	H-4	John Spalding and Ted Trujillo	
1967	Synchronization of Chinese Hamster Ovary Cells in a Tissue Culture Pilot Plant	H-4	Lawrence Gurley	
1967	Synthesis of Four-Section Block Copolymers and Their Replication with RNA Polymerase	H-4	Robert Ratliff and Donald Hoard	
1967	The Fluorescent Cell Photometer: A New Method for the Rapid Measurement of Biological Cells Stained with Fluorescent Dyes	H-4	Marvin Van Dilla and Paul Mullaney	James Coulter, Shops Department
1967	The Synthesis of Histone Fractions during the Life Cycle of Mammalian Cells	H-4	Lawrence Gurley and Julia Hardin	
1967	Urinary Deoxycytidine Following Chronic Whole-Body Irradiation of the Monkey	H-4	Arthur Murray III	
1968	Whole-Body NMR Spectrometer	H-4	Paul Jackson and Wright Langham	
1969	Evaluation of Deoxycytidinuria in the Subhuman Primate as a Radiation Biodosimeter	H-4	Arthur Murray III	

Year(s)	Investigation Title	Lead Group	HRL Personnel/Author(s)	Collaborator(s)
1970	Direct Digital Readout and Computers of Amino Acid Analysis Data	H-4	George Shepherd, Carol Roberts, and Philip Dean	R. B. Glascock, C-8 Group and Richard Hiebert, P-1 Group
1970	GRADPRO: A Computer Program for Use in Isopycnic Density Gradient Centrifugation	H-4	Philip Dean, Billie Noland, and George Shepherd	
1970	Proposal for a Biomedical Addition to the Los Alamos Scientific Laboratory's High-Flux Meson Physics Facility	H-4	Wright Langham	David Croce and Katherine Harper, Medium-Energy Physics Division
1971	Absorption of Silver-110 in Rats	H-4	John Furchner and Glessie Drake	
1971	Animal Colony Activities: Variety of Animals Utilized	H-4		
1971	Biological Applications of Cell Analysis and Sorting: Immunofluorescent Measurements with Flow Microfluorometry	H-4	L. Scott Cram, Harry Crissman, J. Coleman Hensley, Dale Holm, Donald Petersen, Angela Romero, Ted Trujillo, and Marvin Van Dilla	
1971	Biological Applications of Cell Analysis and Sorting: Life-Cycle Analysis of Cells by Flow Microfluorometry and Labeled DNA Precursors	H-4	L. Scott Cram, Harry Crissman, J. Coleman Hensley, Dale Holm, Donald Petersen, Angela Romero, Ted Trujillo, and Marvin Van Dilla	
1971	Biological Applications of Cell Analysis and Sorting: Monitoring Ploidy of Cell-Culture Systems by Flow Microfluorometry	H-4	L. Scott Cram, Harry Crissman, J. Coleman Hensley, Dale Holm, Donald Petersen, Angela Romero, Ted Trujillo, and Marvin Van Dilla	
1971	Biological Effects of Radiation Dose Protraction by Fractionation, Continuous Gamma-Ray Exposure, and Changing Dose Rate in Mice: Comparative Effects of Radiation Dose Protraction by Fractionation and by Continuous Exposure in Mice	H-4	John Spalding, Ruben Archuleta, Jerry London, and Ogden Johnson	
1971	Biological Effects of Radiation Dose Protraction by Fractionation, Continuous Gamma-Ray Exposure, and Changing Dose Rate in Mice: Effects of Changing (Build-Up and Decay) versus Fixed Dose Rate on Mean Survival Time of Mice	H-4	John Spalding, Ruben Archuleta, Jerry London, and Ogden Johnson	
1971	Cell Analysis and Sorting Instrumentation Development: An Improved Instrument for Quantitative Cellular Fluorescence Measurements on Single Cells	H-4	A. Brunsting, James Coulter, L. Scott Cram, Dale Holm, John Horney, Paul Mullaney, Angela Romero, John Steinkamp, Ted Trujillo, Marvin Van Dilla, and W. T. West	

Year(s)	Investigation Title	Lead Group	HRL Personnel/Author(s)	Collaborator(s)
1971	Cell Analysis and Sorting Instrumentation Development: Differential Light Scattering; A Possible Method of Mammalian Cell Identification	H-4	A. Brunsting, James Coulter, L. Scott Cram, Dale Holm, John Horney, Paul Mullaney, Angela Romero, John Steinkamp, Ted Trujillo, Marvin Van Dilla, and W. T. West	
1971	Cell Analysis and Sorting Instrumentation Development: Multiparameter Cell Analysis and Sorting	H-4	A. Brunsting, James Coulter, L. Scott Cram, Dale Holm, John Horney, Paul Mullaney, Angela Romero, John Steinkamp, Ted Trujillo, Marvin Van Dilla, and W. T. West	
1971	Chromosome Structure and Function in Normal, Irradiated, and Transformed Cells: DNA Constancy in Heteroploidy	H-4	Paul Kraemer, Donald Petersen, Larry Deaven, Carl Hildebrand, Benjamin Barnhart, Summers Cox, Robert Tobey, Harry Crissman, and Marvin Van Dilla	
1971	Chromosome Structure and Function in Normal, Irradiated, and Transformed Cells: DNA-Membrane Associations in Cultured Chinese Hamster Cells	H-4	Paul Kraemer, Donald Petersen, Larry Deaven, Carl Hildebrand, Benjamin Barnhart, Summers Cox, Robert Tobey, Harry Crissman, and Marvin Van Dilla	
1971	Chromosome Structure and Function in Normal, Irradiated, and Transformed Cells: Repair of Radiation Damage and Replication of a Bacterial Virus Chromosome	H-4	Paul Kraemer, Donald Petersen, Larry Deaven, Carl Hildebrand, Benjamin Barnhart, Summers Cox, Robert Tobey, Harry Crissman, and Marvin Van Dilla	
1971	Chromosome Structure and Function in Normal, Irradiated, and Transformed Cells: The Relationship between Heteroploidy and Chromosomal Nondisjunction	H-4	Paul Kraemer, Donald Petersen, Larry Deaven, Carl Hildebrand, Benjamin Barnhart, Summers Cox, Robert Tobey, Harry Crissman, and Marvin Van Dilla	
1971	Comparative Residual Biological Effects Of Radiation Dose Protraction by Fractionation and Continuous Gamma-Ray Exposure in Dogs and Monkeys: Comparative Biological Effects of Low Dose-Rate Exposure in Beagles and Macaca mulatta Monkeys	H-4	John Spalding, Laurence Holland, and James Prine	

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1971	Comparative Residual Biological Effects Of Radiation Dose Protraction by Fractionation and Continuous Gamma-Ray Exposure in Dogs and Monkeys: Hematopoietic Response of Monkeys to Fractionated Gamma-Ray Exposures	H-4	John Spalding, Laurence Holland, and James Prine	
1971	Hot Particle Project: : Preparation and Properties of Microspheres; Preparation of Microspheres	H-4	Ernest Anderson and James Perrings	
1971	Hot Particle Project: : Preparation and Properties of Microspheres; Properties of the Ceramic Microspheres	H-4	Ernest Anderson, Philip Dean, James Perrings, Susan Carpenter, Julie Langham, and Phyllis Sanders	
1971	Hot Particle Project: Preparation and Properties of Microspheres; Preparation of Zirconia Sols	H-4	James Perrings	
1971	Mercury-203 Retention in Rats	H-4	Julie Wilson, Glessie Drake, and John Furchner	
1971	Physical Radiobiology and Computer Applications: in vivo Measurement of Plutonium Lung Burdens and Lead-210 in the Skull	H-4	Philip Dean and Harold Ide	U.S. Public Health Service, North Bethesda, Maryland; New Mexico Department of Public Health, Santa Fe; and Colorado State Department of Public Health, Denver
1971	Radiation and Genetic Information Transfer: Effects of X-Irradiation upon Transcription	H-4	David A. Smith, Julia Hardin, F. Newton Hayes, Aaron Martinez, V. E. Mitchell, Robert Ratliff, and Gary Strniste	
1971	Radiation and Genetic Information Transfer: Translation	H-4	David A. Smith, Julia Hardin, F. Newton Hayes, Aaron Martinez, V. E. Mitchell, Robert Ratliff, and Gary Strniste	
1971	Regulatory and Control Mechanisms in the Mammalian Cell Cycle: Effects of Isoleucine Deficiency on Nucleic Acid and Protein Metabolism in Cultured Chinese Hamster Cells	H-4	M. Duane Enger, Robert Tobey, Lawrence Gurley, Ronald Walters, Arnold Hampel, Arthur Saponara, Robert Ratliff, Evelyn Campbell, Phyllis Sanders, and Susan Carpenter	
1971	Regulatory and Control Mechanisms in the Mammalian Cell Cycle: Effects of X-Irradiation on DNA Precursor Metabolism and DNA Replication in Chinese Hamster Cells	H-4	M. Duane Enger, Robert Tobey, Lawrence Gurley, Ronald Walters, Arnold Hampel, Arthur Saponara, Robert Ratliff, Evelyn Campbell, Phyllis Sanders, and Susan Carpenter	

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1971	Regulatory and Control Mechanisms in the Mammalian Cell Cycle: Low Molecular-Weight RNAs of Post Ribosomal Particles	H-4	M. Duane Enger, Robert Tobey, Lawrence Gurley, Ronald Walters, Arnold Hampel, Arthur Saponara, Robert Ratliff, Evelyn Campbell, Phyllis Sanders, and Susan Carpenter	
1971	Selenium-75 Distribution in Mice after Chronic Exposure	H-4	John Furchner, Jerry London, and Glessie Drake	
1971	Stable Isotopes in Biomedical Research: Effects of High Levels of Carbon-13 Incorporation on Biological Systems	H-4	Donald Ott, Charles Gregg, Judith Hutson, Victor Kollman, M. P. Martin, and V. S. Chavez	
1971	Surface Phenomena and Cellular Interaction: Cell-Cycle Dependent Desquamation of Heparan Sulfate from the Cell Surface	H-4	Paul Kraemer, Robert Tobey, Phyllis Sanders, and Susan Carpenter	
1971	Synthesis and Radiosensitivity of Model DNA: Chemical Synthesis	H-4	F. Newton Hayes; Donald Hoard; Ulrich Hollstein; Elmo Martinez, Jr.; V. E. Mitchell; Robert Ratliff; David Williams; and Esther Wilmoth	
1971	Synthesis and Radiosensitivity of Model DNA: The Thymine Photodimer	H-4	F. Newton Hayes; Donald Hoard; Ulrich Hollstein; Elmo Martinez, Jr.; V. E. Mitchell; Robert Ratliff; David Williams; and Esther Wilmoth	
1971, 1977	Hot Particle Project: Experimental Conditions; Sphere Distribution in the Lung	H-4	Ernest Anderson, Glessie Drake, Laurence Holland, Jerry London, James Prine, Julie Wilson, Robert Wood, Susan Carpenter, and L. E. Bryant	
1971–1972	Effects of Ionizing Radiation on Chromatin Structure and the Mitotic Apparatus: Effects of Ionizing Radiation on Chromatin Structure and Metabolism	H-4	George Shepherd, Paul Byvoet, Julia Hardin, Billie Noland, and D. K. Shortess	
1971–1972	Effects of Ionizing Radiation on Chromatin Structure and the Mitotic Apparatus: Effects of Ionizing Radiation on Components of the Mitotic Apparatus	H-4	George Shepherd, Paul Byvoet, Julia Hardin, Billie Noland, and D. K. Shortess	
1971–1972	Preparation of Compounds Labeled with Stable Isotopes: Biosynthesis	H-4	Donald Ott, Charles Gregg, Judith Hutson, Vernon Kerr, Victor Kollman, M. P. Martin, V. S. Chavez, Tomas Sanchez, Thomas Whaley, Enrigue Adame, John Hanners, and M. A. Nevarez	

Year(s)	Investigation Title	Lead Group	HRL Personnel/Author(s)	Collaborator(s)
1971–1972	Preparation of Compounds Labeled with Stable Isotopes: Organic Synthesis	H-4	Donald Ott, Charles Gregg, Judith Hutson, Vernon Kerr, Victor Kollman, M. P. Martin, V. S. Chavez, Tomas Sanchez, Thomas Whaley, Enrigue Adame, John Hanners, and M. A. Nevarez	CNC-4 Group
1971–1972	Radiation and Genetic Information Transfer: Replication and Amplification	H-4	David A. Smith, Julia Hardin, F. Newton Hayes, Aaron Martinez, V. E. Mitchell, Robert Ratliff, and Gary Strniste	
1971–1972	Radiation and Genetic Information Transfer: Transcription	H-4	David A. Smith, Julia Hardin, F. Newton Hayes, Aaron Martinez, V. E. Mitchell, Robert Ratliff, and Gary Strniste	
1971–1972	Regulatory and Control Mechanisms in the Mammalian Cell Cycle: Response of Histone Metabolism to X-Irradiation	H-4	M. Duane Enger, Robert Tobey, Lawrence Gurley, Ronald Walters, Arnold Hampel, Arthur Saponara, Robert Ratliff, Evelyn Campbell, Phyllis Sanders, and Susan Carpenter	
1971–1972	Stable Isotopes in Biomedical Research: Biochemistry	H-4	Donald Ott, Charles Gregg, Judith Hutson, Victor Kollman, M. P. Martin, V. S. Chavez, Vernon Kerr, Thomas Whaley, and Tomas Sanchez	
1971–1972	Stable Isotopes in Biomedical Research: Clinical Applications	H-4	Donald Ott, Charles Gregg, Judith Hutson, Victor Kollman, M. P. Martin, V. S. Chavez, Vernon Kerr, Thomas Whaley, and Tomas Sanchez	
1971–1972	Synthesis and Radiosensitivity of Model DNA: Enzymatic Synthesis	H-4	F. Newton Hayes; Donald Hoard; Ulrich Hollstein; Elmo Martinez, Jr.; V. E. Mitchell; Robert Ratliff; David Williams; Esther Wilmoth; Charles Delisi; Georgia Fritz; and Walter Goad, Jr.	
1971–1972	Synthesis and Radiosensitivity of Model DNA: X-Irradiation	H-4	F. Newton Hayes; Donald Hoard; Ulrich Hollstein; Elmo Martinez, Jr.; V. E. Mitchell; Robert Ratliff; David Williams; Esther Wilmoth; Charles Delisi; Georgia Fritz; and W. B. Goad	
1971–1973	Animal Colony Activities: Compliance with Federal Laws	H-4		
1971–1973	Animal Colony Activities: Disease Surveillance	H-4	Patricia LaBauve, Mary Brooks, and Laurence Holland	

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1971–1973	Animal Colony Activities: Support Activities	H-4	Patricia LaBauve, Susan Carpenter, Laurence Holland, James Prine, Robert Wood, Jerry London, and Julie Wilson	
1971–1973	Hot Particle Project: Biological Results	H-4	Glessie Drake, Laurence Holland, Jerry London, Julie Wilson, James Prine, Robert Wood, Susan Carpenter, and Phyllis Sanders	
1971–1973	Hot Particle Project: Experimental Conditions; Exposure of Animals	H-4	Ernest Anderson, Philip Dean, Glessie Drake, Laurence Holland, Jerry London, Paul Mullaney, Julie Wilson, and James Perrings	
1971–1973	Hot Particle Project: Experimental Conditions; Retention end Excretion	H-4	Ernest Anderson, Glessie Drake, John Furchner, Laurence Holland, Jerry London, Julie Wilson, and Philip Dean	
1972	Analytical Support: Chest and Whole-Body Counting Data Analysis	H-4	Philip Dean and James Jett	
1972	Analytical Support: Flow Microfluorometric (FMF) Data Analysis	H-4	Philip Dean and James Jett	
1972	Analytical Support: HUMCO II Data Analysis	H-4	Philip Dean and James Jett	
1972	Animal Colony Activities: Hamster Anesthesia	H-4	Laurence Holland, Glessie Drake, Jerry London, and Julie Wilson	
1972	Animal Colony Hamster Anesthesia	H-4	Laurence Holland, Glessie Drake, Jerry London, and Julie Wilson	
1972	Automation of Data Collection: Graf-Pen Interface to PDP-8/E Computer	H-4	Millard Butler	
1972	Automation of Data Collection: HUMCO II Interface with PDP-8/F Computer	H-4	Millard Butler	
1972	Automation of Data Collection: NaI (T1) Spectrometer and Transuranium Element Chest Counter Interface with PDP-8/I Computer	H-4	Millard Butler	
1972	Biological Applications of Cell Analysis and Sorting: Application of Biophysical Instrumentation to Animal Disease Diagnosis	H-4	L. Scott Cram, Harry Crissman, Jean Forslund, Paul Horan, Paul Kraemer, Donald Petersen, Mudundi Raju, Angela Romero, Robert Tobey, and Ted Trujillo	

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1972	Biological Applications of Cell Analysis and Sorting: Fluorescent DNA Distributions in MCA-1 Tumor Cell Populations	H-4	L. Scott Cram, Harry Crissman, Jean Forslund, Paul Horan, Paul Kraemer, Donald Petersen, Mudundi Raju, Angela Romero, Robert Tobey, and Ted Trujillo	
1972	Biological Applications of Cell Analysis and Sorting: Normal and Tumor Cell Kinetic Studies Using Flow Microfluorometry (FMF)	H-4	L. Scott Cram, Harry Crissman, Jean Forslund, Paul Horan, Paul Kraemer, Donald Petersen, Mudundi Raju, Angela Romero, Robert Tobey, and Ted Trujillo	
1972	Biological Applications of Cell Analysis and Sorting: Tumor Cell Identification and Separation	H-4	L. Scott Cram, Harry Crissman, Jean Forslund, Paul Horan, Paul Kraemer, Donald Petersen, Mudundi Raju, Angela Romero, Robert Tobey, and Ted Trujillo	
1972	Biological Applications of Cell Analysis and Sorting: Use of Flow Microfluorometry for Analysis and Evaluation of Synchronizing Protocols and Drug Effects on Cell-Cycle Traverse	H-4	L. Scott Cram, Harry Crissman, Jean Forslund, Paul Horan, Paul Kraemer, Donald Petersen, Mudundi Raju, Angela Romero, Robert Tobey, and Ted Trujillo	
1972	Cell Analysis and Sorting Instrumentation Development: A Dual-Parameter Cell Microphotometer	H-4	A. Brunsting, James Coulter, L. Scott Cram, John Horney, John Martin, Paul Mullaney, John Steinkamp, Marvin Van Dilla, and W. T. West	
1972	Cell Analysis and Sorting Instrumentation Development: Differential Light-Scattering Signatures of Mammalian Cells	H-4	A. Brunsting, James Coulter, L. Scott Cram, John Horney, John Martin, Paul Mullaney, John Steinkamp, Marvin Van Dilla, and W. T. West	
1972	Cell Analysis and Sorting Instrumentation Development: Multiparameter Cell Sorter	H-4	A. Brunsting, James Coulter, L. Scott Cram, John Horney, John Martin, Paul Mullaney, John Steinkamp, Marvin Van Dilla, and W. T. West	
1972	Chromosome Structure and Function: Band Analysis of the Chinese Hamster Cell Line CHO	H-4	Benjamin Barnhart, Carl Hildebrand, Larry Deaven, Richard Okinaka, Robert Tobey, Donald Petersen, Summers Cox, and Phyllis Sanders	
1972	Chromosome Structure and Function: DNA-Membrane Associations in Cultured Chinese Hamster Cells; Nature of the DNA-Membrane Association and Its Involvement in Temporal and Spatial Organization of DNA in the Nucleus	H-4	Benjamin Barnhart, Carl Hildebrand, Larry Deaven, Richard Okinaka, Robert Tobey, Donald Petersen, Summers Cox, and Phyllis Sanders	

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1972	Chromosome Structure and Function: Packaging of a Bacterial Virus Chromosome; A Model Supported by Reactivation of Radiation-Damaged Virus DNA	H-4	Benjamin Barnhart, Carl Hildebrand, Larry Deaven, Richard Okinaka, Robert Tobey, Donald Petersen, Summers Cox, and Phyllis Sanders	
1972	Chromosome Structure and Function: Repair of Radiation Damage, Derepression, and Replication of a Bacterial Virus Chromosome	H-4	Benjamin Barnhart, Carl Hildebrand, Larry Deaven, Richard Okinaka, Robert Tobey, Donald Petersen, Summers Cox, and Phyllis Sanders	
1972	Electronics Development: Amplifier with Base-Line Restoration	H-4	Millard Butler, L. J. Carr, and John Larkins	
1972	Electronics Development: Cell Separator and Counting Logics	H-4	Millard Butler, L. J. Carr, and John Larkins	
1972	Electronics Development: V2/3 Generator	H-4	Millard Butler, L. J. Carr, and John Larkins	
1972	Hot Particle Project: Experimental Conditions; Distribution of Spheres in the Lung by Microradiography of Hamster Lungs	H-4	Susan Carpenter, Laurence Holland, James Prine, Robert Wood, and L. E. Bryant	J. R. London, M-1 Group
1972	Karyology: Semi-Automatic Chromosome Analysis	H-4	Philip Dean	
1972	Mammalian Metabolism: Retention of Tin-113 in Mice after Oral, Intraperitoneal, and Intravenous Injection	H-4	Jerry London, Glessie Drake, Julie Wilson, and John Furchner	
1972	Mammalian Radiobiology: Biological Effects of Gamma-Ray Dose Protraction during Continuous Exposure with Fixed and Changing Dose Rates	H-4	John Spalding, Ruben Archuleta, Jerry London, and Ogden Johnson	
1972	Mammalian Radiobiology: Comparative Biological Effects of Radiation Dose Protraction in Dogs and Monkeys	H-4	John Spalding, Ruben Archuleta, Jerry London, and Ogden Johnson	
1972	Mammalian Radiobiology: Radiobiological Pilot Investigations for the Negative Pion Radiotherapy Program	H-4	Mudundi Raju, Ruben Archuleta, Laurence Holland, and John Spalding	
1972	Pion Beam Characteristics	H-4	Chaim Richman and W. D. Jinks	
1972	Radiation and Genetic Information Transfer: Effects of X-Irradiation on RNA Polymerase	H-4	David A. Smith, F. Newton Hayes, Aaron Martinez, V. E. Mitchell, Robert Ratliff, and Gary Strniste	
1972	Radiation and Genetic Information Transfer: Replication	H-4	David A. Smith, F. Newton Hayes, Aaron Martinez, V. E. Mitchell, Robert Ratliff, and Gary Strniste	

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1972	Radiation and Genetic Information Transfer: Ultraviolet-Induced Cross-Links between RNA Polymerase and DNA	H-4	David A. Smith, F. Newton Hayes, Aaron Martinez, V. E. Mitchell, Robert Ratliff, and Gary Strniste	
1972	Regulatory and Control Mechanisms in the Mammalian Cell Cycle: Detailed Analysis of Biochemical Events Associated with Mammalian DNA Replication	H-4	M. Duane Enger, Robert Tobey, Lawrence Gurley, Ronald Walters, Arthur Saponara, and Evelyn Campbell	
1972	Regulatory and Control Mechanisms in the Mammalian Cell Cycle: Informosomes in Cultured Chinese Hamster Cells; Cycloheximide-Mediated Polysome Superformation is Accompanied by Association of Informosomes with Ribosomes	H-4	M. Duane Enger, Robert Tobey, Lawrence Gurley, Ronald Walters, Arthur Saponara, and Evelyn Campbell	
1972	Regulatory and Control Mechanisms in the Mammalian Cell Cycle: Modified Bases of Mammalian RNA	H-4	M. Duane Enger, Robert Tobey, Lawrence Gurley, Ronald Walters, Arthur Saponara, and Evelyn Campbell	
1972	Surface Phenomena and Cellular Interaction: Flow Microfluorometric (FMF) Studies of Lectin Binding to Mammalian Cells	H-4	Paul Kraemer, Harry Crissman, and Marvin Van Dilla	
1972	Synthesis and Radiosensitivity of Model DNA: Chemical Synthesis of Oligodeoxyribonucleotides	H-4	F. Newton Hayes; David Williams; Robert Ratliff; Charles Delisi; Georgia Fritz; Walter Goad, Jr.; Donald Hoard; Ulrich Hollstein; Elmo Martinez, Jr.; V. E. Mitchell; and Esther Wilmoth	
1972	Synthesis and Radiosensitivity of Model DNA: Numerical Analysis of Gel Permeation Chromatograms	H-4	F. Newton Hayes; David Williams; Robert Ratliff; Charles Delisi; Georgia Fritz; Walter Goad, Jr.; Donald Hoard; Ulrich Hollstein; Elmo Martinez, Jr.; V. E. Mitchell; and Esther Wilmoth	
1972–1973	Animal Colony Activities: Pathology	H-4	James Prine, Susan Carpenter, Robert Wood, Laurence Holland, Patricia LaBauve, Jerry London, and Julie Wilson	
1972–1973	Hot Particle Project: Dosimetry	H-4	Ernest Anderson, Philip Dean, and D. M. Matsakis	H. J. Trussel, C-5 Group, and M-2 Group

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1973	Biological Application of Flow Microfluorometry and Cell Sorting: Age Distribution Studies of EMT6 Tumor Cells in vivo and in vitro Using FMF Instrumentation	H-10	L. Scott Cram, Harry Crissman, Paul Horan, Jean Forslund, Mudundi Raju, Ted Trujillo, John Steinkamp, Elva Clinard, and Mary Louise Bartlett	
1973	Biological Application of Flow Microfluorometry and Cell Sorting: Application of FMF Instrumentation and Cell Sorting to Problems in Radiation Biology Related to Radiotherapy	H-10	L. Scott Cram, Harry Crissman, Paul Horan, Jean Forslund, Mudundi Raju, Ted Trujillo, John Steinkamp, Elva Clinard, and Mary Louise Bartlett	
1973	Biological Application of Flow Microfluorometry and Cell Sorting: Flow Microfluorometric Analysis and Evaluation of the Effects of Several Chemical Agents on Cell-Cycle Progression	H-10	L. Scott Cram, Harry Crissman, Paul Horan, Jean Forslund, Mudundi Raju, Ted Trujillo, John Steinkamp, Elva Clinard, and Mary Louise Bartlett	
1973	Biological Application of Flow Microfluorometry and Cell Sorting: Purification of Viral Antigens	H-10	L. Scott Cram, Harry Crissman, Paul Horan, Jean Forslund, Mudundi Raju, Ted Trujillo, John Steinkamp, Elva Clinard, and Mary Louise Bartlett	
1973	Biological Application of Flow Microfluorometry and Cell Sorting: Quantitative Evaluation of Fluorescent Conjugates	H-10	L. Scott Cram, Harry Crissman, Paul Horan, Jean Forslund, Mudundi Raju, Ted Trujillo, John Steinkamp, Elva Clinard, and Mary Louise Bartlett	U.S. Department of Agriculture, Washington, D.C.
1973	Biological Application of Flow Microfluorometry and Cell Sorting: Quantitative Measurement of SV-40 T-Antigen	H-10	L. Scott Cram, Harry Crissman, Paul Horan, Jean Forslund, Mudundi Raju, Ted Trujillo, John Steinkamp, Elva Clinard, and Mary Louise Bartlett	
1973	Biological Application of Flow Microfluorometry and Cell Sorting: Radiation Studies Involving Tumor Cells	H-10	L. Scott Cram, Harry Crissman, Paul Horan, Jean Forslund, Mudundi Raju, Ted Trujillo, John Steinkamp, Elva Clinard, and Mary Louise Bartlett	
1973	Biological Application of Flow Microfluorometry and Cell Sorting: Rapid, Differential Diagnosis of Newcastle Disease Virus	H-10	L. Scott Cram, Harry Crissman, Paul Horan, Jean Forslund, Mudundi Raju, Ted Trujillo, John Steinkamp, Elva Clinard, and Mary Louise Bartlett	

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1973	Biological Application of Flow Microfluorometry and Cell Sorting: Sensitivity of Tumor Cell Detection	H-10	L. Scott Cram, Harry Crissman, Paul Horan, Jean Forslund, Mudundi Raju, Ted Trujillo, John Steinkamp, Elva Clinard, and Mary Louise Bartlett	
1973	Biological Application of Flow Microfluorometry and Cell Sorting: Soluble Antigen/Fluorescent Antibody Test for Detection of Antibodies to Trichinella spiralis and Hog Cholera Virus in Hog Sera	H-10	L. Scott Cram, Harry Crissman, Paul Horan, Jean Forslund, Mudundi Raju, Ted Trujillo, John Steinkamp, Elva Clinard, and Mary Louise Bartlett	
1973	Cell Staining and Preparation: Comparison and Evaluation of Dyes for Staining the DNA and Protein of Cells in Suspension	H-10	Harry Crissman, Angela Romero, Paul Horan, and Ted Trujillo	
1973	Cell Staining and Preparation: Dispersal of Gynecological Material	H-10	Harry Crissman, Angela Romero, Paul Horan, and Ted Trujillo	
1973	Data Processing: Analytic Support	H-10	James Jett and Philip Dean	
1973	Data Processing: Automatic Data Processing	H-10	James Jett and Philip Dean	
1973	Data Processing: Karyology; Semi-Automatic Chromosome Analysis	H-10	James Jett and Philip Dean	
1973	Instrumentation and Bioengineering: A Potential Sensing Technique for Cell Volume Measurement	H-10	John Steinkamp, John Martin, Paul Mullaney, W. T. West, John Horney, Gary Salzman, John Crowell, James Perrings, L. J. Carr, John Larkins, and Millard Butler	
1973	Instrumentation and Bioengineering: Cell Sorter Advances	H-10	John Steinkamp, John Martin, Paul Mullaney, W. T. West, John Horney, Gary Salzman, John Crowell, James Perrings, L. J. Carr, John Larkins, and Millard Butler	
1973	Instrumentation and Bioengineering: Light-Scattering Studies	H-10	John Steinkamp, John Martin, Paul Mullaney, W. T. West, John Horney, Gary Salzman, John Crowell, James Perrings, L. J. Carr, John Larkins, and Millard Butler	
1973	Pion Radiobiology and Associated Dosimetry: Pion Beam Characteristics of Instrumentation for the Negative Pion Radiotherapy Program	H-10	Mudundi Raju, Chaim Richman, James Jett, and James Blossom	
1973	Pion Radiobiology and Associated Dosimetry: Preliminary Experiments in Radiation Biology Related to the Pretherapeutic Negative Pion Program	H-10	Mudundi Raju, Chaim Richman, James Jett, and James Blossom	

Year(s)	Investigation Title	Lead Group	HRL Personnel/Author(s)	Collaborator(s)
1973	Pion Radiobiology and Associated Dosimetry: Relative Biological Effectiveness and Oxygen Enhancement Ratio Measurements for Mixed Alpha-Particle and X-Ray Exposure	H-10	Mudundi Raju, Chaim Richman, James Jett, and James Blossom	
1973	Pion Radiobiology and Associated Dosimetry: Stage Sensitivity of CHO Cells to Alpha Particles and X Rays	H-10	Mudundi Raju, Chaim Richman, James Jett, and James Blossom	
1973	Applications of Stable Isotopes: Clinical, Pharmacological, Metabolic, and Biochemical Studies	H-11	Charles Gregg, Judith Hutson, Vernon Kerr, Victor Kollman, Donald Ott, Tomas Sanchez, and Thomas Whaley	W. W. Shreeve, Veterans Administration Hospital, Northport, New York, and State University of New York, Stonybrook
1973	Applications of Stable Isotopes: Environmental, Chemical, and Other Applications	H-11	Charles Gregg, Judith Hutson, Vernon Kerr, Victor Kollman, Donald Ott, Tomas Sanchez, and Thomas Whaley	W. W. Shreeve, Veterans Administration Hospital, Northport, New York, and State University of New York, Stonybrook
1973	Preparation of Compounds Labeled with Stable Isotopes: Carbon-13 and Carbon-12 Labeled Amino Acids	H-11	Enrigue Adame, Manuel Gonzales, Charles Gregg, John Hanners, Judith Hutson, Vernon Kerr, Victor Kollman, D. W. Montoya, M. A. Nevarez, Donald Ott, Tomas Sanchez, and Thomas Whaley	Guido Daub, University of New Mexico, Albuquerque, and E. S. Olsen, South Dakota State University, Brookings
1973	Preparation of Compounds Labeled with Stable Isotopes: Carbon-13 and Carbon-12 Labeled Lipids	H-11	Enrigue Adame, Manuel Gonzales, Charles Gregg, John Hanners, Judith Hutson, Vernon Kerr, Victor Kollman, D. W. Montoya, M. A. Nevarez, Donald Ott, Tomas Sanchez, and Thomas Whaley	Guido Daub, University of New Mexico, Albuquerque, and E. S. Olsen, South Dakota State University, Brookings
1973	Preparation of Compounds Labeled with Stable Isotopes: Carbon-13 and Carbon-12 Labeled Nucleotides	H-11	Enrigue Adame, Manuel Gonzales, Charles Gregg, John Hanners, Judith Hutson, Vernon Kerr, Victor Kollman, D. W. Montoya, M. A. Nevarez, Donald Ott, Tomas Sanchez, and Thomas Whaley	Guido Daub, University of New Mexico, Albuquerque, and E. S. Olsen, South Dakota State University, Brookings
1973	Preparation of Compounds Labeled with Stable Isotopes: Discussion of Methods and Results	H-11	Enrigue Adame, Manuel Gonzales, Charles Gregg, John Hanners, Judith Hutson, Vernon Kerr, Victor Kollman, D. W. Montoya, M. A. Nevarez, Donald Ott, Tomas Sanchez, and Thomas Whaley	Guido Daub, University of New Mexico, Albuquerque, and E. S. Olsen, South Dakota State University, Brookings

Year(s)	Investigation Title	Lead Group	HRL Personnel/Author(s)	Collaborator(s)
1973	Preparation of Compounds Labeled with Stable Isotopes: Miscellaneous Products and Intermediates	H-11	Enrigue Adame, Manuel Gonzales, Charles Gregg, John Hanners, Judith Hutson, Vernon Kerr, Victor Kollman, D. W. Montoya, M. A. Nevarez, Donald Ott, Tomas Sanchez, and Thomas Whaley	Guido Daub, University of New Mexico, Albuquerque, and E. S. Olsen, South Dakota State University, Brookings
1973	Effects of External Radiation on Living Organisms Comparative Hematopoietic Effects of Dose Protraction by Fractionation in Beagles and Macaca mulatta Monkeys	H-4	John Spalding, Laurence Holland, Patricia LaBauve, Jerry London, James Prine, and Ogden Johnson	
1973	Effects of External Radiation on Living Organisms: Recovery and Residual Injury Observations [Equivalent Residual Dose (ERD) Assumptions]	H-4	John Spalding, Laurence Holland, Patricia LaBauve, Jerry London, James Prine, and Ogden Johnson	
1973	Effects of External Radiation on Living Organisms: Recovery Rate and Persistent Injury in Monkeys Given Large Doses of Gamma Rays by Fractionation	H-4	John Spalding, Laurence Holland, Patricia LaBauve, Jerry London, James Prine, and Ogden Johnson	
1973	Hot Particle Project: Computer Support	H-4	Ernest Anderson and Philip Dean	
1973	Hot Particle Project: Microradiography	H-4	Susan Carpenter, Laurence Holland, James Prine, Robert Wood, and L. E. Bryant	J. R. London, M-1 Group
1973	Hot Particle Project: Survival Curves	H-4	Ernest Anderson, Philip Dean, Glessie Drake, Laurence Holland, Jerry London, and Julie Wilson	
1973	Mammalian Metabolism: Disposition of Cesium-137 during Potassium Depletion in Rats	H-4	John Furchner and Glessie Drake	
1973	Mammalian Metabolism: Retention of Arsenic-74 after Oral, Intraperitoneal, and Intravenous Infection in Rats	H-4	John Furchner and Glessie Drake	
1973	Cellular Metabolism: Effects of Physical and Chemical Agents upon Chromatin and the Mitotic Apparatus	H-9	George Shepherd, Billie Noland, and Julia Hardin	
1973	Cellular Metabolism: Modification of Deoxyribonucleic Acid	H-9	Arthur Saponara and Carl Hildebrand	
1973	Cellular Metabolism: Sequential Biochemical Events in Preparation for DNA Replication and Mitosis	H-9	Lawrence Gurley, Carl Hildebrand, Paul Kraemer, Robert Ratliff, Robert Tobey, Ronald Walters, Joseph Valdez, and Evelyn Campbell	

Year(s)	Investigation Title	Lead Group	HRL Personnel/Author(s)	Collaborator(s)
1973	Cytogenetics: Chromosome G-Banding and DNA Constancy in Aneuploid Cell Populations	H-9	Larry Deaven, Phyllis Sanders, Julie Grilly, and Donald Petersen	
1973	Microbial Studies: Derepression and Inactivation of a Bacterial-Virus Chromosome in the Lysogenic State	H-9	Benjamin Barnhart and Summers Cox	
1973	Microbial Studies: The Development of Bacterial Virus HP1c1 after Ultraviolet Induction	H-9	Benjamin Barnhart, Richard Okinaka, and Summers Cox	
1973	Studies with Model DNA Polymers: High Pressure Liquid Chromatography of Nucleic Acid Derivatives	H-9	Georgia Fritz	
1973	Studies with Model DNA Polymers: Kinetics of Radiation Damage by Radicals	H-9		W. B. Goad, Theoretical Division
1973	Studies with Model DNA Polymers: Ultraviolet-Induced Cross-Links between RNA Polymerase and DNA	H-9	Gary Strniste, Aaron Martinez, V. E. Mitchell, and David A. Smith	
1973	The Cell Surface: High Molecular-Weight Heparan Sulfate from the Cell Surface	H-9	Paul Kraemer and David A. Smith	
1973	The Cell Surface: Mathematical Models for Immunologic Phenomena	H-9	Charles Delisi, G. Siskind, and B. Goldstein	George Bell, Theoretical Division
1973–1974	Pion Radiobiology and Associated Dosimetry: Cell Survival Measurements as a Function of Depth	H-10	Mudundi Raju, Chaim Richman, James Jett, James Blossom, Ted Trujillo, and Elvira Bain	J. Dicello, MP-3 Group
1973–1974	Cellular Metabolism: Modification of Ribonucleic Acids	H-9	Arthur Saponara, M. Duane Enger, and John Hanners	
1973–1974	Studies with Model DNA Polymers: Chemical Synthesis of Oligodeoxyribonucleotides	H-9	David Williams and Elmo Martinez, Jr.	
1973–1974	Studies with Model DNA Polymers: Effects of X Irradiation of DNA on Transcription	H-9	David A. Smith and Aaron Martinez	
1973–1974	Studies with Model DNA Polymers: Radiation Chemistry of Models for DNA	H-9	F. Newton Hayes, Donald Hoard, Esther Wilmoth, and V. E. Mitchell	
1974	Biological and Medical Applications of Flow-Systems Cell Analysis and Sorting Instrumentation: A New Method for Measurement of Nuclear and Cytoplasmic Size in Individual Mammalian Cells	H-10	L. Scott Cram, Harry Crissman, John Steinkamp, Melvin Oka, Paul Horan, Angela Romero, and Jean Forslund	

Year(s)	Investigation Title	Lead Group	HRL Personnel/Author(s)	Collaborator(s)
1974	Biological and Medical Applications of Flow-Systems Cell Analysis and Sorting Instrumentation: Analysis of Chlorophyll Fluorescence in Algae by Flow Microfluorometry	H-10	L. Scott Cram, Harry Crissman, John Steinkamp, Melvin Oka, Paul Horan, Angela Romero, and Jean Forslund	
1974	Biological and Medical Applications of Flow-Systems Cell Analysis and Sorting Instrumentation: Effects of Culture Conditions on Chinese Hamster DNA Content and Cell-Cycle Traverse	H-10	L. Scott Cram, Harry Crissman, John Steinkamp, Melvin Oka, Paul Horan, Angela Romero, and Jean Forslund	
1974	Biological and Medical Applications of Flow-Systems Cell Analysis and Sorting Instrumentation: Immunological Investigations	H-10	L. Scott Cram, Harry Crissman, John Steinkamp, Melvin Oka, Paul Horan, Angela Romero, and Jean Forslund	
1974	Biological and Medical Applications of Flow-Systems Cell Analysis and Sorting Instrumentation: Lymphocyte Stimulation with Specific Mitogens	H-10	L. Scott Cram, Harry Crissman, John Steinkamp, Melvin Oka, Paul Horan, Angela Romero, and Jean Forslund	
1974	Biological and Medical Applications of Flow-Systems Cell Analysis and Sorting Instrumentation: Newcastle Disease Virus (NDV)	H-10	L. Scott Cram, Harry Crissman, John Steinkamp, Melvin Oka, Paul Horan, Angela Romero, and Jean Forslund	
1974	Biological and Medical Applications of Flow-Systems Cell Analysis and Sorting Instrumentation: Simultaneous Analysis of DNA Content and Cell Volume in Cells Treated with a Chemotherapeutic Agent	H-10	L. Scott Cram, Harry Crissman, John Steinkamp, Melvin Oka, Paul Horan, Angela Romero, and Jean Forslund	
1974	Biological and Medical Applications of Flow-Systems Cell Analysis and Sorting Instrumentation: Sorting and Autoradiographic Analysis of 3H-Thymidine Labeled Cells	H-10	L. Scott Cram, Harry Crissman, John Steinkamp, Melvin Oka, Paul Horan, Angela Romero, and Jean Forslund	
1974	Development of Cell Staining and Preparational Techniques Suitable for Use with Flow-Systems Instruments: Cell Dispersal	H-10	Harry Crissman, Paul Horan, and Angela Romero	
1974	Development of Cell Staining and Preparational Techniques Suitable for Use with Flow-Systems Instruments: Staining Methods Specific for Cellular DNA and Protein	H-10	Harry Crissman, Paul Horan, and Angela Romero	

Year(s)	Investigation Title	Lead Group	HRL Personnel/Author(s)	Collaborator(s)
1974	Development of Flow-Systems Instrumentation for Rapid Cell Analysis and Sorting: Advanced Flow Cell Development	H-10	Gary Salzman, John Crowell, John Martin, John Steinkamp, Paul Mullaney, Millard Butler, James Jett, and Christopher Goad	
1974	Development of Flow-Systems Instrumentation for Rapid Cell Analysis and Sorting: Multiangle Laser Light Scattering from Biological Cells in Fast Flow Systems	H-10	Gary Salzman, John Crowell, John Martin, John Steinkamp, Paul Mullaney, Millard Butler, James Jett, and Christopher Goad	
1974	Development of Flow-Systems Instrumentation for Rapid Cell Analysis and Sorting: Potential Sensing Technique	H-10	Gary Salzman, John Crowell, John Martin, John Steinkamp, Paul Mullaney, Millard Butler, James Jett, and Christopher Goad	
1974	Development of Flow-Systems Instrumentation for Rapid Cell Analysis and Sorting: Sorter Improvements	H-10	Gary Salzman, John Crowell, John Martin, John Steinkamp, Paul Mullaney, Millard Butler, James Jett, and Christopher Goad	
1974	Electronic Computer and Other Support for the LASL Biomedical Program: A Clustering Algorithm for Multiparameter Data Reduction	H-10	James Jett, Christopher Goad, John Larkins, James Perrings, and Philip Dean	
1974	Physical Dosimetry and Radiobiology Studies at LAMPF: Age-Response of Line CHO Cells to X-Irradiation and Alpha Particles from Plutonium	H-10	Mudundi Raju, Chaim Richman, Ted Trujillo, James Jett, Ronald Walters, and Robert Tobey	
1974	Physical Dosimetry and Radiobiology Studies at LAMPF: Cell Survival Curves	H-10	Mudundi Raju, Ted Trujillo, and Elvira Bain	J. Dicello, MP-3 Group
1974	Physical Dosimetry and Radiobiology Studies at LAMPF: Response of Normal Skin (Mouse Foot) to Fractionated Doses of X-Irradiation	H-10	Mudundi Raju, Susan Carpenter, J. Farr, Laurence Holland, Ogden Johnson, Claudine Kasunic, and P. Larragoite	
1974	Biomedical Applications of Stable Isotopes: Biochemical Studies	H-11		
1974	Biomedical Applications of Stable Isotopes: Clinical Studies	H-11		
1974	Biomedical Applications of Stable Isotopes: Pharmacological Studies	H-11		
1974	Biosynthesis and Carbon-13 Nuclear Magnetic Resonance Characterization of Labeled Cells	H-11		

Year(s)	Investigation Title	Lead Group	HRL Personnel/Author(s)	Collaborator(s)
1974	Carbon-13 Nuclear Magnetic Resonance Analysis of Biosynthesized Molecules: Photosynthetic Incorporation of Carbon Dioxide into Galactosylglycerol by Red Algae	H-11		
1974	Carbon-13 Nuclear Magnetic Resonance Analysis of Biosynthesized Molecules: The Formation of Lactate by Glycolysis	H-11		
1974	Preparation of Labeled Compounds	H-11		
1974	Effects of Ionizing Radiation from External Sources on Living Organisms: A Population Monitor on the Possible Genetic Impact of Whole-Body Exposure to X-Irradiation to Successive Generations of Mammals	H-4	John Spalding, Laurence Holland, Patricia LaBauve, Jerry London, James Prine, Ogden Johnson, and Mary Brooks	
1974	Effects of Ionizing Radiation from External Sources on Living Organisms: Comparative Response of Monkeys and Dogs to Dose Protraction by Fractionation and Continuous Low Dose-Rate Exposure	H-4	John Spalding, Laurence Holland, Patricia LaBauve, Jerry London, James Prine, Ogden Johnson, and Mary Brooks	
1974	Effects of Ionizing Radiation from External Sources on Living Organisms: Recovery Rate and Life Reduction in Mice Exposed to Gamma-Ray Fractionation at Different Dose Levels	H-4	John Spalding, Laurence Holland, Patricia LaBauve, Jerry London, James Prine, Ogden Johnson, and Mary Brooks	
1974	Effects of Ionizing Radiation from External Sources on Living Organisms: The General Site of Origin of the Persistent Radiation Lesion	H-4	John Spalding, Laurence Holland, Patricia LaBauve, Jerry London, James Prine, Ogden Johnson, and Mary Brooks	
1974	Hot Particle Project: Effects of Internal Radiation on Living Organisms; Mean Survival Times	H-4	Ernest Anderson, Susan Carpenter, Glessie Drake, Laurence Holland, Jerry London, James Perrings, James Prine, David M. Smith, Julie Wilson, and Robert Wood	
1974	Hot Particle Project: Effects of Internal Radiation on Living Organisms; Microsphere Experiments	H-4	Ernest Anderson, Susan Carpenter, Glessie Drake, Laurence Holland, Jerry London, James Perrings, James Prine, David M. Smith, Julie Wilson, and Robert Wood	

Year(s)	Investigation Title	Lead Group	HRL Personnel/Author(s)	Collaborator(s)
1974	Hot Particle Project: Effects of Internal Radiation on Living Organisms; Other Microsphere Experiments	H-4	Ernest Anderson, Susan Carpenter, Glessie Drake, Laurence Holland, Jerry London, James Perrings, James Prine, David M. Smith, Julie Wilson, and Robert Wood	
1974	Hot Particle Project: Effects of Internal Radiation on Living Organisms; Pathology	H-4	Ernest Anderson, Susan Carpenter, Glessie Drake, Laurence Holland, Jerry London, James Perrings, James Prine, David M. Smith, Julie Wilson, and Robert Wood	
1974	Hot Particle Project: Effects of Internal Radiation on Living Organisms; Polonium-210 Experiments	H-4	Ernest Anderson, Susan Carpenter, Glessie Drake, Laurence Holland, Jerry London, James Perrings, James Prine, David M. Smith, Julie Wilson, and Robert Wood	John Little, Harvard University School of Public Health, Boston, Massachusetts
1974	Hot Particle Project: Effects of Internal Radiation on Living Organisms; Radiation Standards for "Hot Particles"	H-4	Ernest Anderson, Susan Carpenter, Glessie Drake, Laurence Holland, Jerry London, James Perrings, James Prine, David M. Smith, Julie Wilson, and Robert Wood	
1974	Mammalian Metabolism: Cesium-137 Body Burden in Potassium-Depleted Rats	H-4	John Furchner and Glessie Drake	
1974	Mammalian Metabolism: Estimate of Radiation Protection Guides for Selenium-75	H-4	John Furchner, Jerry London, and Julie Wilson	
1974	Mammalian Metabolism: Modification of the Oral Absorption of Barium	H-4	John Furchner and Glessie Drake	
1974	Cellular Metabolism: Cell-Cycle-Specific Changes in the Organization of Chromatin in Mammalian Nuclei	H-9	Carl Hildebrand and Robert Tobey	
1974	Cellular Metabolism: Effects of X-Irradiation on DNA Precursor Metabolism and Deoxyribonucleoside Triphosphate Pools in Chinese Hamster Cells	H-9	Ronald Walters, Lawrence Gurley, Robert Tobey, M. Duane Enger, and Robert Ratliff	
1974	Cellular Metabolism: Messenger-Related RNA Metabolism in Cultured Chinese Hamster Cells	H-9	M. Duane Enger, Evelyn Campbell, and John Hanners	
1974	Cellular Metabolism: Unique Techniques for Cell-Cycle Analysis Utilizing Mithramycin and Flow Microfluorometry	H-9	Robert Tobey, Melvin Oka, and Harry Crissman	

Year(s)	Investigation Title	Lead Group	HRL Personnel/Author(s)	Collaborator(s)
1974	Cytogenetics: The Nature of Chromosome Instability in Heteroploid Cell Populations	H-9	Larry Deaven, Phyllis Sanders, Priscilla Jose, and Donald Petersen	
1974	Microbial Studies: Increased Frequencies of Lysogeny in Heavily Ultraviolet Irradiated Populations of Temperate Bacteriophage	H-9	Benjamin Barnhart and Summers Cox	
1974	Microbial Studies: The Development of Bacterial Virus HP1c1 after Ultraviolet Induction of Temperature-Sensitive Mutants of Phage HP1c1	H-9	Benjamin Barnhart, Richard Okinaka, and Summers Cox	
1974	Studies with Model DNA Polymers: Buoyant Densities Considered as Sequence-Dependent Properties	H-9	Robert Ratliff and David A. Smith	
1974	Studies with Model DNA Polymers: Circular Dichroism Spectra of Synthetic Polynucleotides	H-9	Robert Ratliff and David A. Smith	
1974	The Cell Surface: Population Analysis of Arrested Human Diploid Fibroblasts by Flow Microfluorometry	H-9	Paul Kraemer	
1974–1975	Cellular Metabolism: The Involvement of Histone Phosphorylation with Cell Proliferation, DNA Replication, and Chromosome Condensation	H-9	Lawrence Gurley, Ronald Walters, Robert Tobey, Joseph Valdez, John Hanners, Phyllis Sanders, and Joseph D'Anna	
1975	Biological and Medical Applications of Flow-Systems Cell Analysis and Sorting Instrumentation: Analysis of DNA and Protein in Cells from Ascites and Solid Tumor Systems of Mice	H-10	L. Scott Cram, Harry Crissman, John Steinkamp, Melvin Oka, Marylou Ingram, and Jean Forslund	
1975	Biological and Medical Applications of Flow-Systems Cell Analysis and Sorting Instrumentation: Isolation and Characterization of Human Blood Monocytes	H-10	L. Scott Cram, Harry Crissman, John Steinkamp, Melvin Oka, Marylou Ingram, and Jean Forslund	
1975	Biological and Medical Applications of Flow-Systems Cell Analysis and Sorting Instrumentation: Spectral Characterization and Evaluation of Fluorochrome for Use in Multiple Staining and Analysis of Mammalian Cells	H-10	L. Scott Cram, Harry Crissman, John Steinkamp, Melvin Oka, Marylou Ingram, and Jean Forslund	
1975	Development of Flow-Systems Instrumentation for Rapid Cell Analysis and Sorting: A Flow-System Multiangle Light-Scattering Photometer	H-10	Gary Salzman, John Crowell, John Martin, John Steinkamp, Paul Mullaney, Millard Butler, James Jett, and Christopher Goad	

Appendix C: Health Research Laboratory–Led Investigations from 1953 to 1986

Year(s)	Investigation Title	Lead Group	HRL Personnel/Author(s)	Collaborator(s)
1975	Development of Flow-Systems Instrumentation for Rapid Cell Analysis and Sorting: An Improved Light-Collection System for FMF Cell-Analysis Instruments	H-10	Gary Salzman, John Crowell, John Martin, John Steinkamp, Paul Mullaney, Millard Butler, James Jett, and Christopher Goad	
1975	Development of Flow-Systems Instrumentation for Rapid Cell Analysis and Sorting: Development and Application of a New Flow-System Technique for Rapid Measurement of Nuclear and Cytoplasmic Size in Mammalian Cells	H-10	Gary Salzman, John Crowell, John Martin, John Steinkamp, Paul Mullaney, Millard Butler, James Jett, and Christopher Goad	
1975	Physical Dosimetry and Radiobiology Studies: Application of FMF to Radiobiological Problems Related to Radiotherapy	H-10	Mudundi Raju, Ted Trujillo, Elvira Bain, J. Paul Frank, Chaim Richman, and James Blossom	
1975	Physical Dosimetry and Radiobiology Studies: Characteristics of a Negative Pion Beam for the Irradiation of Superficial Nodules in Cancer Patients	H-10	Mudundi Raju, Ted Trujillo, Elvira Bain, J. Paul Frank, Chaim Richman, and James Blossom	
1975	Non-Radioactive Biomedical and Environmental Tracers: Stable Isotopes	H-11		
1975	Effects of Ionizing Radiation from External Sources on Living Organisms: Delayed Radiation Injury from Partial-Body X-Ray Exposures	H-4	John Spalding, Jerry London, Ogden Johnson, and James Prine	
1975	Effects of Ionizing Radiation from External Sources on Living Organisms: Life Shortening, Histopathological and Chromosomal Damage as Criteria for Assessment of the Impact of Various Irradiation Conditions in the Mouse	H-4	John Spalding, Jerry London, Ogden Johnson, and James Prine	
1975	Hot Particle Program: Effects of Internal Radiation on Living Organisms: The Pathology of Focal and Diffuse Irradiation of the Lung	H-4	Ernest Anderson, Laurence Holland, James Prine, David M. Smith, Susan Carpenter, Glessie Drake, Jerry London, Julie Wilson, and Robert Thomas	
1975	Hot Particle Program: Effects of Internal Radiation on Living Organisms: Tumorigenicity of Intratracheal Microsphere	H-4	Ernest Anderson, Laurence Holland, James Prine, David M. Smith, Susan Carpenter, Glessie Drake, Jerry London, Julie Wilson, and Robert Thomas	

Year(s)	Investigation Title	Lead Group	HRL Personnel/Author(s)	Collaborator(s)
1975	Hot Particle Program: Effects of Internal Radiation on Living Organisms: Tumorigenicity of Intravenous Microsphere	H-4	Ernest Anderson, Laurence Holland, James Prine, David M. Smith, Susan Carpenter, Glessie Drake, Jerry London, Julie Wilson, and Robert Thomas	
1975	Mammalian Metabolism: Retention Patterns of Potential Environmental Toxicants	H-4	John Furchner, Robert Thomas, Glessie Drake, Jerry London, and Julie Wilson	
1975	Cellular Metabolism: Effects of Energy-Related Physical and Chemical Carcinogens and Mutagens on Chromatin Structure and Function	H-9	Gary Strniste, George Shepherd, Julia Hardin, and J. C. Rall	
1975	Cellular Metabolism: Effects of Nuclear and Non-Nuclear Pollutant on Gene Expression in Mammalian Cells; The Necessity of an Integrated, Broad-Based Program of Basic and Applied Research	H-9	M. Duane Enger, Evelyn Campbell, Preston Ritter, Carl Hildebrand, and John Hanners	
1975	Cellular Metabolism: Evidence that X Irradiation Inhibits DNA Replicon Interaction in Chinese Hamster Cells	H-9	Ronald Walters, Carl Hildebrand, and John Hanners	
1975	Cellular Metabolism: Kinetic and Biochemical Effects of Hazardous Agents on Cell Proliferation Capacity	H-9	Robert Tobey, Melvin Oka, Harry Crissman, and Linda Ferzoco	
1975	Cellular Metabolism: Mathematical Models of the Immune Response	H-9	George Bell and Alan Perelson	
1975	Cellular Metabolism: Organization of DNA in the Mammalian Nucleus during the Cell Division Cycle	H-9	Carl Hildebrand, Robert Tobey, Lawrence Gurley, and Richard Okinaka	
1975	Cellular Metabolism: Structure of Nucleic Acids	H-9	Arthur Saponara, M. Duane Enger, and John Hanners	
1975	Cytogenetics: Rapid Karyotype Analysis with Flow Systems	H-9	Larry Deaven, Phyllis Sanders, and Linda Ferzoco	
1975	Microbial Studies: Biochemical Genetics	H-9	Benjamin Barnhart, Summers Cox, Richard Okinaka, and Paul Kraemer	
1975	Studies with Model DNA Polymers: Physico-Chemical Measurement of the Effect of X Irradiation on Model DNAs	H-9	F. Newton Hayes; Donald Hoard; David Williams; Elmo Martinez, Jr.; V. E. Mitchell; and Esther Wilmoth	
1975	Studies with Model DNA Polymers: The Influence of Base Sequences in Synthetic DNAs on Transcription by RNA Polymerase	H-9	David A. Smith and Aaron Martinez	

Year(s)	Investigation Title	Lead Group	HRL Personnel/Author(s)	Collaborator(s)
1975, 1978	Hot Particle Program: Effects of Internal Radiation on Living Organisms: Tumorigenicity of Intratracheal Polonium-210 Sols	H-4	Ernest Anderson, Laurence Holland, James Prine, David M. Smith, Susan Carpenter, Glessie Drake, Jerry London, Julie Wilson, and Robert Thomas	
1975–1976	Cellular Metabolism: Pollutants and Genetic Information Transfer	H-9	Robert Ratliff, David A. Smith, and Aaron Martinez	
1975–1976	The Cell Surface: Properties of the Cell Surface	H-9	Paul Kraemer, Maria Da Silva, and Benjamin Barnhart	
1976	Biological Applications of the Multiangle Light-Scattering Flow System: A High-Efficiency Flow Cytometer	H-10	Mary Jane Skogen-Hagenson	
1976	Biological Applications of the Multiangle Light-Scattering Flow System: Classification of Microalgal Species	H-10	Brandon Price, Victor Kollman, and Gary Salzman	
1976	Biological Applications of the Multiangle Light-Scattering Flow System: Evaluation of the Dose-Effect Relationship for the Immune Response to Biologically Active Agents Associated with Oil Shale Technology	H-10	Mark Wilder and L. Scott Cram	
1976	Biological Applications of the Multiangle Light-Scattering Flow System: Identification of Human Abnormal Erythrocyte Morphologies	H-10	Brandon Price, Marylou Ingram, and Gary Salzman	
1976	Cell Preparation: Flow Microfluorometric Analysis and Characterization of Protein Contents and Proliferating Kinetics in Ascites and Solid Tumors	H-10	Harry Crissman, Richard Kissane, and Anita Stevenson	
1976	Cell Preparation: Spectrophotofluorometric and Flow Microfluorometric Analysis of DNA Staining in Mammalian Cells Using Fluorescent Antibiotics	H-10	Harry Crissman, Richard Kissane, and Anita Stevenson	
1976	Development of Flow-Systems Instrumentation for Rapid Cell Analysis And Sorting: Analytical Support for Flow Systems and Other Research Activities	H-10	James Jett, Douglas Jackson, and John Crowell	
1976	Development of Flow-Systems Instrumentation for Rapid Cell Analysis And Sorting: Flow Analysis and Separation of Respiratory Cells; Preliminary Characterization Studies in Hamsters	H-10	John Steinkamp, Karen Hansen, Julie Wilson, and Gary Salzman	

Year(s)	Investigation Title	Lead Group	HRL Personnel/Author(s)	Collaborator(s)
1976	Physical Dosimetry and Radiobiology Studies: Flow Cytophotometry in Radiobiology	H-10	Mudundi Raju, Robert Cox, Brandon Price, and Gary Salzman	
1976	Physical Dosimetry and Radiobiology Studies: Heavy Particles in Radiotherapy; A Comparative Study	H-10	Mudundi Raju, Elvira Bain, Susan Carpenter, Robert Cox, and James Robertson	Howard Amols, MP-3 Group, and National Cancer Institute, Bethesda, Maryland
1976	Applications of Stable Isotopes: Biochemical Applications	H-11	Thomas Whaley	
1976	Applications of Stable Isotopes: Biological Effects of Stable Isotopes	H-11	Charles Gregg	
1976	Applications of Stable Isotopes: Clinical Applications	H-11	Charles Gregg	
1976	Synthesis of Labeled Compounds: Biochemical Synthesis of Labeled Compounds	H-11	Victor Kollman	
1976	Synthesis of Labeled Compounds: Organic Synthesis of Labeled Compounds	H-11	Thomas Whaley	
1976	External Irradiation: Chromosome Aberrations of Mouse Blood Lymphocytes Following Protracted Irradiation with 60Co	H-4	Agnes Stroud and John Spalding	
1976	External Irradiation: Partial-Body Irradiation of Mice	H-4	John Spalding, Jerry London, James Prine, David M. Smith, and Ruben Archuleta	
1976	Hot Particle Program: Adjuncts; Combined Inhalation and Injection	H-4	Robert Thomas, David M. Smith, and James Prine	Marvin Tillery, H-5 Group
1976	Hot Particle Program: Adjuncts; Ferric oxide and Pu/ZrO2-Induced Pulmonary Carcinogenesis	H-4	David M. Smith	
1976	Hot Particle Program: Adjuncts; Interaction between Systemic Alpha Exposure and Lung Exposure	H-4	Laurence Holland, James Prine, David A. Smith, and Ernest Anderson	
1976	Hot Particle Program: Adjuncts; Zymosan and Zymosan Plus X Irradiation	H-4	Laurence Holland, Robert Thomas, James Prine, and David A. Smith	
1976	Hot Particle Program: Chromosome Aberrations in Syrian Hamster Lung Cells by Inhaled 238PuO2/ZrO2 Particles	H-4	Agnes Stroud	
1976	Hot Particle Program: Comparative Tumorigenicity of Localized and Diffuse Lung Irradiation	H-4	Ernest Anderson, Laurence Holland, James Prine, David M. Smith, and Robert Thomas	
1976	Hot Particle Program: Dosimetry of 210Po Instillations	H-4	Ernest Anderson, Glessie Drake, Jerry London, and Julie Wilson	

Year(s)	Investigation Title	Lead Group	HRL Personnel/Author(s)	Collaborator(s)
1976	Hot Particle Program: Microscopic Findings; Lesions Induced by Adjuncts to the Hot Particle Program	H-4	David M. Smith and James Prine	
1976	Hot Particle Program: Pathology; The MUMPS Animal Data System	H-4	James Prine, Christopher Goad, David M. Smith, and Douglas Jackson	
1976	Immunology Studies: A Model System to Determine Toxic Effects on the Immune System	H-4	David M. Smith, Patricia Baron, Glessie Drake, Patricia LaBauve, Jerry London, and Julie Wilson	
1976	Immunology Studies: Survival in Lethally Irradiated Mice Receiving Allogenic Fetal Liver and Thymus	H-4	Julie Wilson	E. O. Goodrich, Office of the U.S. Surgeon General, Medical Research, Development, and Acquisition Command, Falls Church, Virginia
1976	Oil Shale Toxicity: Planned Experiments	H-4	Laurence Holland, David M. Smith, James Prine, and Robert Thomas	Marvin Tillery, H-5 Group
1976	Oil Shale Toxicity: Results and Discussion	H-4	Laurence Holland, David M. Smith, James Prine, and Robert Thomas	Marvin Tillery, H-5 Group
1976	Pion Radiobiology: Effects of Negative Pions and X Irradiation on Testes Weight Loss and Spermatogenic Stem Cell Renewal in Mice	H-4	Leo Gomez; David M. Smith; John Dicello, Jr.; and E. C. Rivera	Howard Amols, MP-3 Group
1976	Pion Radiobiology: Late Effects of Radiation on the Rat Rectum	H-4	W. C. Black, Leo Gomez, Morton Kligerman, and E. C. Rivera	
1976	Trace Element Metabolism: Retention of 109Cd in Mice, Rats, Monkeys, and Dogs	H-4	Robert Thomas, Julie Wilson, Jerry London, and Glessie Drake	
1976	Cellular Metabolism: Altered RNA Metabolism as a Function of Cadmium Accumulation and Intracellular Distribution in Cultured Chinese Hamster Cells	H-9	M. Duane Enger, Carl Hildebrand, Helen Barrington, Marianne Jones, Evelyn Campbell, and John Hanners	
1976	Cellular Metabolism: Chromatin Structure near the DNA Replication Fork	H-9	Carl Hildebrand and Ronald Walters	
1976	Cellular Metabolism: Expanded Mechanistic and Mathematical Treatment of Thymidylate Chromophore Destruction by Water Free-Radicals	H-9	F. Newton Hayes and Donald Hoard	
1976	Cellular Metabolism: Histone Phosphorylation and Chromatin Structure in Cell Proliferation	H-9	Lawrence Gurley, Joseph D'Anna, Larry Deaven, Steven Barham, Ronald Walters, Robert Tobey, and Joseph Valdez	

Year(s)	Investigation Title	Lead Group	HRL Personnel/Author(s)	Collaborator(s)
1976	Cellular Metabolism: Photoaddition Products Induced in Chromatin by Ultraviolet Light	H-9	Gary Strniste and Stanley Rall	
1976	Cellular Metabolism: The Use of Circular Synthetic Polydeoxynucleotides as Substrates for the Study of DNA Repair Enzymes	H-9	Robert Ratliff and Judy Bingham	
1976	Cellular Metabolism: Validation of the LASL Cultured Cell System as a Predictive Guide to Human Cellular Kinetic Response following Exposure to DNA-Interactive Compounds	H-9	Robert Tobey, Harry Crissman, Larry Deaven, and Richard Kissane	
1976	Cytogenetics: Factors Affecting the Induction of Chromosomal Aberrations by Cadmium	H-9	Larry Deaven, Evelyn Campbell, and Catherine Sanchez	
1976	Genetic Studies: Somatic Cell Genetics	H-9	Benjamin Barnhart, Summers Cox, Paul Kraemer, and Richard Okinaka	
1976–1977	Oil Shale Toxicity: Histochemical Evaluation of Lung Tissue	H-4	J. L. Dodd and David M. Smith	
1976–1977	Oil Shale Toxicity: Intratracheal Experiments	H-4	Laurence Holland, David M. Smith, James Prine, Robert Thomas, Julie Wilson, Glessie Drake, Jerry London	Marvin Tillery, H-5 Group
1976–1978	Oil Shale Toxicity: Inhalation Experiments	H-4	Laurence Holland, David M. Smith, James Prine, Robert Thomas, Ernesto Vigil, and Ruben Archuleta	Marvin Tillery and M. Gonzales, H-5 Group
1977	Applications of Flow Analysis and Sorting to Biological Problems: Flow Microfluorometric Detection of Cycling and Noncycling Cells	H-10	Douglas Swartzendruber	
1977	Applications of Flow Analysis and Sorting to Biological Problems: Systems Damage Evaluation Using Lymphocytes	H-10	L. Scott Cram and Mark Wilder	
1977	Applications of Flow Analysis and Sorting to Biological Problems: Teratocarcinoma; An Alternative for Embryos in the Study of Teratogenesis	H-10	Douglas Swartzendruber, L. Scott Cram, and Karen Cox	
1977	Cell Preparation: Analysis of an Energy Transfer Phenomenon for Two Fluorescent DNA-Specific Compounds; Propidium Iodide and Mithramycin	H-10	Harry Crissman, Richard Kissane, Anita Stevenson, and David Orlicky	

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1977	Cell Preparation: Characterization of the Proliferation Capacity and Protein Content of Tumor Cell Populations at Various Stages of Tumor Development	H-10	Harry Crissman, Richard Kissane, Anita Stevenson, and David Orlicky	
1977	Development of Instrumentation for Rapid Cell Analysis and Sorting: A High-Sensitivity Flow Chamber	H-10	Marty Barholdi	
1977	Development of Instrumentation for Rapid Cell Analysis and Sorting: Analysis of DNA Histograms from Asynchronous and Synchronous Cell Populations	H-10	James Jett	
1977	Development of Instrumentation for Rapid Cell Analysis and Sorting: Continued Development of High-Efficiency Flow Cytometers	H-10	Mary Jane Skogen-Hagenson	
1977	Development of Instrumentation for Rapid Cell Analysis and Sorting: Detection and Recovery of Viable Cell Hybrids by Fluorescence Resonance Energy Transfer and Fluorescence Activated Cell Sorting	H-10	James Leary and L. Scott Cram	
1977	Development of Instrumentation for Rapid Cell Analysis and Sorting: Development of a Dual-Laser Excitation Flow Cytometric System	H-10	John Steinkamp and John Horne	
1977	Development of Instrumentation for Rapid Cell Analysis and Sorting: Fluorescence Resonance Transfer Measurements of Virus-Cell Interactions in Permissive Infection and in Transformation	H-10	James Leary and L. Scott Cram	J. M. Lehman, University of Colorado Medical Center, Denver
1977	Development of Instrumentation for Rapid Cell Analysis and Sorting: Fluorescent and Enzymatic Studies of Mammalian Blood Cells	H-10	Zita Svitra, George Saunders, and John Steinkamp	
1977	Development of Instrumentation for Rapid Cell Analysis and Sorting: Fluorescent Peroxidase-Antiperoxidase Triple Antibody Labeling of Cell Surface and Intracellular Antigens; A Flow-Systems Technique Approaching the Sensitivity of Radioimmunoassay	H-10	James Leary and L. Scott Cram	
1977	Development of Instrumentation for Rapid Cell Analysis and Sorting: Identification of Lymphocyte Cell Surface Alloantigens from the B Locus of Chicken Genotypes Able or Unable to Regress Rous Sarcoma Virus-Induced Tumors	H-10	James Leary and L. Scott Cram	

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1977	Development of Instrumentation for Rapid Cell Analysis and Sorting: Nanosecond Fluorescence Spectroscopy	H-10	John Martin, Mark Wilder, and P. Christopher Hammel	
1977	Development of Instrumentation for Rapid Cell Analysis and Sorting: The Use of Electrical Impedance for Cell Classification	H-10	Robert Hoffman	
1977	Physical Dosimetry and Radiobiology Studies: Negative Pion Radiobiology Studies	H-10	Mudundi Raju, Elvira Bain, Susan Carpenter, Robert Cox, James Robertson, Robert Tobey, and Ronald Walters	Howard Amols, MP-3 Group
1977	Physics and Instrumentation: An Instrument for Static Light-Scattering Measurements on Individual Cells	H-10	Paul Mullaney, Douglas Burger, and Gary Salzman	
1977	Applied Toxicology: Preliminary Data	H-4	David M. Smith, Glessie Drake, Jerry London, and Julie Wilson	
1977	Computer Science: Computer Data Bank of User Evaluations of Operating Room Design	H-4	Edward Goodrich, James Prine, and Douglas Jackson	Committee on Operating Room Environment, American College of Surgeons, Chicago, Illinois
1977	External Radiation: Delayed Radiation Injury of Gut-Exposed and Gut-Shielded Mice	H-4	John Spalding, Ruben Archuleta, and James Prine	
1977	External Radiation: Late Biological Effects of Radiation Injury as Influenced by Radiation Dose, Dose Rate, and Age at the Onset of Exposure	H-4	John Spalding	
1977	Hot Particle Program: Chromosome Aberrations Induced in Syrian Hamster Lung Cells by Intravenous Injection of 239PuO2-ZrO2 Microspheres	H-4	Agnes Stroud and Yolanda Ortiz	
1977	Hot Particle Program: Current Summary of Intravenous Microsphere Experiments	H-4	Ernest Anderson, Laurence Holland, James Prine, David M. Smith, and Robert Thomas	
1977	Hot Particle Program: Retention of Intratracheal Microspheres	H-4	Ernest Anderson, Ruben Archuleta, Glessie Drake, and Jerry London	
1977	Hot Particle Program: Thorium-227 Methodology	H-4	Ernest Anderson and James Perrings	
1977	Hot Particle Program: Tumor Production in Syrian Hamsters following Inhalation of PuO2-ZrO2 Aerosols	H-4	Robert Thomas and David M. Smith	
1977	Immunology: Allogeneic Fetal Tissue Restoration of Lethally X-Irradiated Mice	H-4	Edward Goodrich and Julie Wilson	

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1977	Immunology: The Effect of Low-Level Whole-Body X-Irradiation on Splenic Immunologic Function	H-4	Robert Gross, Patricia Baron, and David M. Smith	
1977	Oil Shale Toxicology: Cell Damage following in vitro Exposure to Retorted Oil Shale	H-4	Agnes Stroud and Yolanda Ortiz	
1977	Oil Shale Toxicology: Gastrointestinal Studies	H-4	Glessie Drake, Jerry London, and Laurence Holland	
1977	Oil Shale Toxicology: Industrial Hygiene Studies	H-4	Leroy Garcia, Laurence Holland, and Ernesto Vigil	Marvin Tillery, H-5 Group
1977	Oil Shale Toxicology: Oil Shale and Silica Particle Effects on Syrian Hamster Macrophages	H-4	Julie Wilson, Karen Hansen, and Laurence Holland	
1977	Radionuclide Metabolism: Retention of Cobalt in Mice as a Function of Size of Administered Dose	H-4	Robert Thomas and Glessie Drake	
1977	Cellular Metabolism: Cadmium Uptake and Intracellular Partitioning in Cultured Chinese Hamster Cells; Correlation with Cadmium-Induced Alterations in RNA Metabolism	H-9	Carl Hildebrand, Evelyn Campbell, Helen Barrington, John Hanners, Marianne Jones, Linda Ferzoco, Arthur Saponara, and M. Duane Enger	
1977	Cellular Metabolism: Developing a Model System for the Analysis of Repair of Damaged Chromatin	H-9	Gary Strniste, Luther Martinez, Manuel Gonzales, and Stanley Rall	
1977	Cellular Metabolism: Flow Microfluorometric Analysis of Bromodeoxyuridine-Mithramycin Treated Cells after X-Irradiation	H-9	Ronald Walters, Douglas Swartzendruber, and Steven Barham	
1977	Cellular Metabolism: Formation and Degradation of DNA-Binding Derivatives of Benzo(a)pyrene	H-9	Robert Ratliff, Judy Bingham, Julia Hardin, and Jonathon Longmire	
1977	Cellular Metabolism: Heparin Releases Heparan Sulfate from the Cell Surface	H-9	Paul Kraemer	
1977	Cellular Metabolism: Histone Phosphorylation and Chromatin Structure during Mitosis	H-9	Lawrence Gurley, Joseph D'Anna, Steven Barham, Larry Deaven, Robert Tobey, and Joseph Valdez	
1977	Cellular Metabolism: Isolation and Characterization of a Cadmium-Resistant Variant of Line CHO Chinese Hamster Cells	H-9	Robert Tobey, Evelyn Campbell, M. Duane Enger, Carl Hildebrand, and Richard Kissane	
1977	Cellular Metabolism: Photoreaction of Potential Carcinogens with DNA	H-9	Donald Hoard	

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1977	Cytogenetics: Cell-Cycle-Specific Chromosome Damage following Treatment of Cultured CHO Cells with 4'–[(9-Acridinyl)-amino] Methanesulphon-m-anisidide-HCl (m-AMSA Chloride)	H-9	Larry Deaven, Evelyn Campbell, Arlene Nock, and Robert Tobey	
1977	Genetics: Mutagenicity Assessment; Life-Cycle and Cell-Membrane Mutants	H-9	Benjamin Barnhart, Summers Cox, and Richard Okinaka	
1977–1978	Utilization of Stable Isotopes in Research	H-11	Thomas Whaley, Richard Blazer, Charles Gregg, Victor Kollman, and David Williams	
1977–1978	Applied Toxicology: General Screening Procedures	H-4	David M. Smith, Glessie Drake, Jerry London, Julie Wilson, Robert Thomas, and Susie Wang	
1977–1978	Oil Shale Toxicology: Dermal Studies	H-4	Julie Wilson and Laurence Holland	
1977–1978	Genetics: Mutagenicity/Cytotoxicity of Plutonium-238	H-9	Benjamin Barnhart, Summers Cox, Linda Ferzoco, and Esther Wilmoth	
1977–1981	Biochemical Syntheses with Stable Isotopes	H-11	Thomas Whaley and Victor Kollman	
1977–1981	Organic Syntheses with Stable Isotopes	H-11/ LS-5	Thomas Whaley, Vernon Kerr, David Williams, Richard Blazer, and Victor Kollman	Guido Daub, University of New Mexico, Albuquerque
1978	Biological Research: Assessment of the Immunologic Effects of the By-Products of Oil Shale Refining	H-10	Mark Wilder and L. Scott Cram	
1978	Biological Research: Development and Evaluation of a Rapid Two-Color Staining Technique for Simultaneous DNA-Protein Analysis in Dual-Laser Cytophotometry	H-10	Harry Crissman, David Orlicky, Gayle Travis, and Richard Kissane	
1978	Biological Research: Flow Analysis by Fluorescence of Peripheral Erythrocyte Populations	H-10	George Saunders and John Steinkamp	
1978	Biological Research: Flow Cytometric Analysis of Teratocarcinoma Cells	H-10	Douglas Swartzendruber, Robert Hoffman, and Karen Cox	
1978	Biological Research: Flow Cytometric Quantitation of in vivo Pulmonary Macrophage Phagocytosis	H-10	John Steinkamp and Julie Wilson	
1978	Biological Research: Flow-System Analysis of Cell Kinetics and the Effects of a Chemotherapeutic Drug Agent on a Model Murine Colon Tumor System	H-10	Harry Crissman, Gayle Travis, David Orlicky, and Richard Kissane	

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1978	Biological Research: Fluorescence Polarization and Pulse-Width Analysis of Chromosomes by a Flow System	H-10	L. Scott Cram	D. J. Arndt-Jovin, B. G. Grimwade, and T. M. Jovin, Abteilung Molekulare Biologie, Max-Planck-Institut fuer Biophysikalische Chemie, Goettingen, Federal Republic of Germany
1978	Biological Research: Light-Scatter Analysis of Peripheral Leukocyte Populations	H-10	George Saunders, Gary Salzman, Robert Gross, and Patricia Baron	
1978	Development of Flow Cytometry Instrumentation for Rapid Cell Analysis and Sorting: A Light-Scattering Flow Photometer	H-10	Marty Barholdi and Gary Salzman	
1978	Development of Flow Cytometry Instrumentation for Rapid Cell Analysis and Sorting: A Statistical Approach to the Classification of Biological Cells from Their Diffraction Patterns	H-10	F. C. Genter and Gary Salzman	Division of Cancer Biology and Diagnosis, National Cancer Institute, Bethesda, Maryland
1978	Development of Flow Cytometry Instrumentation for Rapid Cell Analysis and Sorting: An Instrument for Measurement of Scattered Light by Individual Cells	H-10	Douglas Burger and Paul Mullaney	
1978	Development of Flow Cytometry Instrumentation for Rapid Cell Analysis and Sorting: Measurement of Fluorescence Decay	H-10	John Martin, Mark Wilder, and K. Kruse	Richard Hiebert, E-5 Group
1978	Development of Flow Cytometry Instrumentation for Rapid Cell Analysis and Sorting: New Data Acquisition and Sorting Hardware	H-10	Gary Salzman, James Jett, John Cowell, William Britt, and Mary Jane Skogen-Hagenson	Richard Hiebert, E-5 Group, and Division of Cancer Biology and Diagnosis, National Cancer Institute, Bethesda, Maryland
1978	Development of Flow Cytometry Instrumentation for Rapid Cell Analysis and Sorting: The Parabolic Flow Cytometer	H-10	Mary Jane Skogen-Hagenson and Gary Salzman	
1978	Development of Flow Cytometry Instrumentation for Rapid Cell Analysis and Sorting: Understanding Light Scattering with Stream-in-Air Flow Cytometers	H-10	Gary Salzman, Mark Wilder, and James Jett	Division of Cancer Treatment, National Cancer Institute, Bethesda, Maryland
1978	Development of Flow Cytometry Instrumentation for Rapid Cell Analysis and Sorting: Verification of Cellular Dimensions Measured by Flow Cytometry and Implications for Cytological Diagnosis	H-10	Paul Mullaney and John Steinkamp	

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1978	Radiobiology Studies: Acute Skin Response (Mouse Foot) after Exposure to Single and Fractionated Doses of Negative Pions Compared to 300-kVP X Rays	H-10	Mudundi Raju, Susan Carpenter, and Nobuhiko Tokita	J. Dicello, MP-3 Group, and C. Von Essen, University of New Mexico, Albuquerque
1978	Radiobiology Studies: Cytokinetic Perturbations and Cell Killing of V79 Cells by Radiochemotherapy	H-10	Nobuhiko Tokita, Tod Johnson, Elvira Bain, and Mudundi Raju	
1978	Radiobiology Studies: Effects of Argon Ions on Synchronized Chinese Hamster Cells	H-10	Mudundi Raju, Elvira Bain, Susan Carpenter, and Ronald Walters	J. Howard and P. Powers-Risius, Lawrence Berkeley Laboratory, California
1978	Radiobiology Studies: Flow Cytometric Analysis of Spontaneous Dog Tumors	H-10	Tod Johnson, Nobuhiko Tokita, and Mudundi Raju	E. L. Gillette, Colorado State University, Fort Collins
1978	Radiobiology Studies: in vitro V79-171b Multicellular Spheroid Cytokinetic and Cell-Survival Response to Single vs Fractionated X Irradiation	H-10	Tod Johnson, Nobuhiko Tokita, Elvira Bain, and Mudundi Raju	
1978	Radiobiology Studies: Residual Radiation Damage in the Mouse Foot after Exposure to Heavy Particles	H-10	Susan Carpenter and Mudundi Raju	
1978	Mouse Limb Bud Project	H-11	Charles Gregg and Judith Hutson	
1978	Animal Colony Operations: Athymic Mouse Colony	H-4	Laurence Holland and Mary Brooks	
1978	Applied Toxicology: Status Report on Materials Tested	H-4	David M. Smith, Glessie Drake, Jerry London, Susie Wang, and Robert Thomas	
1978	External Radiation: Influence of Dose, Dose-Rate, and Age at Exposure on Radiation-Induced Life Shortening in Mice Genetically Insensitive to Neoplastic Transformation	H-4	John Spalding	
1978	External Radiation: Observations on a Mammalian Population after X Irradiation to 82 Generations	H-4	John Spalding and Mary Brooks	
1978	Immunology Studies: Allogeneic Fetal Tissue Restoration of Lethally X-Irradiated Mice	H-4	Edward Goodrich, Julie Wilson, and Marla Foreman	
1978	Immunology Studies: Immune Status of Patients with Metaplastic/Neoplastic Pulmonary Disease	H-4	Robert Gross and David M. Smith	Geno Saccomanno and Richard Saunders, St. Mary's Hospital, Grand Junction, Colorado
1978	Oil Shale Toxicology: Analysis of Respirable Shale Dust	H-4		W. Dale Spall, H-DO

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1978	Toxicity of Insulating Materials: Exposure Chambers for Inhalation Exposure of Rodents to Fibrous Material	H-4	Ruben Archuleta and John Spalding	H-5 Group and Thermal Insulation Manufacturers Association
1978	Tumorigenesis in the Lung: Experimental Protocols for Fiscal Year 1978	H-4	Robert Thomas, David M. Smith, Ernest Anderson, Glessie Drake, and Jerry London	
1978	Tumorigenesis in the Lung: Inhalation Exposure of Syrian Hamsters to Iron Oxide Aerosol	H-4	Ruben Archuleta, Robert Thomas, Glessie Drake, and Jerry London	
1978	Tumorigenesis in the Lung: Pulmonary Tumors in Syrian Hamsters following Inhalation of 238,239Pu-ZrO2 Aerosols	H-4	Robert Thomas, David M. Smith, and Ernest Anderson	
1978	Tumorigenesis in the Lung: Tumorigenicity of High Doses of PuO2-ZrO2 Microspheres	H-4	Ernest Anderson, Glessie Drake, Laurence Holland, Jerry London, James Prine, and David M. Smith	
1978	Analysis of Cellular Resistance to Cadmium-Mediated Toxicity Using a CHO Variant with Increased Metallothionein Induction Capacity	H-9	Carl Hildebrand, Robert Tobey, M. Duane Enger, Evelyn Campbell, Richard Kissane, John Hanners, Marianne Jones, and Helen Barrington	
1978	Complexity and Diversity of Polysomal and Informosomal mRNA from Chinese Hamster Cells	H-9	Ronald Walters, Paul Yandell, and M. Duane Enger	
1978	Dephosphorylation of Histones H1 and H3 during the Isolation of Metaphase Chromosomes	H-9	Joseph D'Anna, Lawrence Gurley, Joseph Valdez, and Larry Deaven	
1978	Effects of 60-Hz Electromagnetic Fields on Growth and Survival of Cultured Chinese Hamster Cells	H-9	Robert Tobey	Sandia Laboratory, Albuquerque, New Mexico
1978	Elevated Cell-Surface Hyaluronate in Substrate-Attached Cells	H-9	Paul Kraemer and Benjamin Barnhart	
1978	Mutagenicity Assessment: Nonmetabolic Activation of Polyaromatic Hydrocarbons and Liquid Stream Effluents from Oil Shale Technology	H-9	Benjamin Barnhart, David Chen, Summers Cox, and Esther Wilmoth	
1978	Photoactivation of Polycyclic Aromatic Hydrocarbons and Complex Organic Mixtures: Molecular and Cellular Studies	H-9	Gary Strniste and Elmo Martinez	
1978	Reaction of Carcinogenic Hydrocarbons with Model DNAs	H-9	Donald Hoard and Robert Ratliff	
1978	The Association of Histone Deacetylation with Chromosome Condensation during Mitosis in CHO Cells	H-9	Joseph D'Anna, Lawrence Gurley, Robert Tobey, and Joseph Valdez	

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1978	The Covalent Binding of Benzo(a)pyrene Derivatives to Deoxyribonucleotides of Synthetic Heteropolymers and Studies of DNA Repair Enzymes	H-9	Robert Ratliff and Judy Bingham	
1978	The Use of Picolinic Acid to Investigate the Role of Iron in Cell Proliferation	H-9	Lawrence Gurley, Joseph Valdez, James Jett	
1978–1979	Immunology Studies: Immunology of Experimental Carcinogenesis	H-4/LS-1	David M. Smith, Robert Gross, Patricia Baron, and C. A. Greenaugh	
1979	Differences in Cell-Cycle Progression Delays after Exposure to 238Pu-Alpha Particles Compared to X-Rays	LS-1	Mudundi Raju, Tod Johnson, Nobuhiko Tokita, Susan Carpenter, and James Jett	
1979	Flow Cytometric Measurement of Adriamycin: Implications of Adriamycin-Induced Cell Cycle Perturbation in V79 Cells	LS-1	Nobuhiko Tokita, Tod Johnson, Elvira Bain, Susan Carpenter, and Mudundi Raju	Mary Jane Skogen-Hagenson, University of Iowa School of Medicine, Iowa City, and J. A. Belli, Harvard Medical School, Boston, Massachusetts
1979	Pulmonary Tumorigenesis from Radiation Sources in the Respiratory Tract	LS-1	Robert Thomas, David M. Smith, Ernest Anderson, Glessie Drake, and Jerry London	
1979	Structural Effects of Histone H1 Phosphorylation	LS-1	Joseph D'Anna, Lawrence Gurley, Gary Strniste, and Robert Sebring	
1979	The Effects of Arsenic, a Toxic Oil Shale Constituent, on Cell Proliferation and Histone Phosphorylation	LS-1	Lawrence Gurley, Ronald Walters, James Jett, Robert Tobey, and Joseph Valdez	
1979	The Epidermal Carcinogenicity of Two Shale Oils and Two Natural Petroleums	LS-1	Laurence Holland and Julie Wilson	
1979	Utilization of Resistant Variants in Cellular Toxicology Studies	LS-1	Robert Tobey, Evelyn Campbell, Richard Kissane, M. Duane Enger, and Carl Hildebrand	
1979	Appropriateness of Slit Scan Flow Cytometric Markers for Cytological Screening	LS-2	Paul Mullaney	
1979	Data Acquisition and Processing For Flow Cytometry: The LACEL System	LS-2	Gary Salzman, Sally Wilkins, James Whitfill, Richard Hiebert, and James Jett	
1979	Discrimination between Surface and Uniform Fluorescence by Pulse Shape Analysis	LS-2	James Jett and Anita Stevenson	
1979	Flow Cytometric Cell Sizing by Pulse Shape Analysis	LS-2	Gary Salzman, Richard Hiebert, and James Jett	
1979	Flow Cytometry: Tests for Cytochemical Specificity	LS-2	Paul Mullaney	

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1979	Quantitation of Cell Surface Antigen Density by Flow Cytometry	LS-2	James Jett, Anita Stevenson, Noel Warner, and James Leary	
1979	Time: A New Parameter for Flow Cytometry	LS-2	John Martin, Douglas Swartzendruber, and Gayle Travis	
1979	Mutagenesis Program: An in vitro Screening Assay Based on Photoactivity of Chemical Mutagens and Carcinogens	LS-3	Gary Strniste and Richard Brake	
1979	Mutagenesis Program: Cell-Cycle Dependency of Mutation Induction by N-Methyl-N'-Nitro-N-Nitrosoguanidine in Chinese Hamster Cells	LS-3	David Chen and Benjamin Barnhart	
1979	Mutagenesis Program: Interaction of Photoactivated Benzo(a)pyrene with DNA	LS-3	Donald Hoard, Robert Ratliff, and Judy Bingham	
1979	Mutagenesis Program: Mutagenicity Assessment; Salmonella/Liver Microsome Test of Liquid Effluents from Oil Shale Technologies	LS-3	Benjamin Barnhart, Summers Cox, Esther Wilmoth, and Joyce Nickols	
1979	Mutagenesis Program: The Induction of Sister Chromatid Exchanges and Mutagenicity by Metabolically Activated Mutagens	LS-3	Richard Okinaka, David Chen, Esther Wilmoth, Summers Cox, and Benjamin Barnhart	
1979	Pollutant-Induced Specific Gene Expression: Regulation of Thionein Gene Expression–Purification of cDNA Sequence Complementary to Induction Specific mRNAs	LS-3	Ronald Walters, Jeffrey Griffith, M. Duane Enger, and Carl Hildebrand	
1979	Pollutant-Induced Specific Gene Expression: Regulation of Trace Metal-Mediated Thionein Gene Expression in Cadmium-Resistant Variants of the CHO Cells	LS-3	Carl Hildebrand, M. Duane Enger, Leslie Rall, Robert Tobey, Ronald Walters, John Hanners, Barbara Griffith, Helen Barrington, and Jeffrey Griffith	
1979	Chromosome Stability in Tumorigenesis	LS-4	L. Scott Cram and Mark Wilder	
1979	DNA Content Measurement in Hamster Respiratory Tract Cells Exposed to Oil Shale and Silica	LS-4	John Steinkamp and Julie Wilson	
1979	Induction of Endoreduplication in CHO Cells by Sodium Arsenite	LS-4	Larry Deaven and Arlene Nock	
1979	Labeled Microspheres as Probes for Specific Receptors on Cell Membranes	LS-4	George Saunders	
1979	Studies of Embryonic Differentiation	LS-4	Douglas Swartzendruber, Gayle Travis, and John Martin	

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1979	Studies of Spontaneous Malignant Change of Cultured Mouse Cells	LS-4	Paul Kraemer, Robert Wells, Evelyn Campbell, and Mary Brooks	
1979	Studies on Viable Cell Staining with DNA-Binding Hoechst Dyes	LS-4	Harry Crissman, David Orlicky, Gayle Travis, and Richard Kissane	
1979–1980	Prenatal Toxicology of Oil Shale Product Water	LS-5	Charles Gregg and Judith Hutson	
1979–1981	Asymmetric Syntheses of Amino Acids	H-11/LS-6	Richard Blazer, David Williams, and Thomas Whaley	Guido Daub, University of New Mexico, Albuquerque
1979–1981	Analytical Chemistry of Oil Shale	LS-5	W. Dale Spall and Thomas Whaley	
1979–1981	National Stable Isotopes Resource	LS-5	Thomas Whaley	
1980	Effect of Shale Oil on Delayed Type Hypersensitivity in Mice	LS-1	Patricia Baron	
1980	Inhalation and Intratracheal Exposures	LS-1	Laurence Holland, Ernesto Vigil, Debra Archuleta, and Julie Wilson	
1980	Lack of Effect of 60 Hertz Fields on Growth of Cultured Chinese Hamster Cells	LS-1	Robert Tobey	H. J. Price and L. D. Scott, Mission Research Corporation, and K. D. Ley, Lovelace Foundation, Albuquerque, New Mexico
1980	Long-Term Epidermal Carcinogenicity Studies	LS-1	Laurence Holland and Julie Wilson	
1980	Modification of Software Used in Processing Data for the Aerosol Inhalation Studies	LS-1	Glessie Drake and Jerry London	D. E. Jackson, Eastern New Mexico University, Portales
1980	Preliminary Lung Proliferation Studies	LS-1	Glessie Drake, Jerry London, and Lawrence Gurley	
1980	Radiation Biology and Oncology	LS-1	Nobuhiko Tokita, Elvira Bain, Susan Carpenter, and Mudundi Raju	
1980	The Toxic Effects of Particulate Nickel Arsenide (Ni_5As_2) on Cell Proliferation	LS-1	Lawrence Gurley, Robert Tobey, and Joseph Valdez	J. J. Miglio, CMB-1 Group; S. S. Barham, Mayo Clinic, Rochester, New York; and J. Roy Gordon Research Laboratory, Harvard University, Boston, Massachusetts (Inco Metals Company, Toronto, Canada)
1980	Chromosome Analysis and Sorting	LS-2	James Jett, Mark Wilder, and L. Scott Cram	
1980	Chromosome Modeling for Centromeric Index Determination	LS-2	Gary Salzman and L. Scott Cram	
1980	Kinetic Measurements of DNA Specific Fluorochromes Using Flow Cytometry	LS-2	John Martin, Douglas Swartzendruber, Gayle Travis, Tod Johnson, and Carleton Stewart	

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1980	Software for Flow Cytometry and Sorting	LS-2	Gary Salzman	Sally Wilkins and James Whitfill, E-8 Group
1980	Determination of Direct-Acting Mutagens in Shale Oil Retort Process Water	LS-3	David Chen, Richard Okinaka, and Gary Strniste	
1980	Exogenous Metabolic Activation of Process Waters in Mammalian Cell Cultures	LS-3	Richard Okinaka and Gary Strniste	
1980	Exogenous Metabolic Activation of Shale Oils in Mammalian Cell Cultures	LS-3	Richard Okinaka and Gary Strniste	
1980	in vitro Tests for Determining the Carcinogenic Potential of Spent Shale Particulates	LS-3	M. Duane Enger, Robert Tobey, Carl Hildebrand, Judith Tesmer, and Richard Kissane	
1980	Interactions of Photoactivated Polycyclic Aromatic Hydrocarbons with DNA	LS-3	Donald Hoard, Robert Ratliff, and Judy Bingham	
1980	Molecular Mechanisms of Cd Detoxification in Cd-Resistant Cultured Cells: Role of Metallothionein and Other Inducible Factors	LS-3	Carl Hildebrand, M. Duane Enger, Jeffrey Griffith, Robert Tobey, and Ronald Walters	
1980	Mutagenesis in vitro: Ames/Salmonella Assay of Shale Oils	LS-3	Joyce Nickols and Gary Strniste	
1980	Photoactivation of Shale Oil Byproducts	LS-3	Gary Strniste, Elmo Martinez, David Chen, and Richard Okinaka	
1980	A Comparison of Biochemical Methods of Analyzing Collagen Content of Mammalian Lungs for the Assessment of Pulmonary Damage	LS-4	Margaret Halleck	
1980	Antigen-Specific Stimulation of Amino Acid Transport in Bovine Lymphocytes	LS-4	Emily Tate and L. Scott Cram	
1980	Chromosome Instability and Tumorigenesis	LS-4	L. Scott Cram and Marty Barholdi	
1980	Cytogenetic Effects of Shale-Derived Oils and Related By-Products in Mice	LS-4	Julianne Meyne	
1980	Effects of Process Waters from the Oil Shale Industry on in vitro Induction of Sister Chromatid Exchange	LS-4	Evelyn Campbell, Frank Ray, and Larry Deaven	
1980	Multi-Laser Excited Fluorescence Measurements on Single Mammalian Cells	LS-4	John Steinkamp	

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1980	Production of Monoclonal Antibody against Metallothionein	LS-4	George Saunders, Carl Hildebrand, and Aaron Martinez	
1980	Sensitive Novel Method for Detecting Elastolytic Activity Using Peroxidase Labeled Elastin	LS-4	George Saunders and Zita Svitra	
1980	Studies on Growth and Survival of Hoechst-Stained Cell Populations Following Analysis and Cell Sorting	LS-4	Harry Crissman and Richard Kissane	
1980	Tumorigenicity Assays: Studies of the Fate of Implanted Cells	LS-4	Paul Kraemer, Gayle Travis, and George Saunders	
1980–1981	Mutagenesis in vitro: Ames/Salmonella Assay Shale Oil Process Waters	LS-3	Joyce Nickols and Gary Strniste	
1980–1981	Effects of Acute Inhalation Exposure to Silica	LS-4	Anita Stevenson, D. M. Koelle, Julie Wilson, George Saunders, Carleton Stewart, and Paul Kraemer	
1980–1982	Tumorigenesis in the Lung	LS-1	David M. Smith, Glessie Drake, Jerry London, James Prine, Patricia Baron, J. A. Carlson, J. James Cunningham, Yolanda Valdez, Ernesto Vigil, and Julie Wilson	
1981	Cytometric Analysis of Irradiation Damaged Chromosomes	LS-1	Mark Wilder and Mudundi Raju	
1981	Dose-Response Study for Three Shale Crude Oils and Two Natural Petroleums	LS-1	Laurence Holland and Julie Wilson	
1981	Effects of Solubility on Tumorigenesis of Two Shale Crude Oils and Two Natural Petroleums	LS-1	Julie Wilson and Laurence Holland	
1981	Histone Variants and Histone Modifications Associated with Constitutive Heterochromatin	LS-1	Lawrence Gurley, Margaret Halleck, and Joseph Valdez	
1981	Inhalation Studies	LS-1	Laurence Holland, Julie Wilson, Ernesto Vigil, Douglas Stavert, and Debra Archuleta	Marvin Tillery, M. Gonzalez, and George Royer, H-5 Group
1981	Nickel Arsenide (Ni_5As_2): The Relationship between Its Solubility and Its Toxicity and Mutagenicity	LS-1	Lawrence Gurley, Robert Tobey, Joseph Valdez, and Summers Cox	J. J. Miglio, CMB-1 Group, and S. S. Barham, Mayo Clinic/Foundation, Rochester, New York
1981	Pion Radiobiology	LS-1	Mudundi Raju, Susan Carpenter, and Nobuhiko Tokita	J. F. DiCello, MP-3 Group; and J. L. Butler, D. Pierotti, and A. R. Smith, Cancer Research and Treatment Center, University of New Mexico, Albuquerque

Year(s)	Investigation Title	Lead Group	HRL Personnel/Author(s)	Collaborator(s)
1981	Synthesis of Histone H1° in Synchronized Chinese Hamster Cells	LS-1	Joseph D'Anna, Lawrence Gurley, Robert Tobey, Robert Sebring, Joseph Valdez, Richard Kissane, and Judith Tesmer	
1981	The Effect of Shale Oil and Ultraviolet Light on Delayed Hypersensitivity in Mice	LS-1	Patricia Baron	
1981	Zinc-Induced Enhancement of Resistance to Alkylating Agents	LS-1	Robert Tobey, M. Duane Enger, Jeffrey Griffith, and Carl Hildebrand	
1981	Benzo(a)pyrene Metabolism and Mutation Induction in CHO Cells Using Either Rat Liver Homogenate or Syrian Hamster Embryonic Cell-Mediated Activation	LS-3	Richard Okinaka, Gary Strniste, and David Chen	
1981	Differential Induction by Cadmium of a Low-Complexity Ribonucleic Acid Class in Cadmium-Resistant and Cadmium-Sensitive Mammalian Cells	LS-3	Jeffrey Griffith, M. Duane Enger, Carl Hildebrand, and Ronald Walters	
1981	Genes Coding for Metal-Induced Synthesis of RNA Sequences Are Differentially Amplified in Mammalian Cells	LS-3	Ronald Walters, M. Duane Enger, Carl Hildebrand, Barbara Griffith, and Jeffrey Griffith	
1981	Genotoxicity of Natural and Synthetic Oils in the Ames/Salmonella Test	LS-3	Joyce Nickols and Gary Strniste	
1981	Inducibility of Metallothionein Gene Expression as an Indicator of DNA Damage and Repair Proficiency in Human Cells	LS-3	Carl Hildebrand, Gary Strniste, and John Hanners	
1981	Light Activation of Natural and Synthetic Petroleums	LS-3	Gary Strniste, Judy Bingham, David Chen, and Richard Okinaka	
1981	Light Activation of Oil Shale Retort Process Waters	LS-3	Gary Strniste, David Chen, and Richard Okinaka	
1981	Molecular Cloning and DNA Sequence of the Chinese Hamster Metallothionein-II Gene	LS-3	Barbara Griffith, Ronald Walters, and Jeffrey Griffith	
1981	Quantitation of Mutations Induced by Metabolically Activated Mutagens in Normal Human Fibroblasts	LS-3	David Chen, Richard Okinaka, and Gary Strniste	
1981	Somatic Cell Genetics Approaches to the Analysis of Regulation of Metallothionein Gene Expression	LS-3	Carl Hildebrand, David Chen, M. Duane Enger, Jeffrey Griffith, Robert Tobey, and Ronald Walters	
1981	A Rapid, Sensitive Colorimetric Microplate Assay for Hydroxyproline	LS-4	Margaret Halleck	

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1981	An Assay for Collagenase Using Peroxidase-Labeled Collagen as a Substrate	LS-4	Emily Tate	
1981	Comparison of Direct-Acting Cytogenetic and Mutagenic Effects of a Shale Oil Retort Process Water	LS-4	Julianne Meyne and David Chen	
1981	Differentiation of Mononuclear Phagocytes	LS-4	Carleton Stewart	E. Walker, University of New Mexico, Albuquerque, and W. Walker, St. Jude Children's Research Hospital, Memphis, Tennessee
1981	Effects of Prolonged Inhalation Exposure to Oil Shale Dust	LS-4	Margaret Halleck, George Saunders, Emily Tate, Anita Stevenson, Julie Wilson, Carleton Stewart, W. Dale Spall, and Aaron Martinez	
1981	Flow Analysis of Karyotype Instability	LS-4	Marty Barholdi and L. Scott Cram	
1981	Flow-Cytometric Analysis of Cultured Bone Marrow Mononuclear Phagocytes	LS-4	Carleton Stewart and Sigrid Stewart	
1981	Flow-Cytometric Analysis of Hunan Lymphocyte Spheroids	LS-4	Carleton Stewart and John Steinkamp	
1981	Infiltration of Host Defense Cells Into a Foreign Substratum	LS-4	Anita Stevenson, Karen Bame, Gayle Travis, and Paul Kraemer	
1981	On the Emergence of Permanent Cell Lines from Cultured Diploid Cell Strains	LS-4	Paul Kraemer and Gayle Travis	
1981	Optimization of Culture Conditions for the Growth of Rat Bone Marrow and Alveolar Macrophages	LS-4	George Saunders and Aaron Martinez	
1981	Potassium Ion Influx Measurements on Cultured Chinese Hamster Cells Exposed to 60-Hertz Fields	LS-4	Anita Stevenson and Robert Tobey	
1981	Proliferation Kinetics of Mononuclear Phagocytes of the Bone Marrow	LS-4	Carleton Stewart and Sigrid Stewart	
1981	Rapid Staining Procedures for Analysis of Cellular DNA and Protein by Single and Dual Laser Flow Cytometry	LS-4	Harry Crissman, Richard Kissane, and John Steinkamp	
1981	Sequential Detection and Analysis of Multiple Electronic and Optical Measurements on Cells	LS-4	John Steinkamp	
1981	Sister Chromatid Exchange (SCE) Analysis in Bone Marrow of Mice Treated with Shale Oils and Shale Process Waters	LS-4	Julianne Meyne	
1981	Sister Chromatid Exchange Rates in Geokinetics Oil Shale Workers	LS-4	Evelyn Campbell, Frank Ray, and Larry Deaven	

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1981	Chromosome Sorting for Genomic Cloning of Mammalian DNA	LS-DOT	James Jett, Mark Wilder, and L. Scott Cram	
1981	High-Speed Cell Selection	LS-DOT	John Martin, Carleton Stewart, and James Jett	
1981	Los Alamos Cell Analysis (LACEL) Flow Cytometry Data Acquisition System	LS-DOT		Sally Wilkins, E-8 Group
1981	Multiparameter Cell Sorter II	LS-DOT	John Martin, Mark Wilder, and James Jett	
1981	Resolution Improvements	LS-DOT	Dale Holm, James Jett, John Martin, Mark Wilder, Marty Barholdi, and L. Scott Cram	Richard Hiebert, E-5 Group
1982	A Method for Preparing Cellular Suspensions of Epidermis and Whole Lung	LS-1	Julie Wilson, Yolanda Valdez, and Elmo Martinez	
1982	Applied Toxicology	LS-1	David M. Smith and Jerry London	WX Division; M Division
1982	Blood-Gas Responses in Rats Following Inhalation Exposure to Oil Shale Retort Combustion Products	LS-1	Douglas Stavert, David M. Smith, Debra Archuleta, Jerry London, Ernesto Vigil, and Laurence Holland	
1982	Composition and Synthesis during the G1 and S Phases of an HMG-E/G Component from CHO Cells	LS-1	Joseph D'Anna, Robert Tobey, and Lawrence Gurley	R. R. Becker, Oregon State University, Corvallis
1982	Development of a New Rapid HPLC Method for the Fractionation of Histones	LS-1	Lawrence Gurley, Joseph Valdez, David Prentice, and W. Dale Spall	
1982	Enhanced Resistance to Alkylating Agent Toxicity Obtained by Pretreatment with Combinations of Tract Elements	LS-1	Robert Tobey, Carl Hildebrand, Jeanclare Seagrave, and Joseph Valdez	
1982	Epidermal Carcinogenesis Following Simultaneous Exposure to Shale Oils and Ultraviolet Radiation	LS-1	Julie Wilson, Laurence Holland, and Yolanda Valdez	
1982	Evaluation of Early and Progressive Pulmonary Injury Resulting from Exposure to Oil Shale Particulates and Retort Gases	LS-1	Julie Wilson, John Steinkamp, Ernesto Vigil, Carleton Stewart, and Laurence Holland	E. Martinez, MST-11 Group; S. A. Murphy, University of New Mexico, Albuquerque; and Margaret Halleck, Pennsylvania State University, State College
1982	Flow Cytometric Quantification of Radiation Responses of Murine Peritoneal Cells	LS-1	Nobuhiko Tokita and Mudundi Raju	
1982	Fractionation of Oil Shale Retort Water	LS-1	W. Dale Spall and Robert Sebring	
1982	Identification of Potentially Hazardous Compounds and Compound Classes in Crude Shale Oil	LS-1	W. Dale Spall	

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1982	Initial Operating Conditions and Preliminary Results from the Biological Test Retort Facility	LS-1	W. Dale Spall, Robert Sebring, Ernesto Vigil, Debra Archuleta, and Douglas Stavert	D. Jackson, Eastern New Mexico University, Portales, and George Royer, H-5 Group
1982	Long-Term Exposures of Laboratory Animals to Man-Made Mineral Fibers (MMMF)	LS-1	David M. Smith, Ruben Archuleta, C. A. Greenaugh, M. Martinez, Jerry London, and J. A. Jaramillo	Lawrence Ortiz, H-5 Group
1982	Preparation and Analysis of Chromosomes from Cells in vivo	LS-1	Mark Wilder Mudundi Raju	J. Welleweerd, Radiobiological Institute, Netherlands
1982	Probing Chromatin Structure with DNase I	LS-1	David Prentice, Robert Tobey, and Lawrence Gurley	
1982	Rapid Age Response to Radiation by Flow Sorting without Cell Synchronization	LS-1	James Freyer, Mark Wilder, and Mudundi Raju	
1982	Biodirected Chemical Fractionation of a Shale Oil Retort Process Water	LS-3	Gary Strniste, Joyce Nickols, and W. Dale Spall	
1982	cDNA Cloning and Identification by Amino Acid Decoding of Chinese Hamster Metallothioneins I and II mRNAs	LS-3	Ronald Walters, Brian Crawford, John Hanners, Robert Moyzis, and Carl Hildebrand	M. Duane Enger, LS-DO
1982	Cytoplasmic Ribonucleoproteins Contain an Abbreviated Form of RNA L	LS-3	Arthur Saponara	K. S. Miller, Lindsley F. Kimball Research Institute, New York Blood Center, New York
1982	Effects of Butylated Hydroxyanisole on the Metabolism and Mutagenic Potential of Benzo(a)pyrene in Cultured Mammalian Cells	LS-3	David Chen, Richard Okinaka, and Gary Strniste	
1982	Effects of UV Excision Repair in CHO Cells on Modulating Genotoxic Properties of a Light-Activated Complex Mixture	LS-3	Richard Okinaka, Mark MacInnes, and Gary Strniste	
1982	Human Metallothionein Gene Mapping and Regulation: Somatic Cell and Molecular Genetic Analyses	LS-3	Carl Hildebrand, Brian Crawford, M. Duane Enger, Barbara Griffith, Jeffrey Griffith, John Hanners, Jonathon Longmire, A. Christine Munk, and Ronald Walters	F.-T. Kao, Eleanor Roosevelt Institute for Cancer Research, Colorado Health Science Center, Denver
1982	Investigation of the Syntenic Loci for Thymidine Kinase and Galactokinase in the Chinese Hamster	LS-3	Robert Wagner, Summers Cox, and Robert Schoen	

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1982	Mechanisms of Gene Organization and Regulation Applied to Cultured Cell Toxicology	LS-3	Carl Hildebrand, Brian Crawford, Barbara Griffith, Jeffrey Griffith, John Hanners, Jonathon Longmire, A. Christine Munk, Jeanclare Seagrave, Judith Tesmer, Robert Tobey, and Ronald Walters	M. Duane Enger, LS-DO
1982	Molecular and Somatic Cell Genetic Approaches to the Study of Genetic Alterations in Carcinogenesis	LS-3	Brian Crawford, Carl Hildebrand, Jonathon Longmire, Paul Kraemer, and Ronald Walters	
1982	Mutagenicity of Alpha Particles from Plutonium-238 in Human Fibroblasts	LS-3	David Chen, Mudundi Raju, Gary Strniste, and Nobuhiko Tokita	
1982	Nuclear Magnetic Resonance Studies of Metabolic Regulation	LS-3	Laurel Sillerud and Chung Hwa Han	Thomas Whaley, LS-6 Group
1982	Nucleotide Sequence Comparison and Evolutionary Conservation of Chinese Hamster Metallothioneins I and II mRNAs	LS-3	Ronald Walters, Brian Crawford, Robert Moyzis, John Hanners, and Carl Hildebrand	M. Duane Enger, LS-DO
1982	Photobiology of a Complex Mixture (A Shale Oil Retort Process Water)	LS-3	Gary Strniste and Judy Bingham	
1982	Recombinant DNA Repair Genes	LS-3	Mark MacInnes, Judy Bingham, and Gary Strniste	L. H. Thompson, Lawrence Livermore National Laboratory, California
1982	Trace Metal Effects on Cellular Metabolism	LS-3	Jeanclare Seagrave, Robert Tobey, Carl Hildebrand, and Judith Tesmer	
1982	Analysis of Lymphocyte Cell-Surface Antigens by Two-Wavelength Excitation of FITC- and RITC-Labeled Monoclonal Antibodies	LS-4	John Steinkamp and Carleton Stewart	
1982	Chromosome Analysis by High Illumination Flow Cytometry	LS-4	Marty Barholdi and L. Scott Cram	
1982	Chromosome Specific DNA Sequence Libraries Obtained by Cloning of Flow-Sorted Chromosomes	LS-4	James Jett, Jeffrey Griffith, Ronald Walters, Brian Crawford, Paul Jackson, Mark Wilder, John Hanners, Judith Buckingham, and L. Scott Cram	
1982	Development and Application of Techniques for Simultaneous Analysis of DNA, RNA, and Protein by Flow Cytometry (FCM)	LS-4	Harry Crissman and John Steinkamp	Z. Darzynkiewicz, Sloan-Kettering Memorial Cancer Center, New York, New York
1982	Dual-Laser Kinetic Measurements of Esterase Activity as a Function of Cell Cycle	LS-4	John Martin and James Jett	Douglas Swartzendruber, University of Colorado, Colorado Springs
1982	Flow Cytometric Analysis of Cells within Murine Tumors	LS-4	Anita Stevenson, John Steinkamp, and Carleton Stewart	

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1982	Improved Fluorescence Detection Sensitivity	LS-4	James Jett and John Martin	H. J. Dovichi and R. A. Keller, CHM-2 Group
1982	Induction of Endoreduplication by Sodium Arsenite	LS-4	Larry Deaven	
1982	Interaction of Tumor Cells with Tumoricidal Macrophages	LS-4	Anita Stevenson, John Martin, and Carleton Stewart	
1982	Karyotype Instability in Spontaneous Neoplastic Evolution of Chinese Hamster Cells in Culture	LS-4	L. Scott Cram, Marty Barholdi, Frank Ray, Gayle Travis, and Paul Kraemer	
1982	Lung Inflammation in the Premature Infant: Imbalance between Elastase and Alpha-1-Antitrypsin as a Mechanism for the Development of Bronchopulmonary Dysplasia	LS-4	S. A. Murphy, George Saunders, and Aaron Martinez	
1982	Optical Noise Reduction in Axial Light Loss Measurements on Particles and Cells	LS-4	John Steinkamp	
1982	Rapid Identification of Microorganisms by Circular Intensity Differential Scattering	LS-4	Gary Salzman and W. Kevin Grace	Charles Gregg, LS-DO
1982	Recent Advances in Flow Cytometric Analysis of Lung Cells	LS-4	John Steinkamp, Carleton Stewart, Julie Wilson, and Elmo Martinez	S. Murphy, School of Medicine, University of New Mexico, Albuquerque
1982	Spontaneous Neoplastic Evolution of Cultured Chinese Hamster Cells	LS-4	Paul Kraemer	
1982	The Macrophage: An Early Indicator of Oil Shale Retort Lung Injury	LS-4	S. A. Murphy, Julie Wilson, John Steinkamp, Aaron Martinez, Ernesto Vigil, Laurence Holland, and Carleton Stewart	
1982	The Regulation of Fibroblast Proliferation by a Macrophage-Elaborated Product	LS-4	Walker Wharton	
1983	Cellular and Molecular Biology of Cancer: Role of Toxic Products from Necrosis in Regulating Multicellular Tumor Spheroid Growth	LS-1	James Freyer	T. E. Mathis, Department of Radiology, University of New Mexico, Albuquerque
1983	Cellular and Molecular Radiobiology: Effect of Neon Ions on Synchronized Chinese Hamster Cells	LS-1	Mudundi Raju, Susan Carpenter, Nobuhiko Tokita, Jerry Howard, and Ronald Walters	
1983	Chromosomal Proteins in Chromatin Structure and Function	LS-1	Lawrence Gurley, Joseph D'Anna, David Prentice, Robert Tobey, Joseph Valdez, Robert Sebring, and W. Dale Spall	

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1983	Energy Materials Toxicology: Analytical Chemistry and Pulmonary Toxicology Studies Using Controlled Chemical Reactors	LS-1	W. Dale Spall, Laurence Holland, Ernesto Vigil, Debra Archuleta, Robert Sebring, Douglas Stavert, and J. G. Lynn	C. Fairchild, George Royer, and Marvin Tillery, HSE-5 Group
1983	Mechanisms of Lung Cell Injury: AMs and an Animal Emphysema Model; Characterization and Isolation of Subpopulations of Rat Alveolar Macrophages by Flow Cytometry	LS-1	Bruce Lehnert	
1983	Mechanisms of Lung Cell Injury: AMs and an Animal Emphysema Model; Development of a Representative Animal Model for Human Emphysema	LS-1	Bruce Lehnert and Douglas Stavert	
1983	Mechanisms of Lung Cell Injury: Development and Applications of Whole-Lung Cell Suspensions	LS-1	Julie Wilson and Jerry London	
1983	Advanced Physical Techniques: Magnetic Projection	LS-3	Arthur Saponara and Deborah Grady	
1983	Advanced Physical Techniques: NMR Techniques	LS-3	Laurel Sillerud	
1983	Cellular and Molecular Biology of Cancer: Changes in Oncogene Expression During Carcinogenesis	LS-3	Brian Crawford	
1983	Cellular and Molecular Biology: Chromosome "Walking" in the MT Domain	LS-3	Deborah Grady, Robert Moyzis, Ronald Walters, and Carl Hildebrand	
1983	Cellular and Molecular Biology: Structure of the Chinese Hamster MT-II Gene	LS-3	Ronald Walters, John Hanners, Janet Griego, Judith Buckingham, and Paul Jackson	
1983	Cellular and Molecular Biology: The Molecular Organization of the Human Genome	LS-3	Robert Moyzis, Judith Buckingham, Summers Cox, John Hanners, Janet Griego, and Ronald Walters	
1983	Cellular and Molecular Radiobiology: Recombinant DNA Repair Genes and Enzymes	LS-3	Mark MacInnes, Judy Bingham, and Gary Strniste	
1983	Cellular and Molecular Radiobiology: Repair of Alpha- or X-Radiation-Induced DNA Damage in Cultured Human Skin Fibroblasts	LS-3	David Chen, Judy Bingham, and Gary Strniste	
1983	Energy Materials Toxicology: in vitro Genetic Toxicology	LS-3	Gary Strniste, Richard Okinaka, Judy Bingham, and Joyce Nickols	
1983	Advanced Physical Techniques: Following the Cell Cycle with CIDS	LS-4	Gary Salzman and Robert Tobey	Marcus Maestre, Lawrence Berkeley Laboratory, California

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1983	Cellular and Molecular Biology of Cancer: Alteration in Epidermal Growth Factor (EGF) Binding and Processing during Neoplastic Progression	LS-4	Eric Wakshull, Paul Kraemer, and Walker Wharton	
1983	Cellular and Molecular Biology of Cancer: Chromosome Instability and Carcinogenesis	LS-4	Paul Kraemer and L. Scott Cram	Brian Crawford and Ray Stallings, University of Texas, Austin
1983	Cytogenetics	LS-4	Larry Deaven, Julianne Meyne, and Evelyn Campbell	
1983	Mechanisms of Lung Cell Injury: Technical Developments; Flow Cytometric Analysis of Lung Cell Populations	LS-4	John Steinkamp	
1983	Rapid Quantitative Cell Analysis: Axial Light Loss and Autofluorescence Subtraction	LS-4	John Steinkamp and Carleton Stewart	
1983	Rapid Quantitative Cell Analysis: Chromosome Analysis by High-Illumination Flow Cytometry and Triple-Staining Techniques	LS-4	Marty Barholdi, Julianne Meyne, and L. Scott Cram	
1983	Rapid Quantitative Cell Analysis: Fluorescence Polarization	LS-4	John Martin and Mark Wilder	J. C. Standefer, University of New Mexico, Albuquerque
1983	Rapid Quantitative Cell Analysis: Polarized Light Scattering for Microorganism Identification	LS-4	Gary Salzman	Charles Gregg, LS-DO
1983	Rapid Quantitative Cell Analysis: The Application of Flow Cytometry to Ultrasensitive Analysis	LS-4	John Martin, George Saunders, James Jett, and Mitchell Trkula	R. A. Keller, CHM-2 Group
1983–1984	Mechanisms of Lung Cell Injury: Long-Term Exposures of Laboratory Animals to Man-Made Vitreous Fibers	LS-1	David M. Smith, Ruben Archuleta, C. A. Greenaugh, M. Martinez, and N. F. Johnson	L. W. Ortiz, HSE-5 Group, and Thermal Insulation Manufacturers Association
1983–1984, 1986	Cellular and Molecular Radiobiology: Radiobiology of Ultrasoft X Rays	LS-1	Mudundi Raju, Susan Carpenter, James Freyer, Terry Mathis, Mark Wilder, Patricia Schor, Robert Sebring, and Michael Cornforth	D. J. Brenner and J. J. Chmielewski, P Division (later P-14 Group); M. E. Schillaci, MP-3 Group; and D. T. Goodhead, Medical Research Center, Harwell and Chilton, England
1983–1985	Plant Biotechnology	LS-3	Paul Jackson, James Heyser, Nigel Robinson, and Laurel Sillerud	V. P. Gutschick, LS-6 Group
1983–1986	Resource: National Laboratory Gene Library Project Resource	LS-3	Larry Deaven, L. Scott Cram, Brian Crawford, and Carl Hildebrand	Lawrence Livermore National Laboratory, California
1983–1986	Resources: National Flow Cytometry Resource (NFCR)	LS-4	L. Scott Cram	

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1984	Chromosomal Proteins in Chromatin Structure and Function: Analysis of Nucleoproteins by Injection of Dissolved Whole Nuclei or Whole Chromosomes into a Multicolumn HPLC System	LS-1	Lawrence Gurley, Joseph Valdez, and Paul Jackson	
1984	Chromosomal Proteins in Chromatin Structure and Function: Change in H1 Content, Chromatin Structure, and DNA Elongation in Cells Blocked In Early S Phase by Hydroxyurea, Aphidicolin, or 5-Fluorodeoxyuridine	LS-1	Joseph D'Anna, Robert Tobey, Virgene Church, Harry Crissman, and Paul Jackson	
1984	Chromosomal Proteins in Chromatin Structure and Function: Syntheses of Histones H1 and H1° in Mitotically Selected CHO Cells; Use of High-Performance Liquid Chromatography	LS-1	Joseph D'Anna, Maria Thayer, Robert Tobey, and Lawrence Gurley	
1984	Energy Materials Toxicology: Biological Availability of Nickel Arsenide	LS-1	Lawrence Gurley and Joseph Valdez	J. J. Miglio, CHM-1 Group
1984	Genetic Protective Mechanisms	LS-1	Robert Tobey, Jeanclare Seagrave, and Carl Hildebrand	M. Duane Enger, LS-DO
1984	Mechanisms of Lung Cell Injury: Alveolar Clearance Mechanisms; Particle Translocation to the Tracheobronchial Lymph Nodes	LS-1	Bruce Lehnert and Yolanda Valdez	
1984	Mechanisms of Lung Cell Injury: Dispersion and Identification of Tracheal Cells	LS-1	N. F. Johnson, Julie Wilson, and Robert Sebring	
1984	Mechanisms of Lung Cell Injury: Flow Cytometric Identification Cells According to Their Unique "Electro-Optical" Phenotypes	LS-1	Bruce Lehnert and John Steinkamp	
1984	Mechanisms of Lung Cell Injury: Identification, Characterization, and Isolation of Lung Cell Populations from the Alveolar Compartment	LS-1	Bruce Lehnert, Julie Wilson, Yolanda Valdez, Laurence Holland, and John Steinkamp	
1984	Mechanisms of Lung Cell Injury: Lung Free Cells; Responses to Particle Deposition and Migration Pathways	Ls-1	Bruce Lehnert and Yolanda Valdez	
1984	Mechanisms of Lung Cell Injury: Lung Lavage Fractionation by HPLC	LS-1	Lawrence Gurley, Joseph Valdez, Jerry London, and Bruce Lehnert	
1984	Mechanisms of Lung Cell Injury: Pulmonary Emphysema; Relationships with Nitrogen Dioxide Inhalation	LS-1	Douglas Stavert, Debra Archuleta, Laurence Holland, and Bruce Lehnert	

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1984	Mechanisms of Lung Cell Injury: Silica-Induced Alveolar Type II Cell Tumors in Rats	LS-1	N. F. Johnson, David M. Smith, Laurence Holland, and Robert Sebring	
1984	Cellular and Molecular Biology	LS-3	Robert Moyzis, Judith Buckingham, Summers Cox, Deborah Grady, Carl Hildebrand, N. E. Joste, and Myrna Jones	S. Atchley, Associated Western Universities, Salt Lake City, Utah
1984	Cellular and Molecular Biology: Gene Expression in Mammalian Cells	LS-3	Deborah Grady, Judith Buckingham, Paul Jackson, Carl Hildebrand, and Robert Moyzis	
1984	Cellular and Molecular Radiobiology: Molecular Characterization of α-Particle-Induced Human HGPRT-Deficient Mutants	LS-3	David Chen and Brian Crawford	John Brennand, Baylor College of Medicine, Houston, Texas
1984	Cellular and Molecular Radiobiology: Sensitivity of Human Cells to Chronic, Low Doses of Ionizing Radiation	LS-3	Gary Strniste, Judy Bingham, and David Chen	
1984	Cytogenics and Chromosome Damage Neurosciences: Applications of Stable Isotopes	LS-3	Laurel Sillerud; Chung Hwa Han; Albert Francendese; M. D. Taylor; and Jasper Jackson, Jr.	
1984	Energy Materials Toxicology: Photochemical Reactions that Alter the Genotoxicity of Environmental Pollutants	LS-3	Gary Strniste, Richard Okinaka, Joyce Nickols, and Thomas Whaley	
1984	Genetic Protective Mechanisms: Melphalan Metabolism in Cultured Cells	LS-3	Jeanclare Seagrave, Joseph Valdez, Robert Tobey, and Lawrence Gurley	
1984	Genetic Protective Mechanisms: Multiple Mechanisms Regulating Mammalian Gene Activity in Response to Toxic Metal Stress	LS-3	Carl Hildebrand, Raymond Stallings, Deborah Grady, Ronald Walters, Robert Moyzis, Judith Buckingham, Jonathon Longmire, A. Christine Munk, and Judith Tesmer	
1984	Genetic Protective Mechanisms: Recombinant DNA Repair	LS-3	Mark MacInnes, C. A. Tallerico, A. Christine Munk, Judy Bingham, and Gary Strniste	
1984	Cellular and Molecular Biology of Cancer: Internalization of Epidermal Growth Factor Receptor Complexes Necessary for the Stimulation of Cellular Division	LS-4	Eric Wakshull and Walker Wharton	
1984	Cellular and Molecular Biology of Cancer: Karyotype Instability during in vivo Tumor Progression	LS-4	Marty Barholdi, Frank Ray, L. Scott Cram, and Paul Kraemer	

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1984	Cellular and Molecular Biology of Cancer: Immortalization during Carcinogenesis	LS-4	Paul Kraemer, Frank Ray, A. R. Brothman, Marty Barholdi, and L. Scott Cram	
1984	Cellular and Molecular Biology of Cancer: Proliferation of Cells in Multicell Tumor Spheroids	LS-4	James Freyer, Patricia Schor, and Mark Wilder	
1984	Cellular and Molecular Radiobiology: The Effect of Low-Dose Radiation on the Immune Response	LS-4	Carleton Stewart	R. Anderson, Department of Pathology, University of New Mexico, Albuquerque
1984	Cytogenics and Chromosome Damage Neurosciences: Cytogenetics and Chromosome Damage	LS-4	Larry Deaven, L. Scott Cram, and Julianne Meyne	
1984	Heterogeneous Cell Populations and Their Interaction in Solid Tumors: Normal and Perturbed CHO Cells: Correlation of DNA, RNA, and Protein Content by Flow Cytometry	LS-4	Harry Crissman, Robert Tobey, and John Steinkamp	Z. Darzynkiewicz, Sloan-Kettering Memorial Cancer Center, New York, New York
1984	Heterogeneous Cell Populations and Their Interaction in Solid Tumors: Proliferation and Function of Mononuclear Phagocytes	LS-4	Carleton Stewart	C. L. Willman and T. B. Tomasi, Department of Cell Biology, University of New Mexico, Albuquerque
1984	Heterogeneous Cell Populations and Their Interaction in Solid Tumors: Radiation and the Mononuclear Phagocyte Response to Cancer	LS-4	Carleton Stewart and Anita Stevenson	
1984	Plant and Animal Ecology Resources: Nude Mouse Colony	LS-4	Paul Kraemer, Mary Brooks, and Laurence Holland	
1984	Rapid Quantitative Cell Analysis: Chromosome Ultrastructure as Resolved by Slit-Scan Flow Cytometry	LS-4	Marty Barholdi, Roger Johnston, and L. Scott Cram	
1984	Ultrasensitive Analysis: An Approach to Single-Molecule Dectection in Liquids	LS-4	John Martin and James Jett	N. J. Dovichi, M. Trkula, and R. A. Keller, CHM-2 Group
1984	Ultrasensitive Analysis: The Measurement of Antibody Binding in Cells with a High Autofluorescence Component	LS-4	John Steinkamp and Carleton Stewart	
1984	Ultrasensitive Analysis: Time-Resolved Fluorescence	LS-4	John Martin, Bill Bentley, Charles Gregg, and Carleton Stewart	
1984	Ultrasensitive Analysis: Ultrasensitive Flow Cytometric Fluorimmunoassays	LS-4	George Saunders, James Jett, and John Martin	Mayo Clinic, Rochester, New York

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1984, 1986	Cellular and Molecular Radiobiology: Radiation-Induced Alteration in DNA Precursor Metabolism, Related to DNA Damage	LS-3	Robert Ratliff	
1985	Cellular and Molecular Radiobiology: Biological Dosimetry at the Tissue/Barium Contrast Medium Interface in vitro and in vivo	LS-1	Nobuhiko Tokita, I. van der Kogel, and Mudundi Raju	
1985	Cellular and Molecular Radiobiology: Regrowth of Cells from Multicell Tumor Spheroids	LS-1	James Freyer and Patricia Schor	
1985	Chromosomal Proteins in Chromatin Structure and Function: Cell Cycle Variations in Chromatin Structure Detected by DNASE I	LS-1	Lawrence Gurley, David Prentice, and Robert Tobey	
1985	Energy Materials Technology: Cellular Toxicity to Soluble NI5AS2	LS-1	Lawrence Gurley, Joseph Valdez, Robert Tobey, and Summers Cox	J. J. Miglio, HSE-5 Group
1985	Genetic Protective Mechanisms: Inducibility of Metallothionein throughout the Cell Cycle	LS-1	Robert Tobey	Jeanclare Seagrave, University of New Mexico, Albuquerque
1985	Genetic Protective Mechanisms: Inducibility of Resistance to Alkylating Agents in Cloned Human Tumor Cells	LS-1	Robert Tobey, Elvira Bain, Joseph Valdez, M. E. Schackelford, and Judith Tesmer	
1985	Mechanisms of Lung Cell Injury: Cellular Changes in the Rat's Lung and Pleural Space Compartment Following Thoracic X-Irradiation	LS-1	Bruce Lehnert and A. J. van der Kogel	
1985	Mechanisms of Lung Cell Injury: Development of a Cross-Ventilation Rat Model for Determinations of the Deposition, Uptake, Distribution, and Elimination Kinetics of Inhaled Substance	LS-1	Bruce Lehnert, Douglas Stavert, and Debra Archuleta	
1985	Mechanisms of Lung Cell Injury: Effects of X-Irradiation and Intrapulmonary Cadmium Deposition on the Bronchoalveolar Lavage Fluids from the Lung	LS-1	Lawrence Gurley, Jerry London, Joseph Valdez, A. J. van der Kogel, and Bruce Lehnert	
1985	Mechanisms of Lung Cell Injury: Fractionation of Nucleosomal Core Histones and H1-Class Non-Core Nucleoproteins by HPLC; Modulation of the Synthesis of Non-Core Nucleoproteins during the Cell Cycle	LS-1	Lawrence Gurley, Joseph D'Anna, Maria Thayer, Joseph Valdez, W. Dale Spall, and Robert Tobey	
1985	Mechanisms of Lung Cell Injury: Resolution of Alveolar Macrophage Subpopulations	LS-1	L. A. Dethloff and Bruce Lehnert	

Year(s)	Investigation Title	Lead Group	HRL Personnel/Author(s)	Collaborator(s)
1985	Mechanisms of Lung Cell Injury: Translocation of Particles to the Pleural Space Following Lung Deposition	LS-1	Bruce Lehnert and Yolanda Valdez	
1985	Chromosomal Proteins in Chromatin Structure and Function: Chromatin Structural Changes in S-Phase Cells	LS-1	Joseph D'Anna, Virgene Church, and Robert Tobey	
1985	Cellular and Molecular Radiobiology: Molecular Analysis of Radiation-Induced Mutations in Human Cells	LS-3	David Chen, Gary Strniste, and Judith Tesmer	
1985	Cytogenetics and Chromosome Damage: Is Conserved Linkage of Some Genes Fortuitous or an Indication of Association by Selective Pressure?	LS-3	Robert Wagner, Jonathon Longmire, and Raymond Stallings	
1985	Energy Materials Technology: Photobiology and Photochemistry of Environmental Pollutants	LS-3	Gary Strniste, Joyce Nickols, Richard Okinaka, and Thomas Whaley	
1985	Genetic Protective Mechanisms: Transcriptionally Inactive Hypermethylated Metallothionein Genes Are Replicated in Early S-Phase in CHO Cells	LS-3	Raymond Stallings, Judith Tesmer, Jonathon Longmire, A. Christine Munk, Carl Hildebrand, and Robert Tobey	
1985	Advanced Physical Techniques: Modular Multicolor Fluorescence Detector	LS-4	John Steinkamp, Carleton Stewart, and Robert Habbersett	
1985	Advanced Physical Techniques: Rapid Identification of Microorganisms	LS-4	Gary Salzman, Roger Johnston, Shermila Singham, Dorothy McGregor, W. Kevin Grace, Jim Parson, Bill Bentley, Randy Krall, and Stephen Edmondson	C. W. Patterson, T-12 Group; S. P. Pederson, S-1 Group; Mesa Diagnostics, Los Alamos, New Mexico
1985	Cellular and Molecular Biology of Cancer: Conformational Changes in Chromatin Structure Detected by Flow Cytometric Analysis of Single Cells Labeled with Three DNA-Specific Fluorochromes	LS-4	Harry Crissman and John Steinkamp	
1985	Cellular and Molecular Biology of Cancer: Modulation of EGF Binding and Processing In BALB/c-3T3 Cells	LS-4	Richard Selinfreund, Peter H. Lin, Janet Cooper, and Walker Wharton	
1985	Cellular and Molecular Biology of Cancer: Specific Chromosome Changes during Neoplastic Progression in vitro	LS-4	Paul Kraemer, Marty Barholdi, Frank Ray, and L. Scott Cram	
1985	Cytogenetics and Chromosome Damage: Chromosome Changes of Newly Immortalized Cells	LS-4	L. Scott Cram, Frank Ray, Marty Barholdi, and Paul Kraemer	

Year(s)	Investigation Title	Lead Group	HRL Personnel/Author(s)	Collaborator(s)
1985	Cytogenetics and Chromosome Damage: Chromosome Structure and Function	LS-4	Larry Deaven	
1985	Cytogenetics and Chromosome Damage: Sorting and Cloning of the Complete Chinese Hamster Karyotype	LS-4	James Jett, Mark Wilder, Carl Hildebrand, A. Christine Munk, Linda Meincke, Raymond Stallings, and Brian Crawford	
1985	Heterogeneous Cell Populations and Their Interaction in Solid Tumors: Macrophage-Induced Cytostasis of Tumor Cells	LS-4	Anita Stevenson and Carleton Stewart	
1985	Rapid Quantitative Cell Analysis: Flow Cytometry as a Tool for Chromosome Analysis	LS-4	Marty Barholdi, Kevin Albright, Charles Goolsby, Roger Johnston, Julianne Meyne, Andrew Ray, and L. Scott Cram	
1985	Ultrasensitive Analysis: Ultrasensitive Molecular Detection by Laser-Induced Fluorescence	LS-4	James Jett, John Martin, and George Saunders	R. A. Keller and D. C. Nguyen, CHM-2 Group
1985–1986	Cellular and Molecular Radiobiology: Identification of an Ionizing Radiation-Specific Human Repair Gene	LS-3	David Chen, Mark MacInnes, Robert Moyzis, and Gary Strniste	
1985–1986	Energy Materials Technology: Microbial Ecology	LS-3	Larry Hersman, Francisco Tomei, and Enid Tomei	
1986	A New Integrated HPLC System for the Analysis of Nucleoproteins from Small Numbers of Cells	LS-1	Lawrence Gurley, Paul S. Jackson, Joseph Valdez, and W. Dale Spall	
1986	Development of a Novel Rat Lung Fibroblast Proliferation Assay	LS-1	Robert Tobey, L. A. Dethloff, and Bruce Lehnert	
1986	Flow Sorting and Automated Dissociation of Multicellular Tumor Spheroids	LS-1	James Freyer, Patricia Schor, Mark Wilder, and James Jett	
1986	HPLC Evaluation of Chromosome Preparations for Flow Cytometry	LS-1	Lawrence Gurley, Joseph Valdez, Frank Ray, and Julianne Meyne	
1986	Isolation of Pulmonary Interstitial Macrophages	LS-1	Bruce Lehnert and L. A. Dethloff	
1986	Potentiation of Oxidant Gas-Induced Lung Injury by Post-Exposure Exercise	LS-1	Douglas Stavert and Bruce Lehnert	
1986	Sensitivity to X-Irradiation in Relation to Cell Size of CHO Cells Synchronized in Early G1	LS-1	Robert Tobey, Harry Crissman, and Mark Wilder	F. Traganos and Z. Darzynkiewicz, Sloan-Kettering Institute for Cancer Research, New York
1986	Changes in Chromatin Organization and DNA Elongation under Conditions of HU Treatment that Reportedly Facilitate Gene Amplification	LS-3	Joseph D'Anna, Virgene Church, and Robert Tobey	

Year(s)	Investigation Title	Lead Group	HRL Personnel/Author(s)	Collaborator(s)
1986	Chromosome-Specific Repetitive DNA Probes	LS-3	Robert Moyzis and Julianne Meyne	
1986	DNA-Protein Interactions	LS-3	Deborah Grady, D. L. Robinson, and Robert Moyzis	
1986	Human Genomics: Chromosome-Specific Physical Maps and Their Uses	LS-3	Carl Hildebrand, Robert Moyzis, Jonathon Longmire, Nancy Brown, Lynn Clark, Linda Meincke, A. Christine Munk, and Larry Deaven	
1986	Isolation of Cosmid Clones Containing Human DNA Sequences and Associated with a DNA Excision Repair Gene	LS-3	Mark MacInnes, Derek de Bruin, David Chen, Judith Tesmer, Gary Strniste, Richard Reynolds, and Richard Okinaka	
1986	Molecular and Biochemical Responses of Plants and Plant Cells to Toxic Trace Metal Stress	LS-3	Paul Jackson and Nigel Robinson	
1986	Salt Tolerance in Plants	LS-3	James Heyser and Nigel Robinson	
1986	A New Method for Rapid and Sensitive Detection of Bromodeoxyuridine in DNA Replicating Cells	LS-4	Harry Crissman and John Steinkamp	
1986	A New Technique That Significantly Improves Resolution of DNA Content for Cell-Cycle-Specific Sorting of Viable Cells	LS-4	Harry Crissman, Marianne Hofland, Anita Stevenson, Mark Wilder, and Robert Tobey	
1986	Advanced Flow Cytometry	LS-4	Tudor Buican	
1986	Biological and Chemical Applications of Zeeman Interferometry	LS-4	Roger Johnston	
1986	Chromosome Sorting by Flow Cytometry	LS-4	Kevin Albright, W. Kevin Grace, Evelyn Campbell, Mary Luedemann, Larry Deaven, and Marty Barholdi	
1986	Chromosome Structure and Function	LS-4	Larry Deaven, Kevin Albright, and Evelyn Campbell	
1986	Correlated Analysis of Cell Cycle, Mitochondrial Activity, and Cell Volume in Leukemic Cells Treated with Ara-C	LS-4	Marianne Hofland and Harry Crissman	
1986	Detection of a Single Fluorescent Molecule in a Flow Cytometer	LS-4	John Martin, George Saunders, and James Jett	D. C. Nguyen and R. A. Keller, CLS-2 Group
1986	Effects of Low-Dose Radiation on the Immune Response of Human Peripheral Blood Leukocytes	LS-4	Anita Stevenson and Carleton Stewart	
1986	Four-Color Immunofluorescence of Human Lymphocyte Subpopulations	LS-4	John Steinkamp, Robert Habbersett, and Carleton Stewart	
1986	Health Research Laboratory Computer Network	LS-4	James Jett and Mark Wilder	

Year(s)	Investigation Title	Lead Group	HRL Personnel/Author(s)	Collaborator(s)
1986	Karyotypic Stability and Neoplastic Progression in Chinese Hamster Cells	LS-4	Janet Cooper, Evelyn Campbell, Walker Wharton, and Paul Kraemer	
1986	MT Gene Organization Regulation	LS-4	A. Christine Munk, Judith Tesmer, Janet Cooper, Jonathon Longmire, and Carl Hildebrand	
1986	Oncogene Expression in Myeloid Cells	LS-4	Carleton Stewart and Sigrid Stewart	Cheryl Willman and Thomas Tomasi, University of New Mexico, Albuquerque
1986	Polarized Light Scattering from Biological Cells	LS-4	Shermila Singham and Gary Salzman	M. K. Singham, T-5 Group; C. W. Patterson, T-12 Group; Craig Bohren, Pennsylvania State University, State College; and C. Bustamante, University of New Mexico, Albuquerque
1986	Resource for Mapping of DNA Probes	LS-4	Larry Deaven, Kevin Albright, and Mary Luedemann	
1986	Structure of DNA in Solution	LS-4	Stephen Edmondson	
1986	The Cellular Biology of Myeloid Differentiation	LS-4	Carleton Stewart and Sigrid Stewart	James Bender, University of New Mexico, Albuquerque
1986	The Role of Specific Chromosome Changes in Neoplasia	LS-4	Paul Kraemer, F. Andrew Ray, Marty Barholdi, and L. Scott Cram	

Appendix D: Los Alamos National Laboratory Historic Building Survey Forms

LANL TA- Building # 43-0001

Camera 1712499; Canon EOS 1DX MarkII; 984231

Frame #s DSCN1515–DSCN1565, DSCN1571; UI-55-2022-79-1–UI-55-2022-79-106, UI-55-2022-111-1–UI-55-2022-111-481, UI-55-2022-112-1–UI-55-2022-112-359; P0004802-P0004812

Surveyor(s) C. Gregory; S. McCarthy, J. Ronquillo, N. Naranjo

Date 5/11/2022; 5/25/2006

Los Alamos National Laboratory
Historic Building Survey Form

Building Name: Health Research Laboratory | UTMs easting: 380797 | northing: 3971569 | zone: 13

Legal Description: Map: Guaie Mountain Ouad | tnsp: 19N | range: 6E | sec: 17

Current Use/ Function: Health Research Laboratory | Original Use/ Function: Medical Research Laboratory

Date (estimated): | Date (actual): 1953 | Property Type: Laboratory/Processing

Type of Construction

Pre-Engineered ☐ Steel Frame ☑ Wood Frame ☐ CMU ☑ Reinforced Concrete ☑

Other Type of Construction: | # of Stories: 5

Foundation Reinforced Concrete

Exterior CMU-Exterior ☑ Reinforced Concrete-Exterior ☑ Steel (galvanized) ☐ Steel (corrugated) ☐

Wood Siding ☐ Asbestos Shingles-Exterior ☐ In-Fill Panels ☐ Other-Exterior: asbestos-cement panels; metal panels

Exterior Treatment (painted, stuccoed, etc): painted and stuccoed

Exterior Features (docks, speakers, lights, signs, etc): Loading docks are located at the rear (south-southeast) of the building, and the largest one features a standing seam canopy with a shed roof supported by steel posts. The facility also exhibits numerous small and large metal-framed louvered vents; exterior lights, sensors, and cameras; signs; and supplemental mechanical equipment.

Addition CMU-Addition ☑ Reinforced Concrete-Addition ☐ Steel (galvanized)- Addition ☑ Wood ☐

Steel (corrugated)-Addition ☑ Asbestos Shingles-Addition ☐ Other- Addition: asbestos-cement panels

Exterior Treatment-Addition: painted and stuccoed

Exterior Features-Addition: Additions exhibits loading docks; numerous small and large metal-framed louvered vents; exterior lights, sensors, and cameras; signs; and mechanical equipment.

Roof Form Slanted/Shed ☑ Gable ☑ Other Roof Type: flat

Degree of Pitch/ Slope: Moderate

Roof Materials Corrugated Metal ☑ Rolled Asphalt ☐ Asbestos Shingles ☑ 4-Ply Built Up ☑

Other Roof Materials: poured concrete, gravel, and waterproof membrane

Window Type Casement ☑ Single Hung Sash ☐ Double Hung Sash ☐ Fixed Window ☑

Other Window Type: interior and exterior hopper, awning, and sliding-sash

# of Each Window Type/ Comments: exterior windows: 7 3-pane, steel-framed windows; 5 3-pane, steel-framed windows (fixed pane with an exterior hopper above and an awning below); 7 8-by-8, glass block windows; 2 aluminum-framed, sliding-sash windows; 1 glass-block transom window; 1 metal-framed, 6-pane window; 8 metal-framed, casement windows; 2 metal-framed, fixed-pane over sliding sash windows ; 10 metal-framed, fixed-pane sidelights; 4 metal-framed, fixed-pane transom windows; 103 metal-framed, fixed-pane windows; 40 metal-framed, fixed-pane, interior hopper windows; 17 paired, 3-pane, steel-framed windows (fixed pane with an exterior hopper above and an awning below); 6 skylights; and 24 steel-framed, awning windows

Glass Type: Clear ☑ Wire Glass ☐ Opaque ☐ Painted Glass ☐ Glass Block ☑

Light Pattern: see window type/comments above

Door Type

Personnel Door Types

Exterior: Fire Door ☑ Single ☑ Double ☑ Roll-up ☐ Sliding ☐ Hollow Metal ☑ Solid Wood ☐ 1/2 Glazed ☑ Paneled ☐ Louvered ☐ Painted ☑

Interior: Fire Door ☐ Single ☐ Double ☐ Roll-up ☐ Sliding ☐ Hollow Metal ☐ Solid Wood ☐ 1/2 Glazed ☐ Paneled ☐ Louvered ☐ Painted ☐

Equipment Door Types

Exterior: Fire Door ☐ Single ☑ Double ☐ Roll-up ☐ Sliding ☐ Hollow Metal ☑ Solid Wood ☐ 1/2 Glazed ☐ Paneled ☐ Louvered ☑ Painted ☑

Interior: Fire Door ☐ Single ☐ Double ☐ Roll-up ☐ Sliding ☐ Hollow Metal ☐ Solid Metal ☐ 1/2 Glazed ☐ Paneled ☐ Louvered ☐ Painted ☐

# of Each Door Type/Comments: exterior doors: 3 paired, metal-framed glass personnel doors; 3 paired, metal-panel personnel doors; 4 paired, metal-panel personnel doors with fixed lights; 11 standard and wide single, metal-panel personnel doors; 1 single, metal-panel personnel door with a louvered vent; and 1 single, metal-panel personnel door with a louvered vent and a fixed light

Interior Wall: Gypsum Board ☐ Reinforced Concrete- Interior ☐ CMU- Interior ☑ Plywood ☐ Other- Interior:

In-Wall Electrical Wiring ☐ On-Wall Electrical Wiring ☐

Ceiling: Drop Ceiling ☑

Interior Comments (Equipment, etc): While the equipment has been removed, rooms used for important experiments still exist: Room B138-cesium source; Room B142-radiation exposure laboratory; Room SB14-Low Level Crystal Counter (human spectrometer); Room SB16-Los Alamos Human Counter (or HUMCO).

Degree of Remodeling: Major

Condition: Excellent ☐ Good ☑ Fair ☐ Deteriorating ☐ Contaminated ☐ Burned ☐

Associated Buildings ☑

If yes, list building names and #s: TA-43-12 Warehouse; exempt facilities TA-43-10 Sewage Lift Station; TA-43-22 Shed; TA-43-28 Storage Shed; TA-43-44 Cooling Tower; TA-43-47 Chemical Shed; TA-43-49 Chemical Shed; and

Integrity: Good

TA-43-61 Safety Storage Shed

Significance Eligible

Eligible Under Criterion A ☑ B ☑ C ☐ D ☐ Not Eligible ☐

DOE Themes

Nuclear Weapon Components and Assembly ☐

Nuclear Weapon Design and Testing ☐

Nuclear Propulsion ☐

Peaceful Uses: Plowshare, Nuclear Medicine, Nuclear Energy, Nuclear Science ☑

Energy and Environment: Research and Design Projects ☐

LANL Themes

Weapons Research and Design, Testing, and Stockpile Support ☐

Super Computing ☐

Reactor Technology ☐

Biomedical/Health Physics ☑

Strategic and Supporting Research ☐

Environment/Waste Management ☐

Administration and Social History ☐

Architectural History ☐

Recommendations/ Additional Comments

TA-43-0001 is determined eligible for listing in the NRHP under Criteria (a) and (b) for its significant contributions to important historical themes of the Laboratory during the Cold War era and for its significant association to Wright H. Langham, an early visionary of the Health Division.

Architectural Features (elevations)

TA-43-0001 (HRL) is a one- and two-story building with penthouses, a subbasement, and a basement. The building is located east and south of Diamond Drive near the edge of the Los Alamos Canyon escarpment. Irregular in plan, the facility comprises an original building with seven additions. HRL measures approximately 305 by 232 feet, encompasses approximately 103,369 square feet, and is oriented north-northwest by south-southeast. The facility cascades from higher elevations near Diamond Drive to lower elevations near the escarpment. Built on poured-concrete foundations and piers, the building is constructed of reinforced and poured-in-place concrete, CMUs, and structural steel. Exterior wall materials include concrete, CMUs, asbestos-cement panels, and metal panels that are painted or clad in a fine-grained (or rubbed) concrete plaster or stucco. Some of the exterior materials exhibit actual expansion joints, whereas others are scored in a similar manner.

The facility has numerous rooflines, and roofs are constructed of poured concrete, metal framing and decking, and asbestos-cement panels, with some covered in gravel, built-up roofing, or waterproof membranes. Although most of the roofs are flat (or extremely low-pitched for water runoff), there is one shed roof and one gabled roof. Most of the flat roofs have parapets, and the original parapet at the northeast corner of the building has been augmented with stepped metal panels. The shed roof features six skylights. Atop many of the roofs are equipment that is accessed by numerous fixed ladders between the various levels. Portable metal-pipe railings have been placed on a few of the roofs. Most of the building has no eaves, but the one-story section on the southern portion of the building features a wide, overhanging closed eave on some façades. This section of the building also features outdoor animal runs associated with interior cages. The runs are flanked by two gated porticos and enclosed by a poured-concrete and CMU wall. Additionally, the building has two large stacks (one constructed of brick) that extend beyond the rooflines near the south-southeast corner of the building, and the roofs exhibit numerous lightning rods, antennas, exhaust vents, smaller stacks, and other mechanical equipment.

The building has numerous entries, and the main entrance is located on the north-northwest façade. Access is provided through paired, metal-framed glass personnel doors with a metal-framed, fixed-pane transom window and flanking metal-framed, fixed-pane sidelights. Located under a long, broad concrete canopy, the doors are accessed via poured-concrete stairs with a metal-pipe railings and a poured-concrete ramp. At the western end of the entryway, a wall extends up from the concrete platform to the edge of the canopy. In this wall are three square, framed decorative openings. Above the main entrance canopy is a deeply inset ribbon of 10/10 fixed-pane windows in a protruding concrete frame. Other entrances to the building include paired, metal-framed glass personnel doors (one pair is flanked by metal-framed, fixed-pane sidelights and has metal-framed, fixed-pane transom windows); paired, metal-panel personnel doors; paired, metal-panel personnel doors with fixed lights (one has a metal-framed, fixed-pane transom window); standard and wide single, metal-panel personnel doors (one has a glass-block transom window); a single, metal-panel personnel door with a louvered vent; and a single, metal-panel personnel door with a louvered vent and a fixed light. Entrances are inset or flush, with some of the latter located under canopies or overhanging eaves or at the top of a stoop. These entrances are accessed via poured-concrete sidewalks, stairs, loading docks, and ramps; metal-framed stairways; and rooftop walkways. Loading docks are located at the rear of the building, and the largest one features a standing seam canopy with a shed roof supported by steel posts.

Fenestration, in addition to those windows already mentioned, includes numerous bands of windows in protruding concrete frames: metal-framed, fixed-pane, interior hopper windows evenly spaced between corrugated concrete panels; single and paired, three-pane, steel-framed windows (fixed pane with an exterior hopper above and an awning below) evenly spaced between corrugated or plain concrete panels; a ribbon of three-pane, steel-framed windows (fixed pane with an exterior hopper above and an awning below); metal-framed, fixed-pane windows flanking a corrugated concrete panel; aluminum-framed, sliding-sash windows; and metal-framed, fixed-pane windows. Other bands of windows include slightly inset 8-by-8 glass-block windows evenly spaced between concrete panels (note that one is modified by an addition); ribbons of metal-framed, fixed-pane windows with protruding concrete sills; a ribbon of 4-over-4 fixed-pane windows; a ribbon of steel-framed, awning windows; metal-framed, casement windows; and metal-framed, fixed-pane windows. Other non-banding fenestration includes paired, steel-framed, three-pane windows (fixed pane with an exterior hopper above and an awning below); three-pane, steel-framed windows with protruding concrete sills; metal-framed, fixed-pane windows with protruding concrete sills; and a metal-framed, six-pane window in a protruding concrete frame. Replacement windows include metal-framed, fixed-pane over sliding sash windows and metal-framed fixed-pane windows. Additionally, many windows have been modified with the addition of air-conditioning units or metal grilles or have been covered up with plywood or painted. Additionally, the facility exhibits numerous small and large metal-framed louvered vents; exterior lights, sensors, and cameras; signs; and supplemental mechanical equipment on the western and southern sides of the building.

Since the facility's original construction, the Laboratory has constructed seven substantive additions, replaced most doors, replaced or modified many windows, replaced a large metal-framed louvered vent, and made numerous interior modifications. TA-43-0001 has structural integrity, and the exterior is in good condition. Its architectural design is influenced by the International Modernist architectural style, and character-defining features include geometrical massing, lack of ornament, flat

Total sq ft 103,369

Architect / Builder W. C. Kruger and Associates; Los Alamos Scientific Laboratory; Philippe de Montauzan Register; Clark, Arrison, Germanas, Architects; Holmes and Narver; and Flatow Moore Shaffer McCabe

Alterations

Architectural Features (continued): roofs, continuous surface planes, bands of windows, and unornamented doors and windows.

Alterations: Since the facility's original construction, the Laboratory has constructed seven substantive additions, replaced most doors, replaced or modified many windows, replaced a large metal-framed louvered vent, and made numerous interior modifications. TA-43-0001 has structural integrity, and the exterior is in good condition. Its architectural design is influenced by the International Modernist architectural style, and character-defining features include geometrical massing, lack of ornament, flat roofs, continuous surface planes, bands of windows, and unornamented doors and windows.

List of Selected Drawings (Cntrl + Enter for paragraph break)

ENG-C11247, Sheet A-1
Medical Research Laboratory
Sub-basement Plan
August 20, 1951; construction completed in 1953 (W.C. Kruger and Associates)

ENG-C11248, Sheet A-2
Medical Research Laboratory
Basement Plan
August 20, 1951; construction completed in 1953 (W.C. Kruger and Associates)

ENG-C11249, Sheet A-3
Medical Research Laboratory
First Floor Plan
August 20, 1951; construction completed in 1953 (W.C. Kruger and Associates)

ENG-C11250, Sheet A-4
Medical Research Laboratory
Second Floor Plan
August 20, 1951; construction completed in 1953 (W.C. Kruger and Associates)

ENG-C11251, Sheet A-5
Medical Research Laboratory
Elevations
August 20, 1951; construction completed in 1953 (W.C. Kruger and Associates)

ENG-C11252, Sheet A-6
Medical Research Laboratory
Elevations
August 20, 1951; construction completed in 1953 (W.C. Kruger and Associates)

ENG-C27981, Sheet 8 of 26
Additional Animal Quarters, Medical Research Laboratory
Basement Floor Plan
March 20, 1959; construction completed in 1960 (W.C. Kruger and Associates)

ENG-C27982, Sheet 9 of 26
Additional Animal Quarters, Medical Research Laboratory
Elevations
March 20, 1959; construction completed in 1960 (W.C. Kruger and Associates)

ENG-C37643, Sheet 2 of 19
Facility Improvements, TA-43-1
Floor Plans and Details
July 28, 1969; construction completed in 1969 (Los Alamos Scientific Laboratory, Engineering Department)

ENG-C37644, Sheet 3 of 19
Facility Improvements, TA-43-1
Elevations and Sections
July 28, 1969; construction completed in 1969 (Los Alamos Scientific Laboratory, Engineering Department)

ENG-C42873, Sheet 5 of 18
Lab-Office Addition, Bldg. HRL-1, T-43
Floor Plan
May 28, 1974; construction completed ca. 1975 (Phillippe Register AIA, PA)

ENG-C42873-0006, Sheet 6 of 18
Lab-Office Addition, Bldg. HRL-1, T-43
Elevations and Details
May 28, 1974; construction completed ca. 1975 (Phillippe Register AIA, PA)

ENG-C42657, Sheet 2 of 10
Tunnel Cage Washer Addition, Bldg. HRL
Plans, Elevations, and Details
January 31, 1975, construction completed ca. 1975 (Los Alamos Scientific Laboratory)

ENG-C42657, Sheet 3 of 10
Tunnel Cage Washer Addition, Bldg. HRL
Plans, Sections, and Elevations
January 31, 1975, construction completed ca. 1975 (Los Alamos Scientific Laboratory)

ENG-C43632, Sheet 2 of 16
HRL Building Addition
Floor Plan and Schedule
September 2, 1977; construction completed in 1977 (Clark, Arrison, Germanas Architects, PC)

ENG-C43632, Sheet 3 of 16
HRL Building Addition
Roof Plan, Elevations, and Section
September 2, 1977; construction completed in 1977 (Clark, Arrison, Germanas Architects, PC)

ENG-C45632, Sheet 10 of 51
HRL Building Addition
First Floor Plan
October 30, 1990; construction completed in 1991 (Holmes and Narver)

ENG-C 45632, Sheet 11 of 51
HRL Building Addition
Second Floor Plan
October 30, 1990; construction completed in 1991 (Holmes and Narver)

ENG-C 45632, Sheet 14 of 51
HRL Building Addition
Building Elevations and Roof Plan
October 30, 1990; construction completed in 1991 (Holmes and Narver)

ENG-C49784, sheet 25 of 72
Biophysics Lab Addition
Ground Floor Plan, Area A
April 1, 1996; construction completed 1997 (Flatow Moore Shaffer McCabe)

ENG-C49784, Sheet 26 of 72
Biophysics Lab Addition
Ground Floor Plan, Area B
April 1, 1996; construction completed 1997 (Flatow Moore Shaffer McCabe)

ENG-C49784, Sheet 27 of 72
Biophysics Lab Addition
First Floor Plan, Area A
April 1, 1996; construction completed 1997 (Flatow Moore Shaffer McCabe)

ENG-C49874, Sheet 28 of 72
Biophysics Lab Addition
First Floor Plan, Area B
April 1, 1996; construction completed 1997 (Flatow Moore Shaffer McCabe)

ENG-C49784, Sheet 34 of 72
Biophysics Lab Addition
Building Elevations
April 1, 1996; construction completed 1997 (Flatow Moore Shaffer McCabe)

AB95-W1E, Sheet 1 of 5
As-built Record Floor Plan, Health Research Laboratory
Sub-basement Floor Plan
October 20, 1995 (Johnson Controls, Inc.)

AB95-W1E, Sheet 2 of 5
As-built Record Floor Plan, Health Research Laboratory
Basement Floor Plan
October 20, 1995 (Johnson Controls, Inc.)

AB95-W1E, Sheet 3 of 5
As-built Record Floor Plan, Health Research Laboratory
Penthouse #2, Penthouse #3, and First Floor Plan
October 20, 1995 (Johnson Controls, Inc.)

AB95-W1E, Sheet 4 of 5
As-built Record Floor Plan, Health Research Laboratory
Second Floor Plan
October 20, 1995 (Johnson Controls, Inc.)

AB95-W1E, Sheet 5 of 5
As-built Record Floor Plan, Health Research Laboratory
Penthouse #1 Floor Plan
October 20, 1995 (Johnson Controls, Inc.)

FPR_43_0001_01, Sheet 1 of 1
Floor Plan of Record, Health Research Laboratory
First Floor Plan
September 20, 2005 (Los Alamos National Laboratory, Facility Planning)

FPR_43_0001_02, Sheet 1 of 1
Floor Plan of Record, Health Research Laboratory
Second Floor Plan
September 20, 2005 (Los Alamos National Laboratory, Facility Planning)

FPR_43_0001_B1, Sheet 1 of 1
Floor Plan of Record, Health Research Laboratory
Basement Plan
September 20, 2005 (Los Alamos National Laboratory, Facility Planning)

FPR_43_0001_B2, Sheet 1 of 1
Floor Plan of Record, Health Research Laboratory
Sub-basement Plan
September 20, 2005 (Los Alamos National Laboratory, Facility Planning)

FPR_43_0001_PH1, Sheet 1 of 1
Floor Plan of Record, Health Research Laboratory
Penthouse Floor Plan
September 20, 2005 (Los Alamos National Laboratory, Facility Planning)

AB33, Sheet 2 of 2
As-built Structure Location Maps
TA-43 Health Research Lab and DOE Hdqrs
July 2, 2013 (Los Alamos National Laboratory)

Oblique aerial of TA-43-0001, view to the southwest, October 14, 2021 (LANL image, file no. 20211014F01 RANGER SR5189507 DTH 0008).

Oblique aerial of TA-43-0001, view to the northeast, October 14, 2021 (LANL image, file no. 20211014F02 RANGER SR5189507 DTH 0026).


Oblique aerial of TA-43-0001, view to the north-northwest, October 14, 2021 (LANL image, file no. 20211014F02 RANGER SR5189507 DTH 0013).

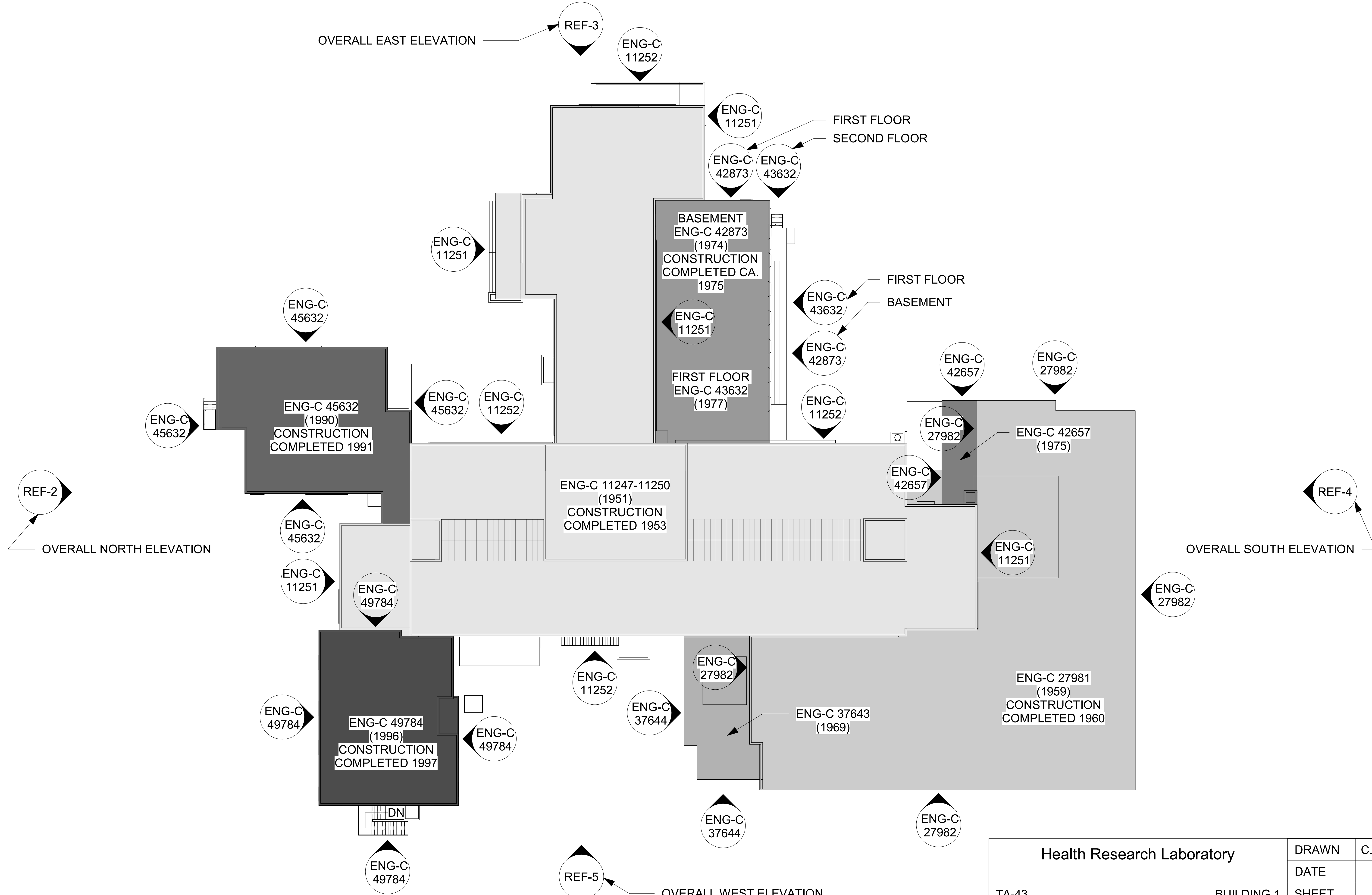

Oblique aerial of TA-43-0001, view to the west-southwest, October 14, 2021 (LANL image, file no. 20211014F02 RANGER SR5189507 DTH 0005).


TA-43-0001, view to the south-southeast, March 31, 2022 (LANL image, file no. UI-55-2022-79-1).


TA-43-0001, view to the east-northeast, March 31, 2022 (LANL image, file no. UI-55-2022-79-38).

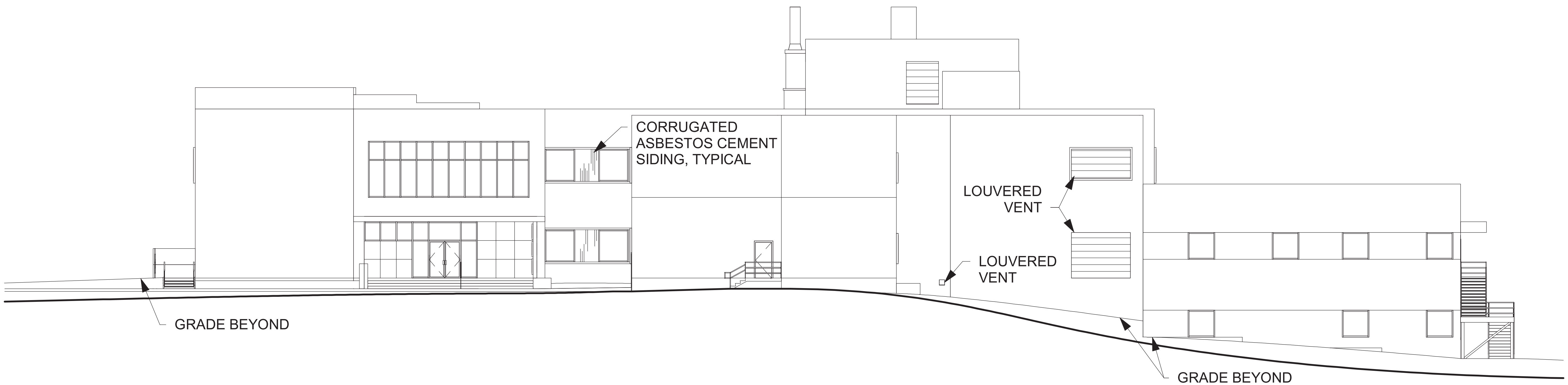
TA-43-0001, view to the north-northwest, March 31, 2022 (LANL image, file no. UI-55-2022-79-81).

TA-43-0001, view to the west-southwest, March 31, 2022 (LANL image, file no. UI-55-2022-79-106).



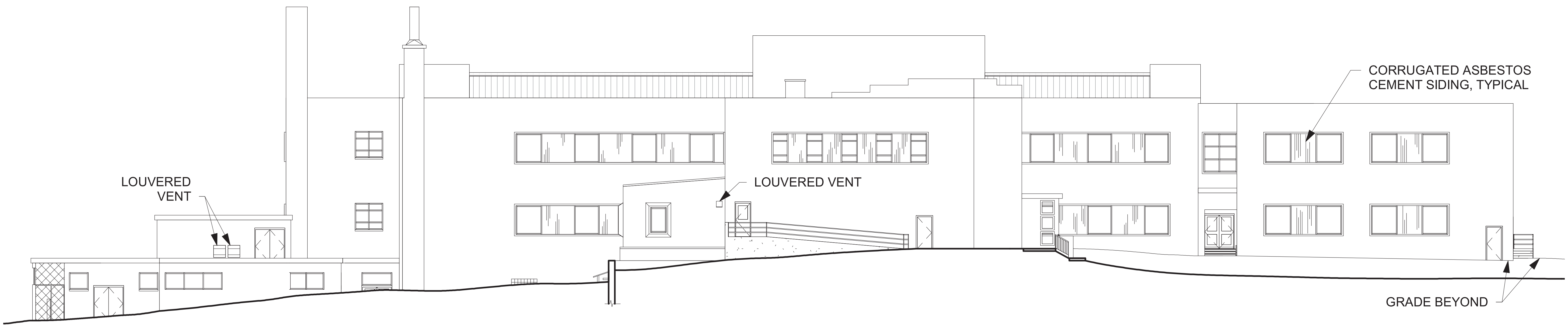
1 FLOOR PLAN AND ELEVATION DRAWINGS KEY
1" = 30'-0"

Health Research Laboratory		DRAWN	C. TOWNSEND
		DATE	03.30.22
TA-43	BUILDING 1	SHEET	REF-1
Los Alamos NATIONAL LABORATORY	PO BOX 1663 LOS ALAMOS, NM 87545	1 OF 5	
		LA-UR	-



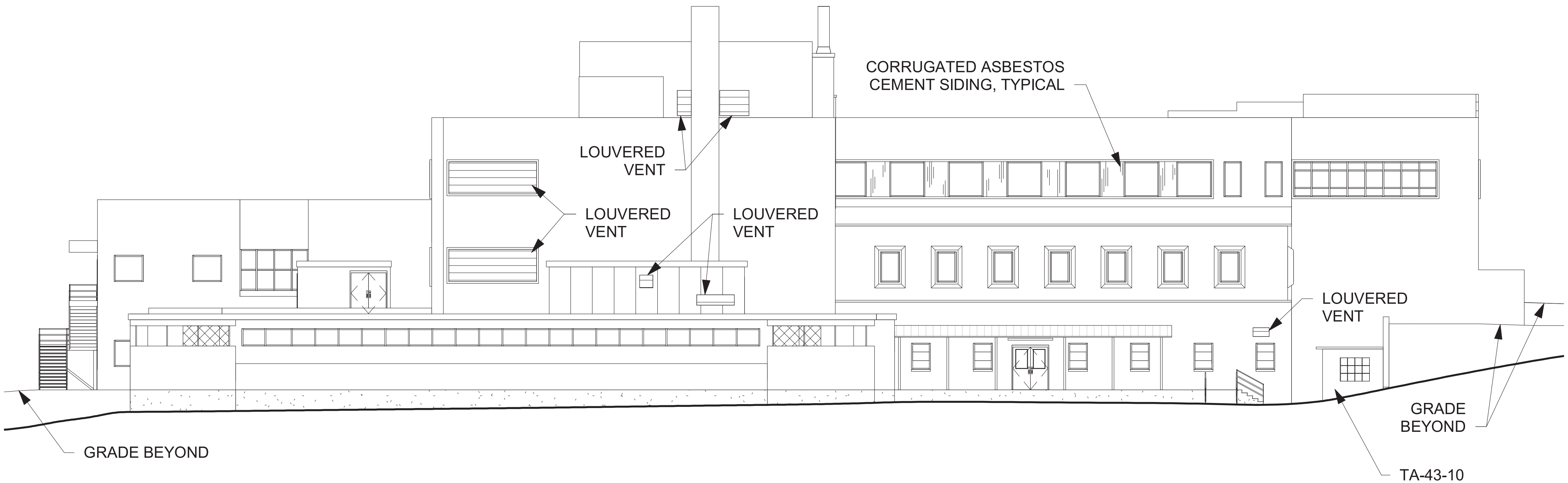
1 OVERALL NORTH ELEVATION
1" = 20'-0"

Health Research Laboratory		DRAWN	C. TOWNSEND
		DATE	03.30.22
TA-43	BUILDING 1	SHEET	REF-2
Los Alamos NATIONAL LABORATORY	PO BOX 1663 LOS ALAMOS, NM 87545	2 OF 5	
		LA-UR	-



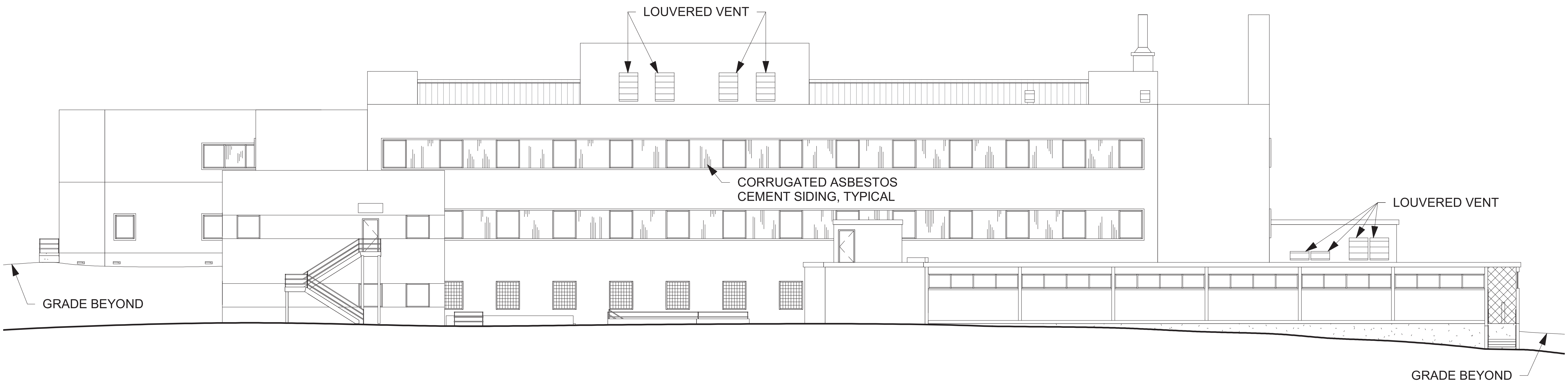
1 OVERALL EAST ELEVATION
1" = 20'-0"

Health Research Laboratory		DRAWN	C. TOWNSEND
		DATE	03.30.22
TA-43	BUILDING 1	SHEET	REF-3
Los Alamos NATIONAL LABORATORY	PO BOX 1663 LOS ALAMOS, NM 87545	3 OF 5	
		LA-UR	-



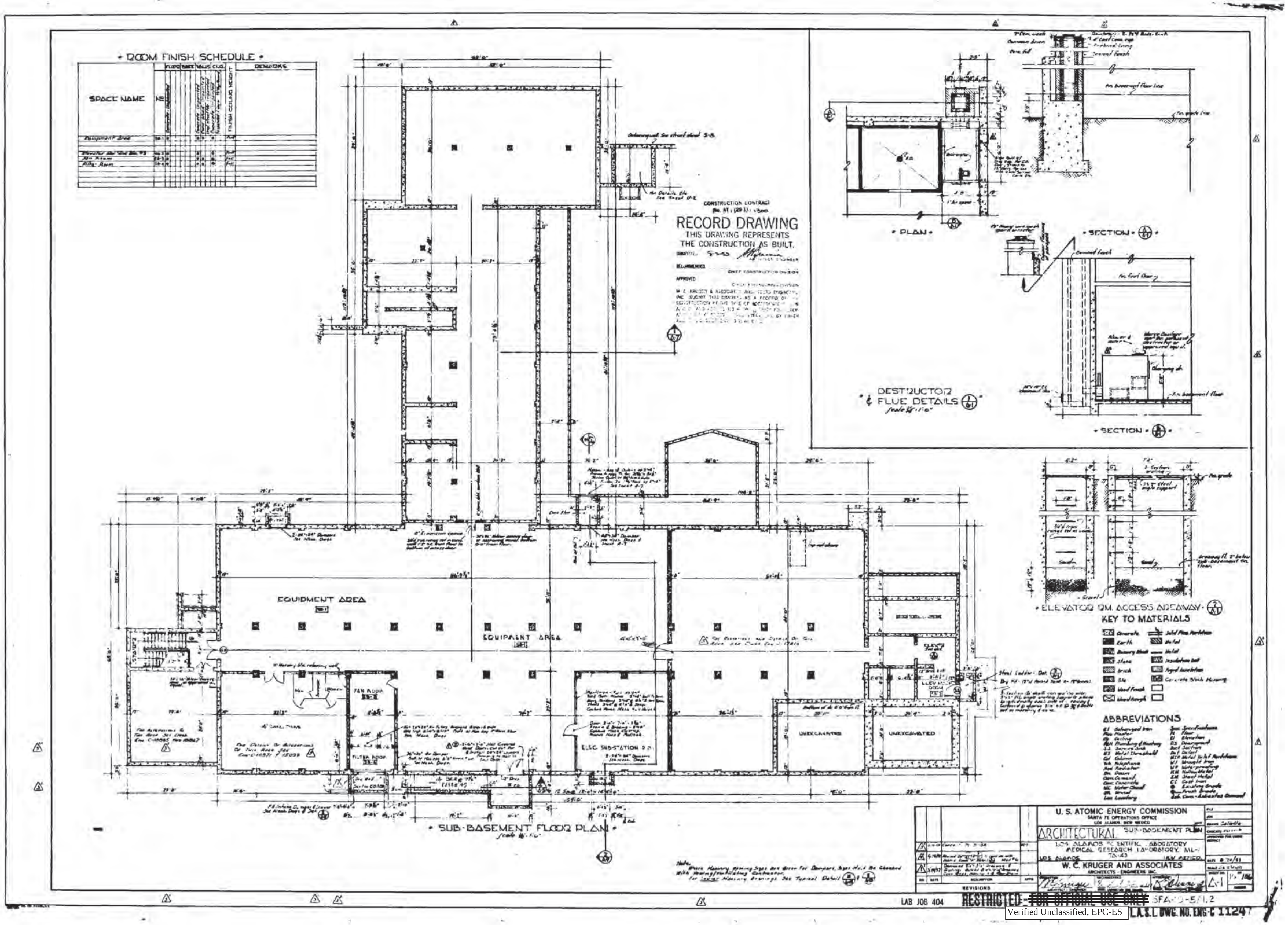
1 OVERALL SOUTH ELEVATION
1" = 20'-0"

Health Research Laboratory		DRAWN	C. TOWNSEND
		DATE	03.30.22
TA-43	BUILDING 1	SHEET	REF-4
Los Alamos NATIONAL LABORATORY	PO BOX 1663 LOS ALAMOS, NM 87545	4 OF 5	
		LA-UR	-

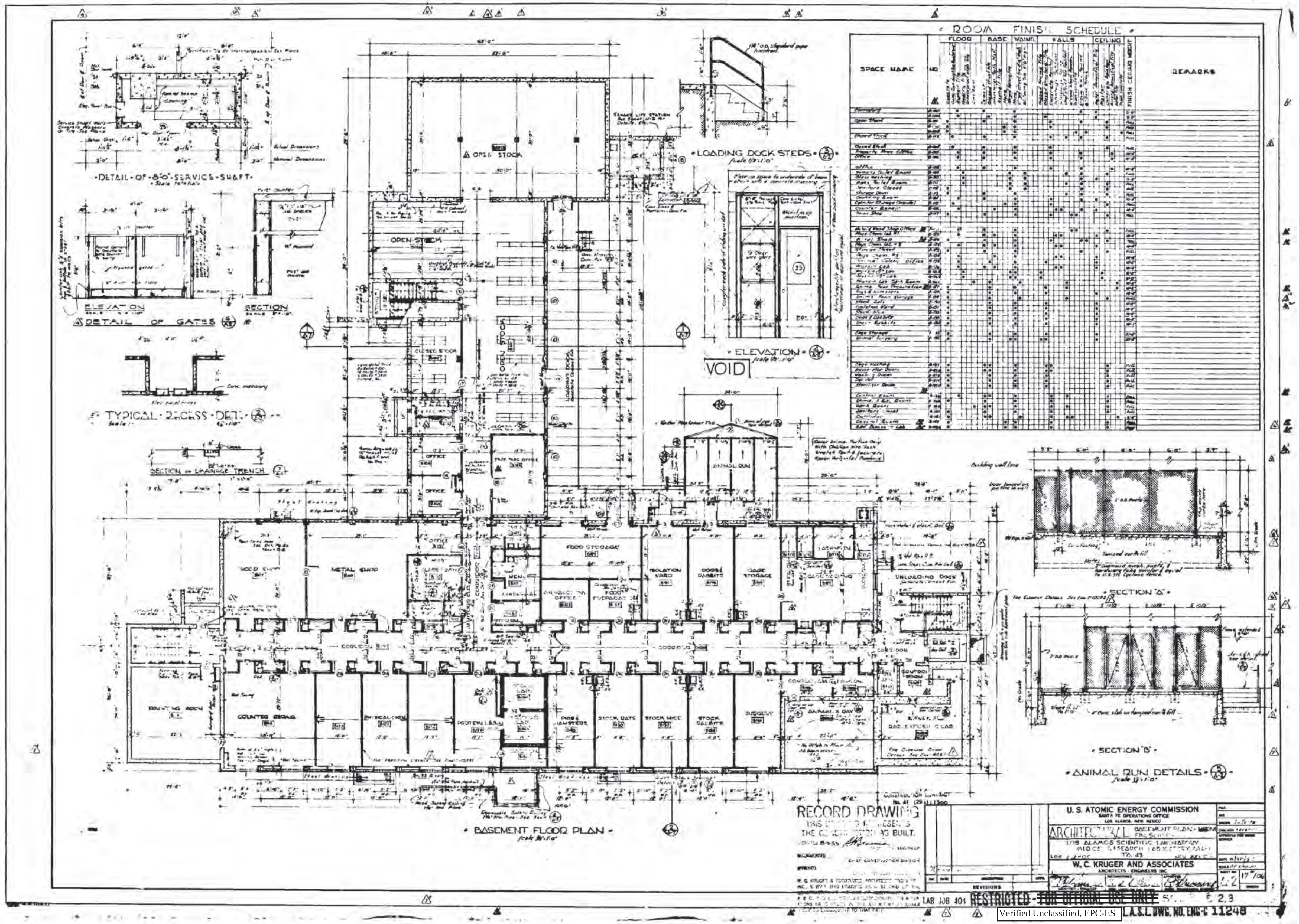


1 OVERALL WEST ELEVATION
1" = 20'-0"

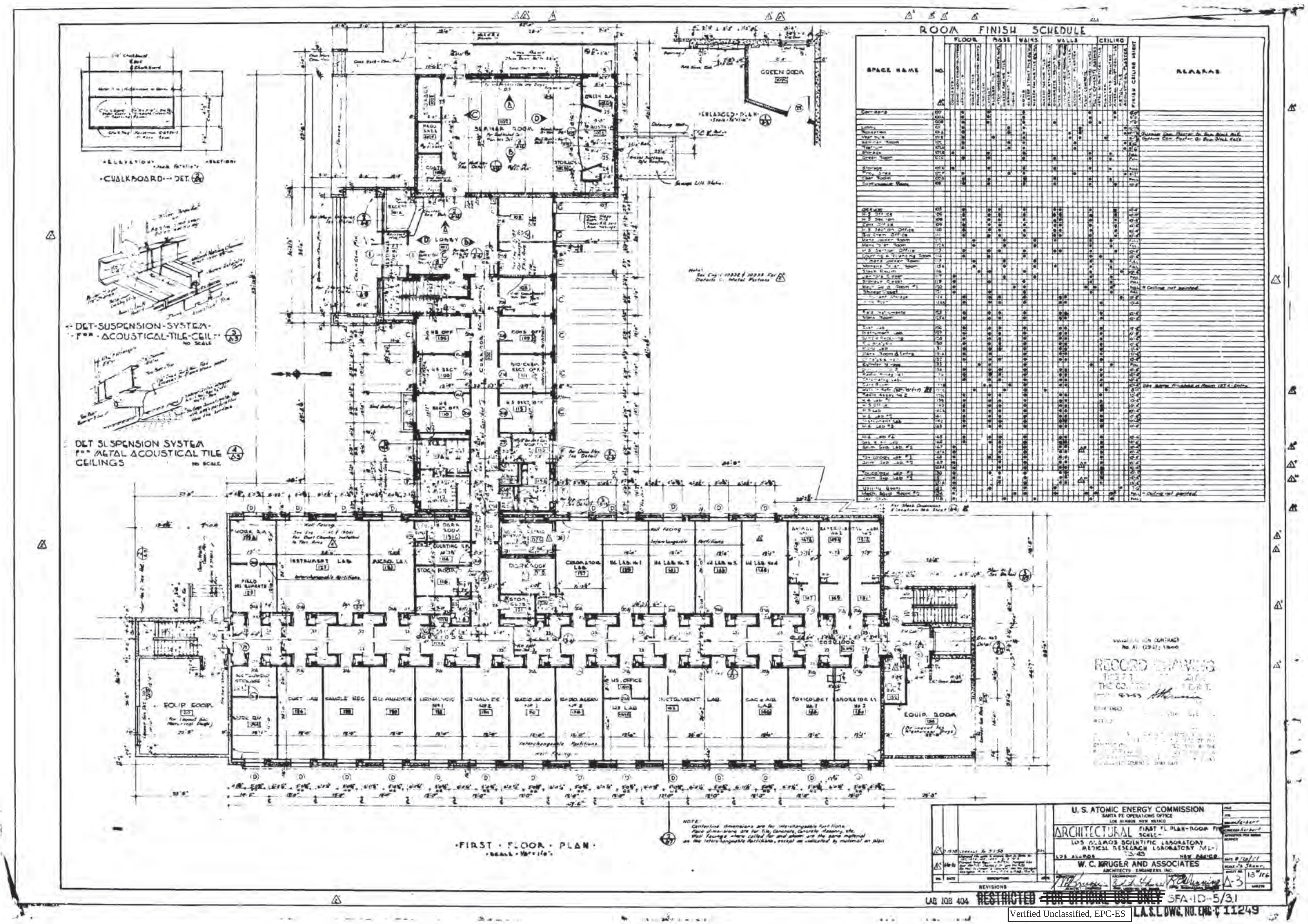
Health Research Laboratory		DRAWN	C. TOWNSEND
		DATE	03.30.22
TA-43	BUILDING 1	SHEET	REF-5
Los Alamos NATIONAL LABORATORY	PO BOX 1663 LOS ALAMOS, NM 87545	5 OF 5	
		LA-UR	-



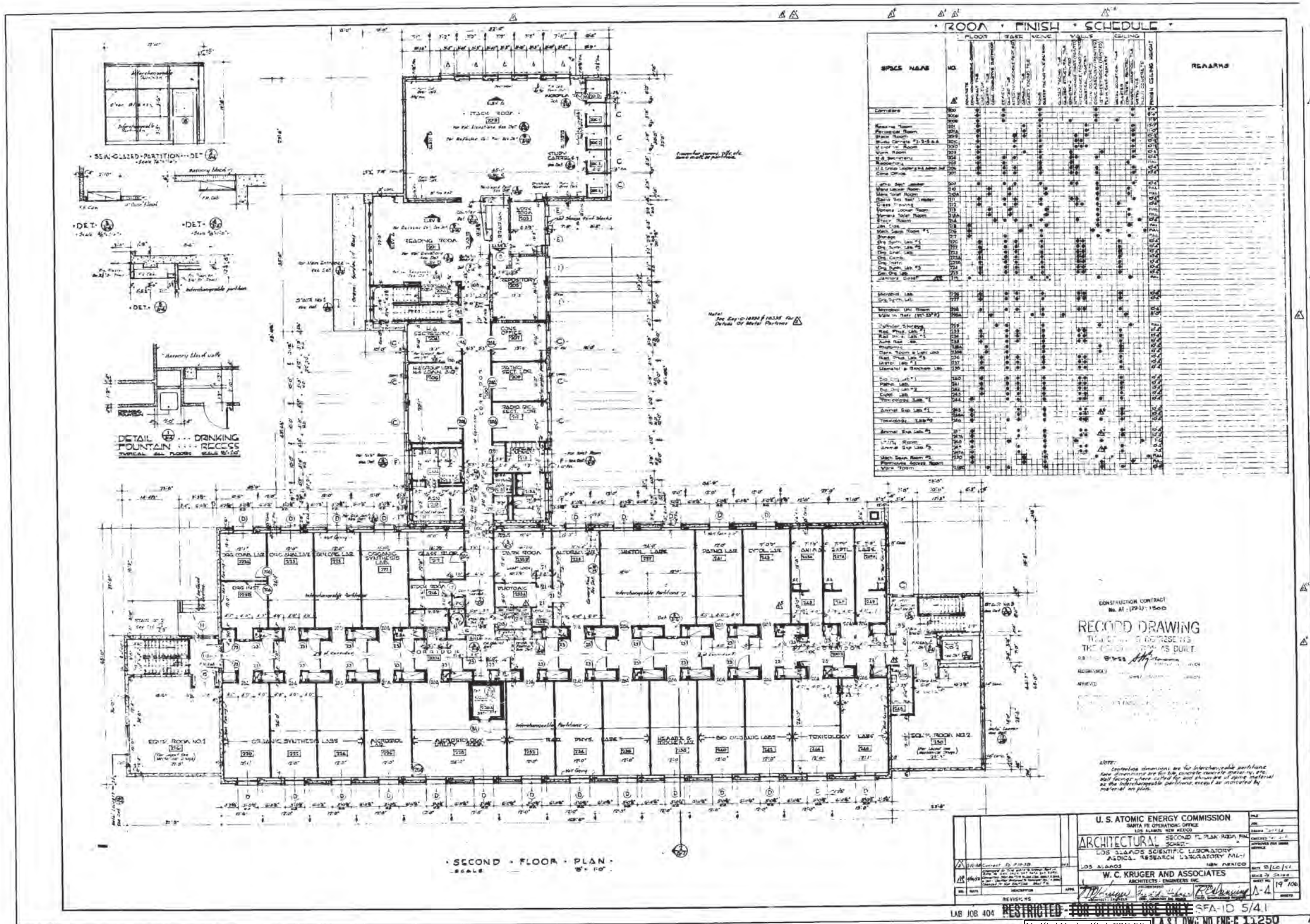
Verified Unclassified, EPC-ES



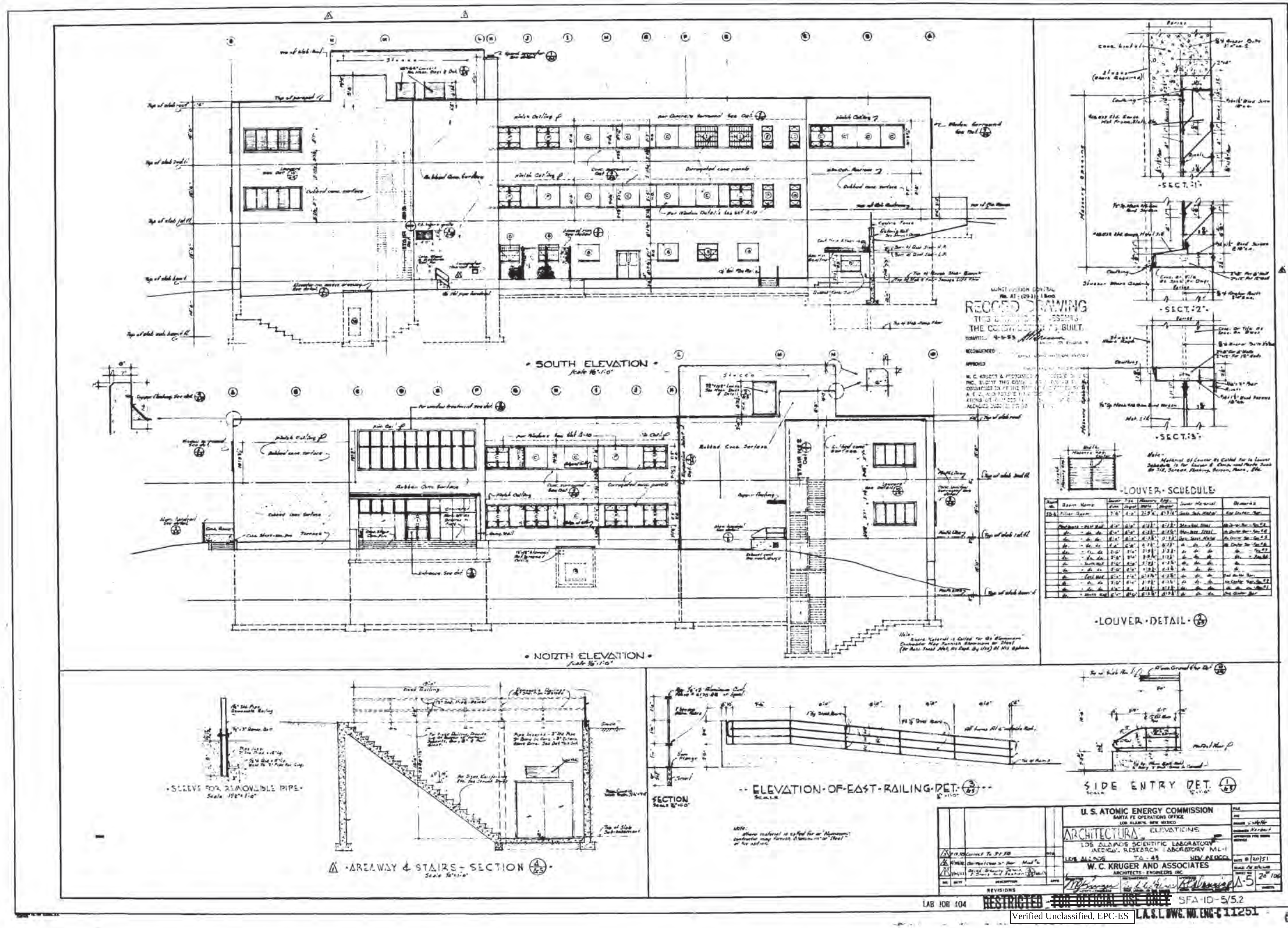
Verified Unclassified, EPC-ES



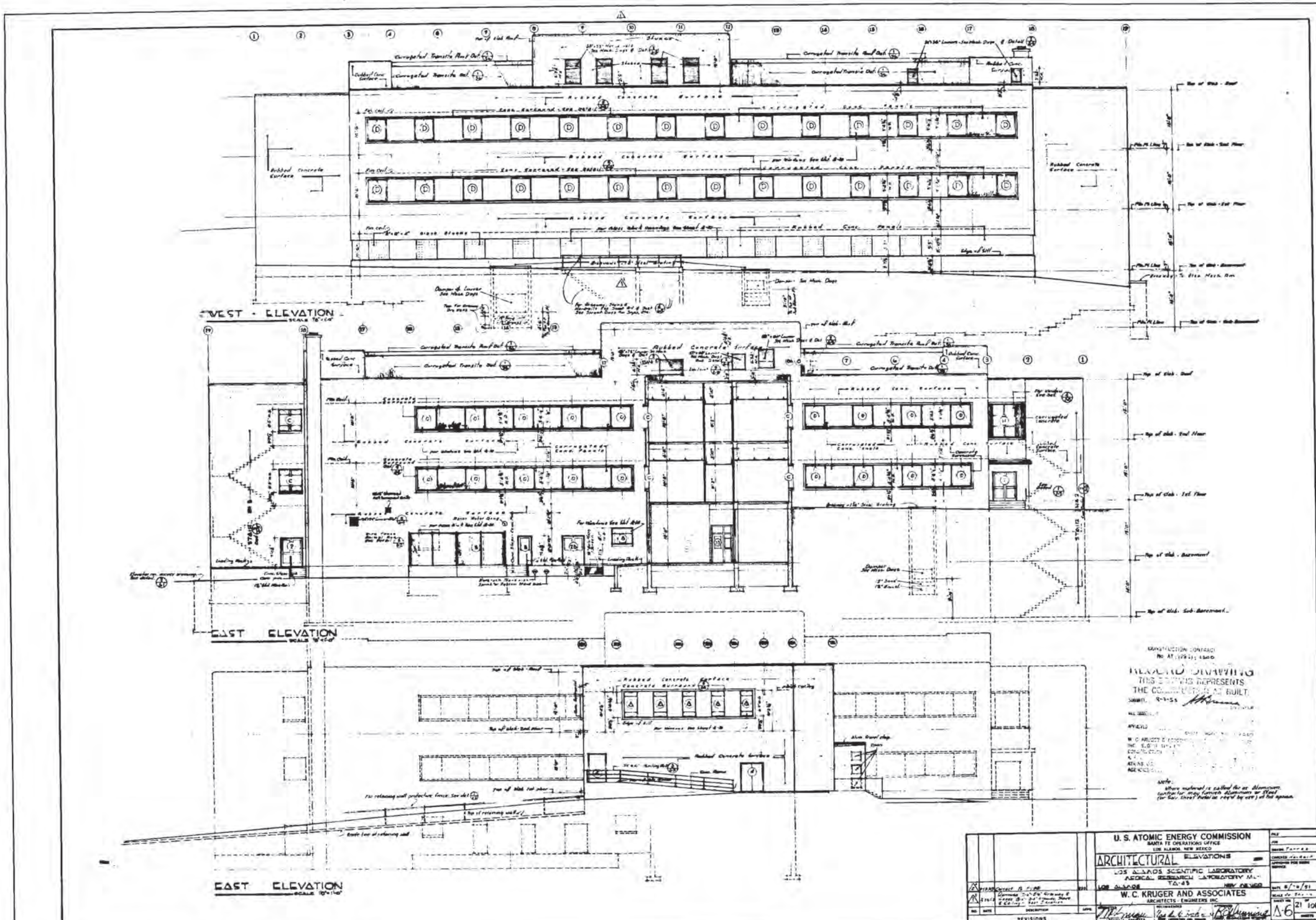
Verified Unclassified, EPC-ES



Verified Unclassified, EPC-ES

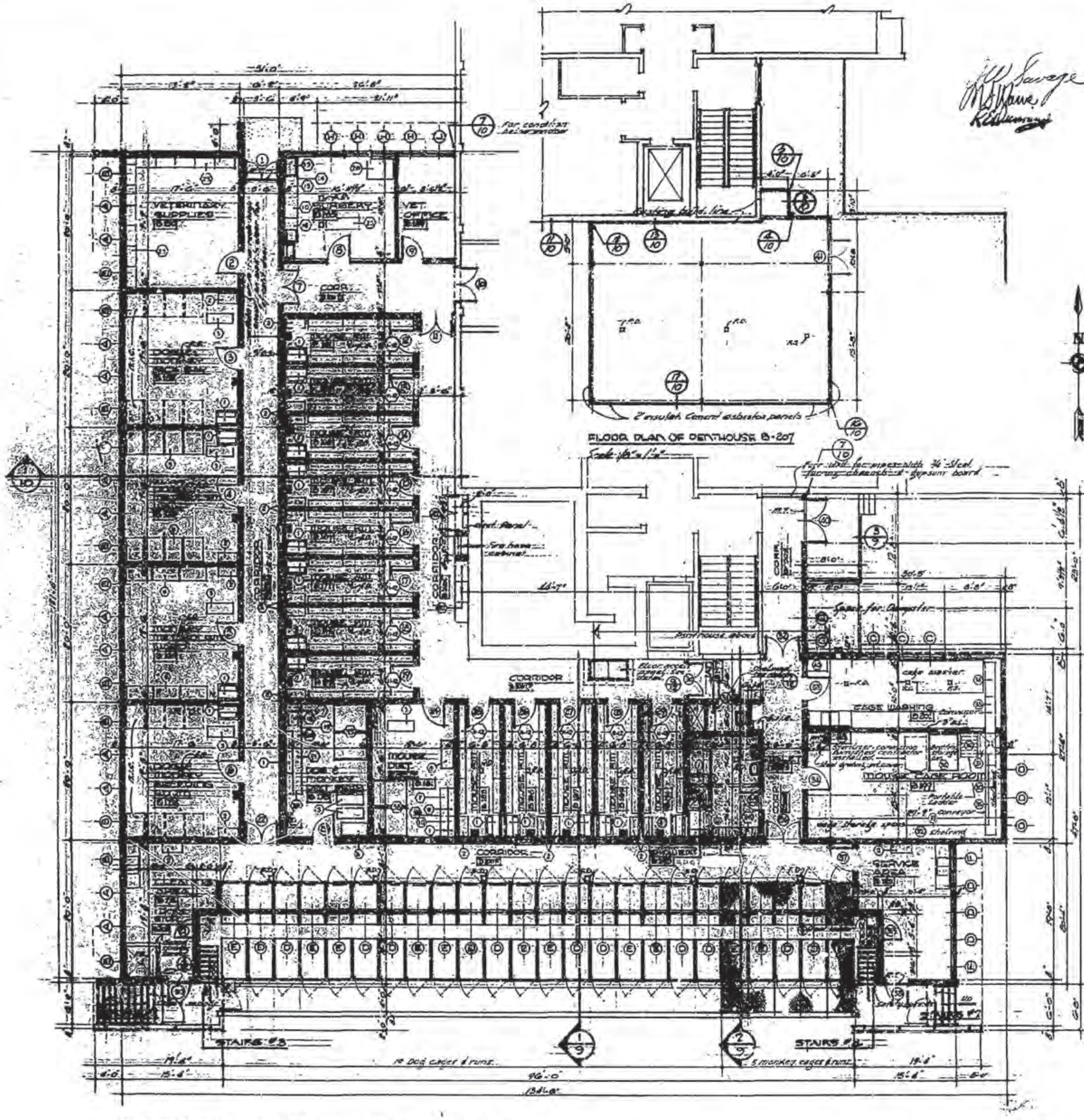


SOUTH ELEVATION
NORTH ELEVATION
LOUVER SCHEDULE
LOUVER DETAIL
SECT. 1
SECT. 2
SECT. 3
SLEEVE FOR REMOVABLE PIPE
AREAWAY & STAIRS - SECTION
ELEVATION OF EAST RAILING DET.
SIDE ENTRY DET.
SECTION
RECORD DRAWING
U. S. ATOMIC ENERGY COMMISSION
SANTA FE OPERATIONS OFFICE
LOS ALAMOS, NEW MEXICO
ARCHITECTURAL ELEVATIONS
LOS ALAMOS SCIENTIFIC LABORATORY
MEDICAL RESEARCH LABORATORY ML-1
LOS ALAMOS TA-43 NEW MEXICO
W. C. KRUGER AND ASSOCIATES
ARCHITECTS - ENGINEERS INC.
REVISIONS
A-5
LAB JOB 404
RESTRICTED - ~~FOR OFFICIAL USE ONLY~~
SFA-ID-5/5.2
Verified Unclassified, EPC-ES
L.A.S.L. DWG. NO. ENG-C 11251



LAB JOB 404 RESTRICTED - ~~FOR OFFICIAL USE ONLY~~ SFA-1D-5,61

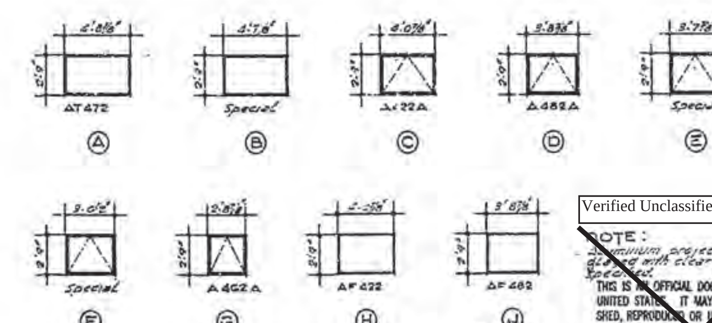
Verified Unclassified, EPC-ES L.A.S.L. DWG. NO. ENG-C 11252



BASEMENT FLOOR PLAN Scale 1/8" = 1'-0"

• ROOM • FINISH • SCHEDULE •

NAME OF SPACE	NO.	Floor: Concrete (hardened)	Floor: Ceramic tile - conductive	Floor: Vinyl asbestos tile	Floor: Ceramic tile	Base: Glazed struct. units	Base: Vinyl (rubber) cove	Base: Concrete	Wains: Glazed struct. units	Wains	Wains	Walls: Masonry units - painted	Walls: Concrete - painted	Walls: Glazed struct. units	Walls: Cement panels	Ceiling: Acoustical tile	Ceiling: Metal deck	Ceiling: Gypsum board	Ceiling: Cement asbestos board	Room - Height	REMARKS
CORRIDOR	B100B	●				●						●						●		[illegible]	
CORRIDOR	B100C	●				●						●								[illegible]	
CORRIDOR	B100D	●				●						●								[illegible]	
CORRIDOR	B100E	●				●						●						●		[illegible]	
CORRIDOR	B100F	●				●			●			●				●				[illegible]	4'0" high glazed struct. unit Pen.-Dividers
CORRIDOR	B100H	●				●						●						●		[illegible]	
VETERINARY SUPPLIES	B150	●				●						●					●			[illegible]	
SURGERY	B155		●			●								●		●				[illegible]	
DOG & MONKEY SICK BAY	B158	●				●						●					●			[illegible]	
VETERINARY OFFICE	B159			●			●					●				●				[illegible]	
MOUSE ROOM	B161	●				●						●					●			[illegible]	
DOG METABOLISM WARD	B162	●				●						●					●			[illegible]	
MOUSE ROOM	B163	●				●						●					●			[illegible]	
MOUSE ROOM	B165	●				●						●					●			[illegible]	
MONKEY METABOLISM WARD	B166	●				●						●					●			[illegible]	
MOUSE ROOM	B167	●				●						●					●			[illegible]	
MOUSE ROOM	B169	●				●						●					●			[illegible]	
D & M BREEDING ROOM	B170	●				●						●					●			[illegible]	
MOUSE ROOM	B171	●				●						●					●			[illegible]	
MOUSE ROOM	B172	●				●						●					●			[illegible]	
CLEANING AREA	B174	●				●						●					●			[illegible]	
MOUSE ROOM	B175	●				●						●					●			[illegible]	
D & M DIET PREPARATION	B176	●				●						●					●			[illegible]	
SERVICE AREA	B180	●				●						●					●			[illegible]	
MICE DIET PREPARATION	B181	●				●						●					●			[illegible]	
MOUSE ROOM	B183	●				●						●					●			[illegible]	
MOUSE ROOM	B185	●				●						●					●			[illegible]	
MOUSE ROOM	B187	●				●						●					●			[illegible]	
MOUSE ROOM	B189	●				●						●					●			[illegible]	
MOUSE ROOM	B191	●				●						●					●			[illegible]	
TOILET	B193				●	●			●			●						●		[illegible]	[illegible] high glazed struct. unit wainscot
SHOWER	B195				●	●								●					●	[illegible]	
JANITOR CLOSET	B197	●				●						●						●		[illegible]	
MOUSE CAGE ROOM	B199	●				●						●					●			[illegible]	
CAGE WASHING ROOM	B201	●				●						●					●			[illegible]	
STORAGE	B203	●				●						●									
STORAGE	B205	●				●						●									
PENTHOUSE	B207	●						●							●		●			[illegible]	
CORRIDOR	B100J	●				●						●						●		9'-6"	



• VINDOV SCHEDULE •

NOTE: Aluminum projected windows glazed with clear glass or Special.

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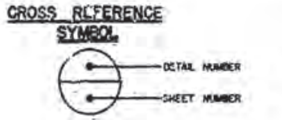
CROSS REFERENCE SYMBOL



KEY TO MATERIALS

- Earth
- Concrete
- Acoustical Tile
- Metal
- Glazed Structural Facing Units
- Gypsum Board or Plaster
- Brick
- Terrazzo
- Masonry Units
- Wood Rough
- Wood Finish
- Insulation

NO.	DATE	REVISIONS	BY	CK.	PROJ. ENGR.	A.E.C. APP.
1	[illegible]	REV. WAS SHT. 7 OF 25 NOW SHT. 8 OF 26				

U. S. ATOMIC ENERGY COMMISSION
LOS ALAMOS AREA OFFICE
LOS ALAMOS, NEW MEXICO

ARCHITECTURAL - BASEMENT FLOOR PLAN - SCHEDULES

ADDITIONAL ANIMAL QUARTERS, TA-43

LOS ALAMOS NEW MEXICO

CONTRACT NO.	AT(29-2)-373
A.E.C. ACCT. NO.	6-300-09-1-1
DRAWN	L.K.
CHECKED	L.K.
A-E APPROVED	
SCALE	AS SHOWN
DATE	MARCH 20, 1959

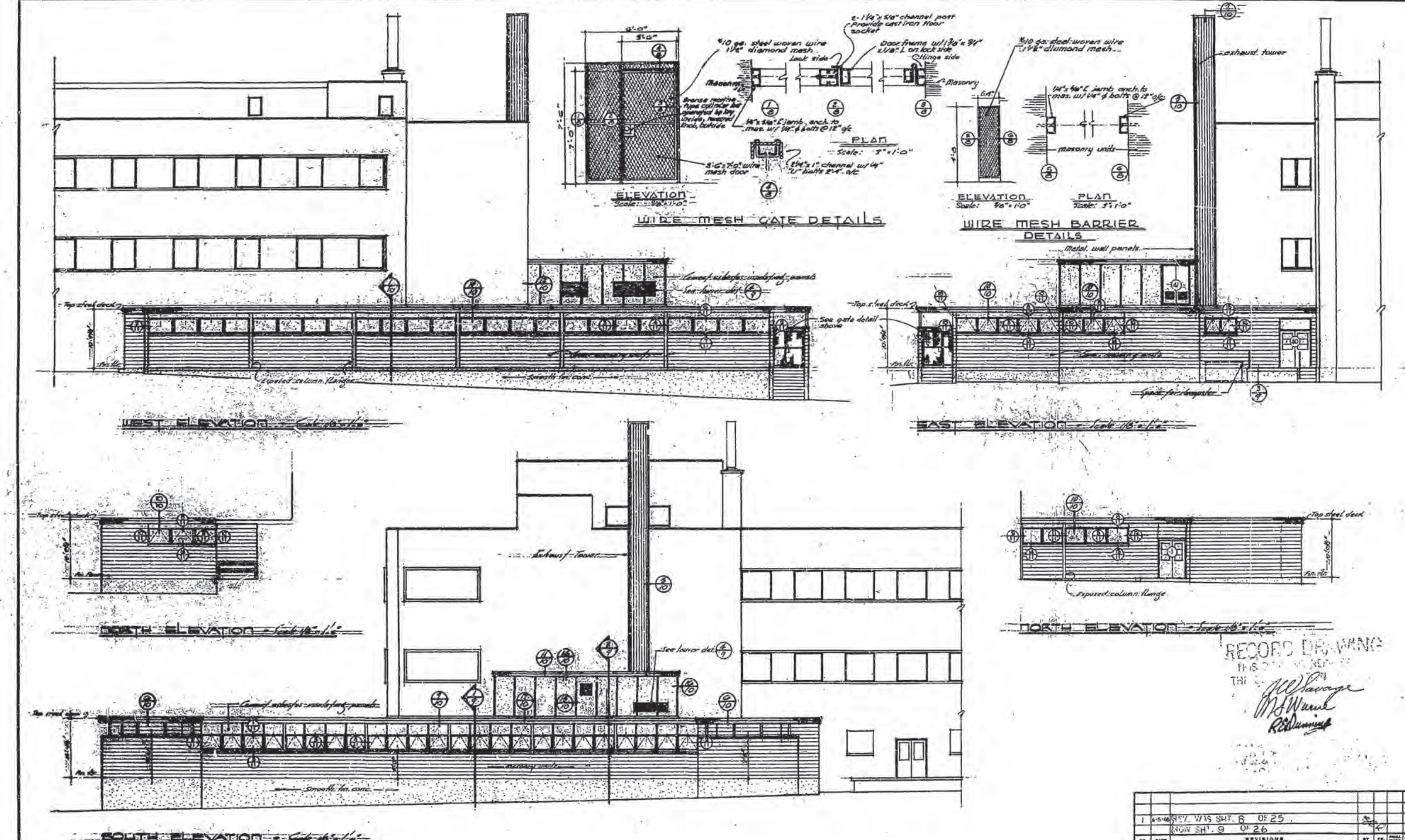
SUBMITTED: ARCHITECT - ENGINEER
RECOMMENDED: A.E.C.
APPROVED

W. C. KRUGER AND ASSOCIATES
ARCHITECTS - ENGINEERS INC.
SANTA FE, NEW MEXICO

DRAWING NO. LA-DK-1/7 SHEET 8 OF 26

LAB. JOB NO. 2001

L.A.S.L. DWG. NO. ENG-C27981



No.	Date	Revisions	By	Ck.
1	6-5-46	REV. WAS SHT. 8 OF 25. NOW SHT. 9 OF 26.		

U. S. ATOMIC ENERGY COMMISSION
LOS ALAMOS AREA OFFICE
LOS ALAMOS, NEW MEXICO

ARCHITECTURAL - ELEVATIONS

ADDITIONAL ANIMAL QUARTERS TA-43

LOS ALAMOS NEW MEXICO

Contract No. AT(29-1)-1575
A.E.C. Acct. No. 0-300-98-14
Drawn H.L.
Checked L.F.
A-E APPROVED
Scale AS SHOWN
Date MARCH 20, 1950

Submitted / Recommended N. S. Warner A.E.C. / Approved

W. C. KRUGER AND ASSOCIATES
ARCHITECTS - ENGINEERS INC.
SANTA FE, NEW MEXICO

Drawing No. LA-DK-1/8. Sheet 9 of 26

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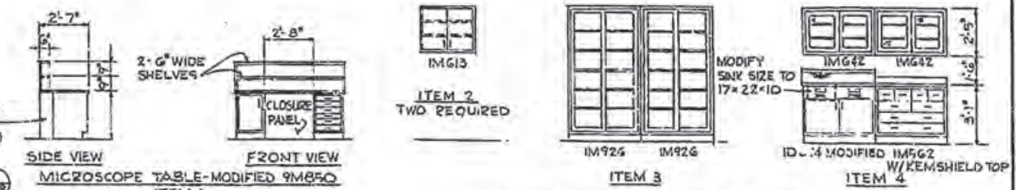
LAB. JOB NO. 2001 L.A.S.L. DWG. NO. ENG-C 27982



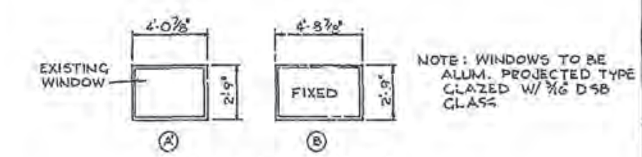
NUMBERS ARE FROM 'KEN METAL' METAL LABORATORY EQUIPMENT CATALOG NO. 67 M BY KEWAUNEE MANUFACTURING CO.

EQUIPMENT ELEVATIONS

Scale: 1/4" = 1'-0"

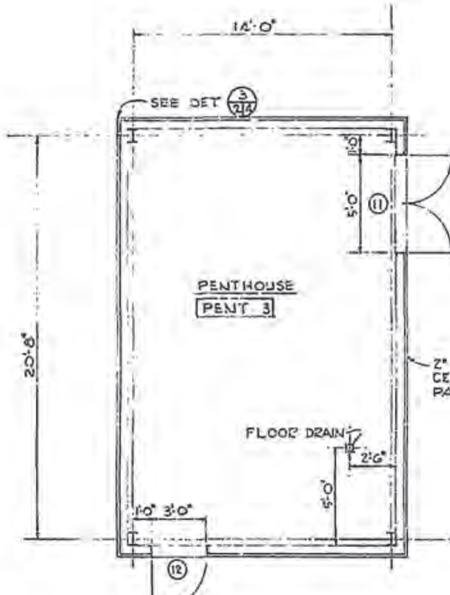
ROOM FINISH SCHEDULE

NAME OF SPACE	NUMBER	FLOOR: CONC W/HARDENER	FLOOR: ASPHALT TILE	WALLS: MASONRY UNITS PAINTED	WALLS: INSULATED CEMENT ASBESTOS PANELS	CEILING: METAL DECK	CEILING: ACOUSTICAL TILE	ROOM HEIGHT	REMARKS
AUTOPSY	B 206		●	●			●	9'-3½"	
OFFICE	B 207		●	●			●	9'-3½"	
RAT QUARANTINE	B 208	●		●		●		10'-3¼"	
JANITOR'S CLOSET	B 209	●		●			●	8'-0"	
MOUSE QUARANTINE	B 210	●		●		●		10'-3¼"	
OFFICE	B 211		●	●			●	9'-3½"	
QUARANTINE SERVICE	B 100K		●	●			●	8'-0"	
CORRIDOR	B 100L		●	●			●	8'-0"	
COVERED ENTRANCE	—	●		●		●		10'-3¼"	
PENTHOUSE	PENT 3	●			●	●		9'-5"	



NOTE: WINDOWS TO BE ALUM. PROJECTED TYPE GLAZED W/ 3/16 DSB GLASS

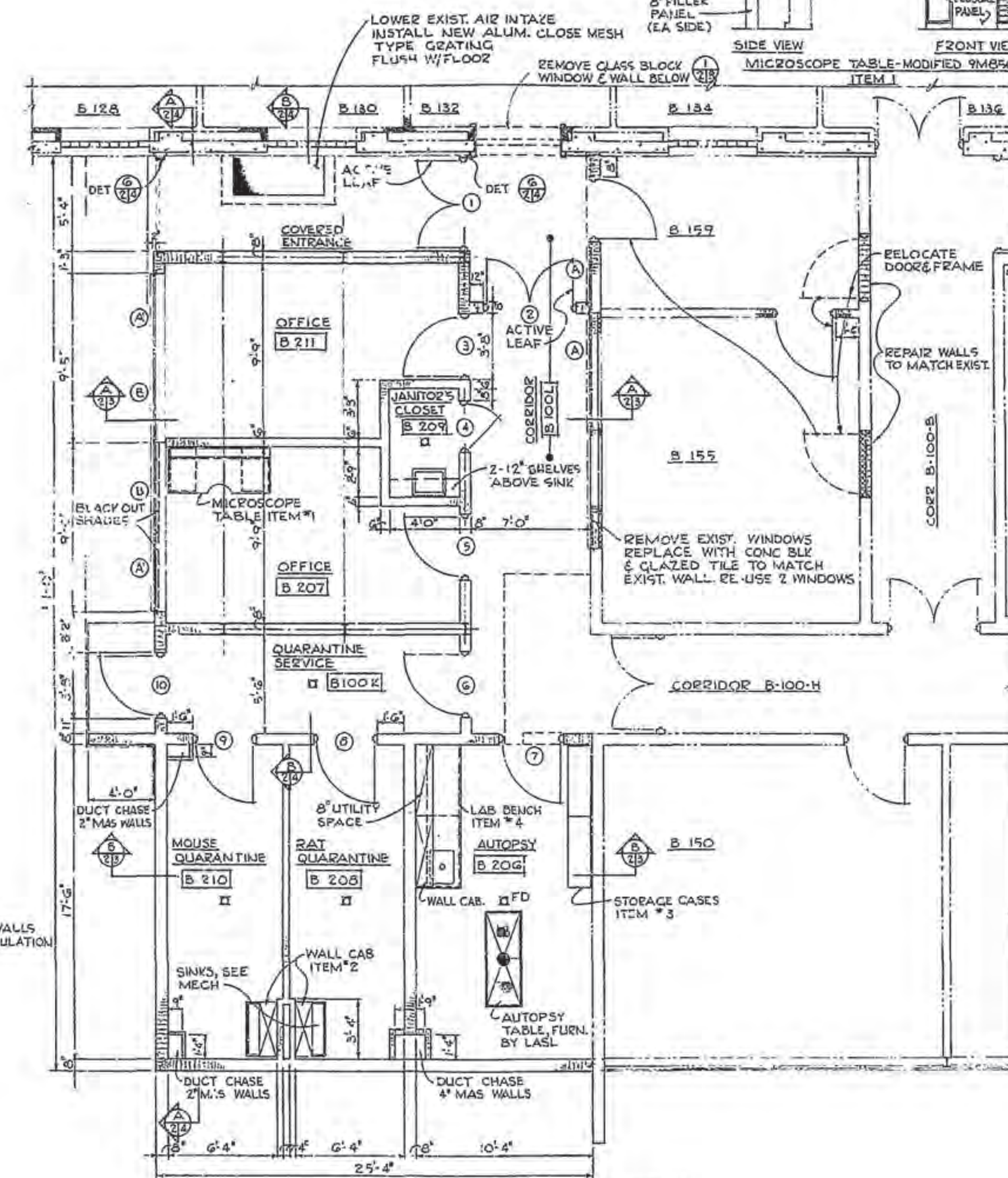
WINDOW SCHEDULE



PENTHOUSE PLAN

Scale: 1/4" = 1'-0"

NOTE: FILL CELLS OF EXTERIOR BLOCK WALLS WITH PEARLITE INSULATION



PARTIAL BASEMENT FLOOR PLAN HRL BUILDING

Scale: 1/4" = 1'-0"

NO.	DATE	REVISIONS	BY	CHKD	GRP	D.O.	GRP. LDR.	ENGR. D.O.
△	9-3-69	NO CHANGE THIS SHEET						

THIS JOB MUST BE INSPECTED AND ANY CHANGES APPROVED BY WILDE ENG-4 PHONE 7-4265

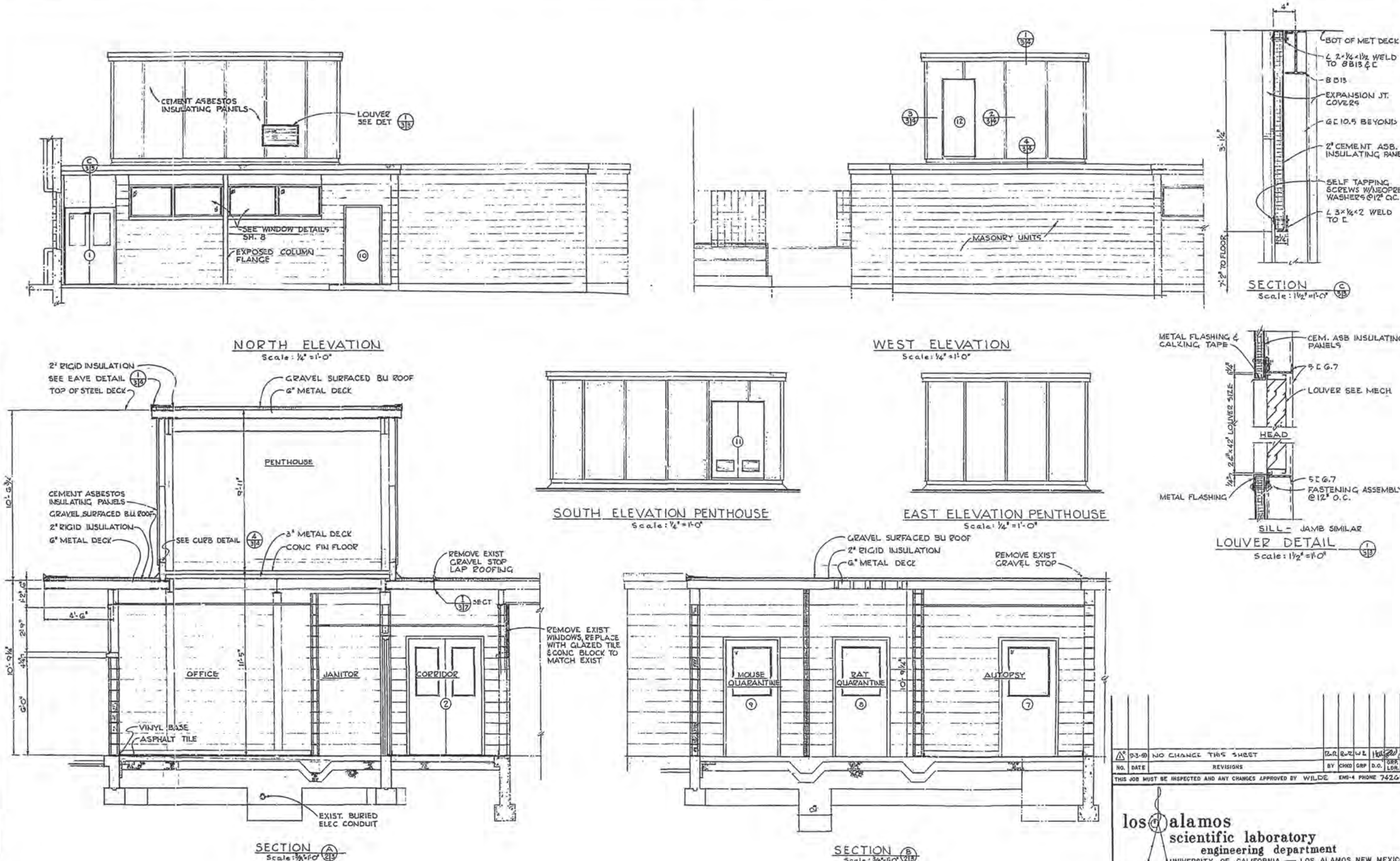
los alamos scientific laboratory
engineering department
UNIVERSITY OF CALIFORNIA — LOS ALAMOS, NEW MEXICO

AUTHORIZED FOR
SECURITY N A
SAFETY H-3
HEALTH H-1
FIRE PROT.
DIVISION H-DO
GROUP H-4
H-5
ENG.-6
SCALE AS NOTED

FACILITY IMPROVEMENTS
FLOOR PLANS & DETAILS
BUILDING HRL-1 TA-43

SUBMITTED JFZ PROJ. ENGR.
APPROVED ENGR. GROUP LEADER
APPROVED ENGR. DEPT. OFFICE
CHECKED JFZ
CA
BA
DATE 7-28-69
A-2
SHEET 2 OF 19
DESIGNED LUPARDUS
DRAWN LUPARDUS
LAB JOB NUMBER 4054-43
DRAWING NO. ENG-C 37643

PHASE 'C'



NO.	DATE	REVISIONS	BY	CHKD	GRP	D.O.	GRP. LDR.	ENGR. D.O.
1	9-3-69	NO CHANGE THIS SHEET	R.R.	R.R.	W.L.			

THIS JOB MUST BE INSPECTED AND ANY CHANGES APPROVED BY WILDE ENG-4 PHONE 74265

los alamos scientific laboratory
engineering department
UNIVERSITY OF CALIFORNIA — LOS ALAMOS, NEW MEXICO

AUTHORIZED FOR	
SECURITY	N A
SAFETY H-3	a Hauk
HEALTH H-1	EAA
FIRE PROT.	a Hauk
DIVISION H-DO	WL
GROUP H-4	
H-5	Kenny
ENG.-5	LJC
SCALE	AS NOTED

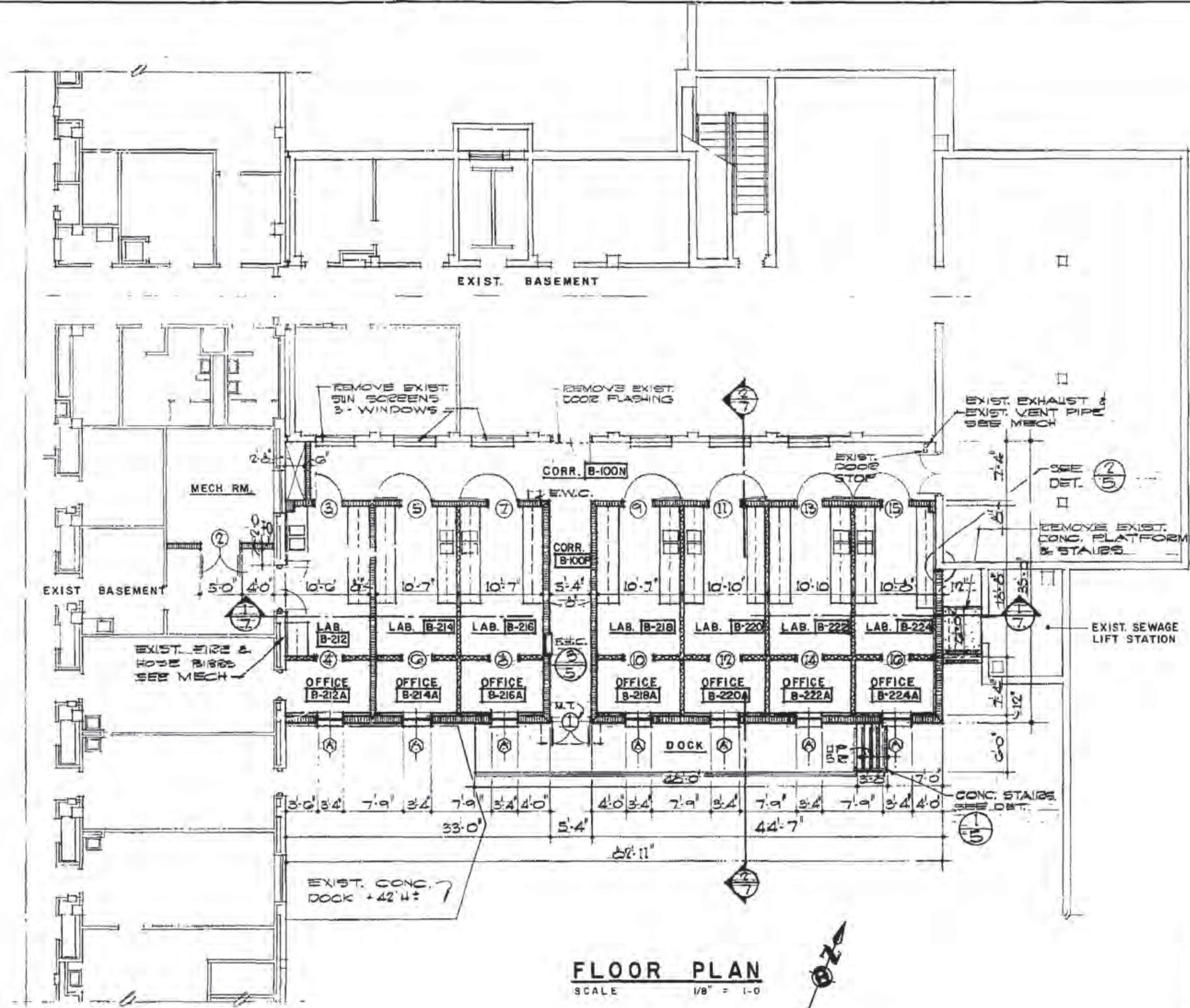
FACILITY IMPROVEMENTS

ELEVATIONS & SECTIONS

BUILDING HRL-1 TA-43

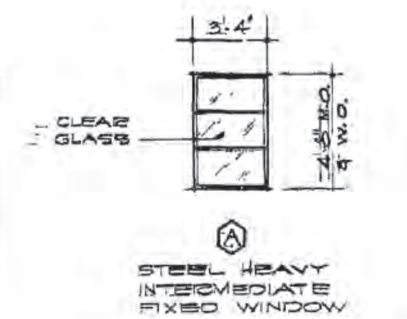
SUBMITTED	APPROVED	APPROVED
JFZ PROJ. ENGR.	ENGR GROUP LEADER	ENGR. DEPT. OFFICE
CHECKED JFZ	CA / BA	DATE 7-28-69 / A-3 / SHEET 3 OF 19
DESIGNED LUPARDUS	LAB JOB NUMBER	DRAWING NO.
DRAWN LUPARDUS	4054-43	ENG-C 37644

PHASE 'C'



FLOOR PLAN

SCALE 1/8" = 1'-0"



WINDOW SCHEDULE

SCALE 1/4" = 1'-0"

LEGEND

EXISTING WALLS

NEW WALLS - CONC. MAS. UNITS

NEW WALLS - MET. STUDS @ 16" O.C. NON BEARING

ROOM FINISH SCHEDULE

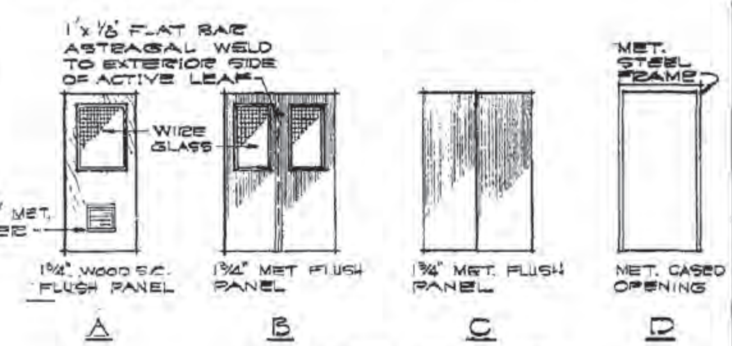
ROOM NUMBERS	SPACES	FLR. VINYL ASB. TILE	FLR. EXIST. CONC.	BASE VINYL	BASE G.W.B.	WALLS CONC. MAS. UNITS	WALLS	WALLS	WAINSCOT HIPAC	WAINSCOT	WAINSCOT HT.	CEILING ACOUST. TILE	CEILING EXIST.	CEILING	HT.	REMARKS
B-100N	CORR.	O		O		O			O		4'-6"	O			9'-0"	
B-212	LAB.	O		O		O	O					O				
B-212A	OFFICE	O		O		O	O					O				
B-214	LAB.	O		O		O	O					O				
B-214A	OFFICE	O		O		O	O					O				
B-216	LAB.	O		O		O	O					O				
B-216A	OFFICE	O		O		O	O					O				
B-100P	CORR.	O		O		O			O		4'-6"	O				
B-218	LAB.	O		O		O	O					O				
B-218A	OFFICE	O		O		O	O					O				
B-220	LAB.	O		O		O	O					O				
B-220A	OFFICE	O		O		O	O					O				
B-222	LAB.	O		O		O	O					O				
B-222A	OFFICE	O		O		O	O					O				
B-224	LAB.	O		O		O	O					O				
B-224A	OFFICE	O		O		O	O					O			9'-0"	
—	MECH.		O			O							O			

DOOR SCHEDULE

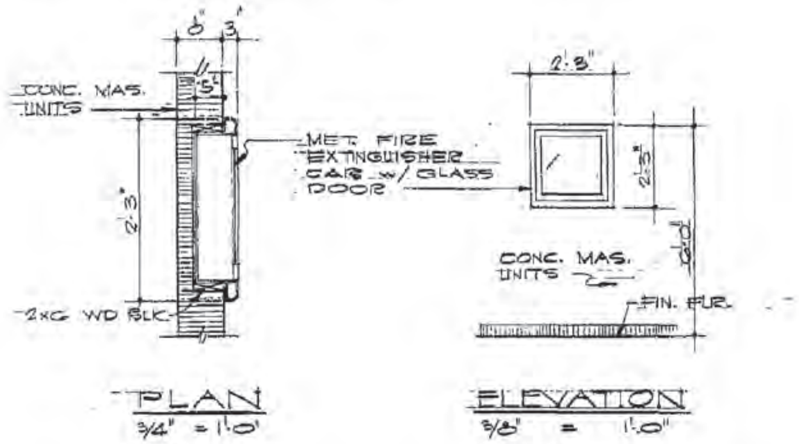
NO	TYPE	THRESHOLD	H.W SET	SIZE	DETS	SIGN	REMARKS
1	B	METAL	HW-1	2-2'-6"x7'-0"x1¾"	A-A		
2	C	—	HW-2	2-2'-0"x7'-0"x1¾"	B-B		FIRE DOOR 1-HR
3	A	—	HW-3	3'-4"x7'-0"x1¾"	B-B		
4	D		—	3'-4"x7'-0"	C-C		
5	A	—	HW-3	3'-4"x7'-0"x1¾"	B-B		
6	D		—	3'-4"x7'-0"	C-C		
7	A	—	HW-3	3'-4"x7'-0"x1¾"	B-B		
8	D		—	3'-4"x7'-0"	C-C		
9	A	—	HW-3	3'-4"x7'-0"x1¾"	B-B		
10	D		—	3'-4"x7'-0"	C-C		
11	A	—	HW-3	3'-4"x7'-0"x1¾"	B-B		
12	D		—	3'-4"x7'-0"	C-C		
13	A	—	HW-3	3'-4"x7'-0"x1¾"	B-B		
14	D		—	3'-4"x7'-0"	C-C		
15	A	—	HW-3	3'-4"x7'-0"x1¾"	B-B		
16	D		—	3'-4"x7'-0"	C-C		

AS BUILT DRAWING
REGISTER AIA
By Rud Date 5/4/75

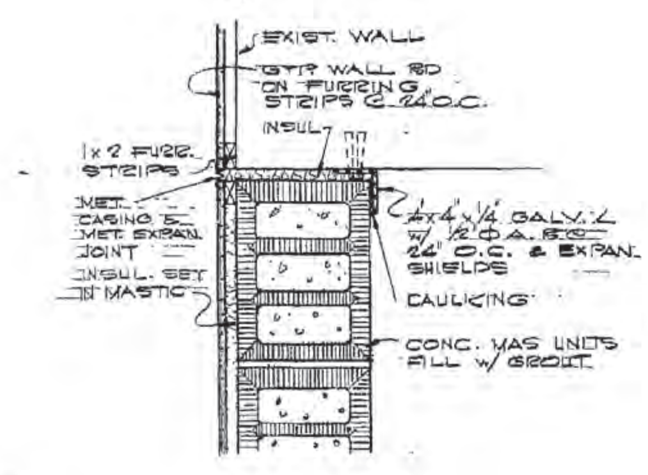
AS CONSTRUCTED DRAWING
CONSTRUCTION CONTRACT NO AT(29-1) 2260
SUBMITTED
RECOMMENDED E. G. Finley ARCHITECT-ENGINEER
APPROVED Bryan K. Holbrook



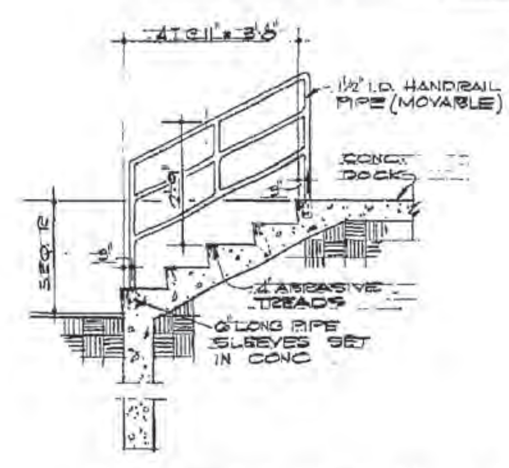
DOOR TYPES



FIRE EXTINGUISHER CABINET DETAIL 3/5



DETAIL 2/5
1/2" = 1'-0"



HANDRAIL DETAIL 1/5
SCALE 1/2" = 1'-0"

NO	DATE	REVISIONS	BY	CK	PROJ ENGR	AEC APP

U. S. ATOMIC ENERGY COMMISSION
LOS ALAMOS AREA OFFICE
LOS ALAMOS NEW MEXICO

ARCHITECTURAL - FLOOR PLAN

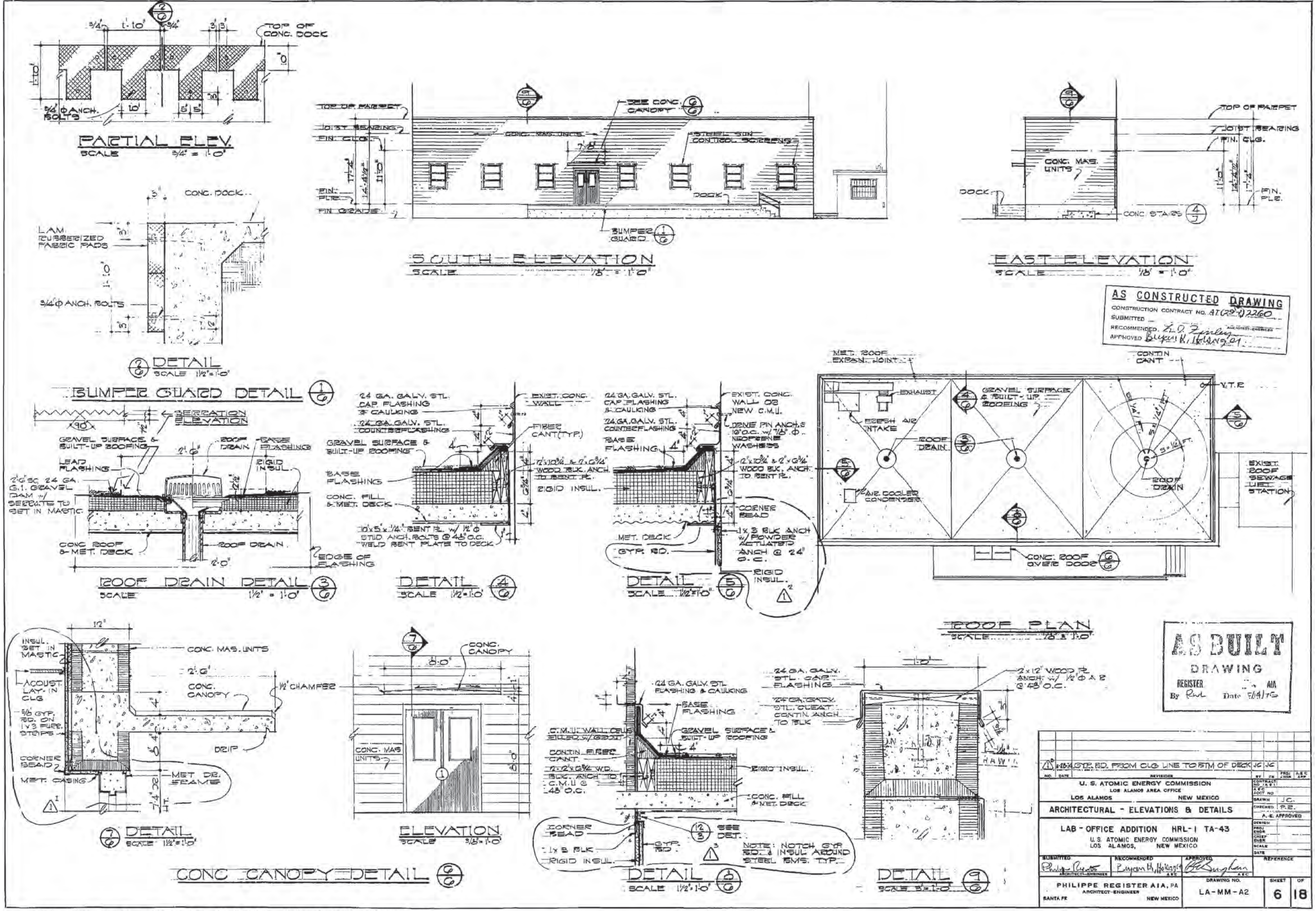
LAB-OFFICE ADDITION HRL-1 TA-43
U S ATOMIC ENERGY COMMISSION
LOS ALAMOS, NEW MEXICO

CONTRACT NO (A.E.)
AEC ACCT NO
DRAWN J.G.
CHECKED P.R.
A.-E. APPROVED
DESIGN
PROJ ENGR
CHIEF ENGR
SCALE
DATE
REFERENCE

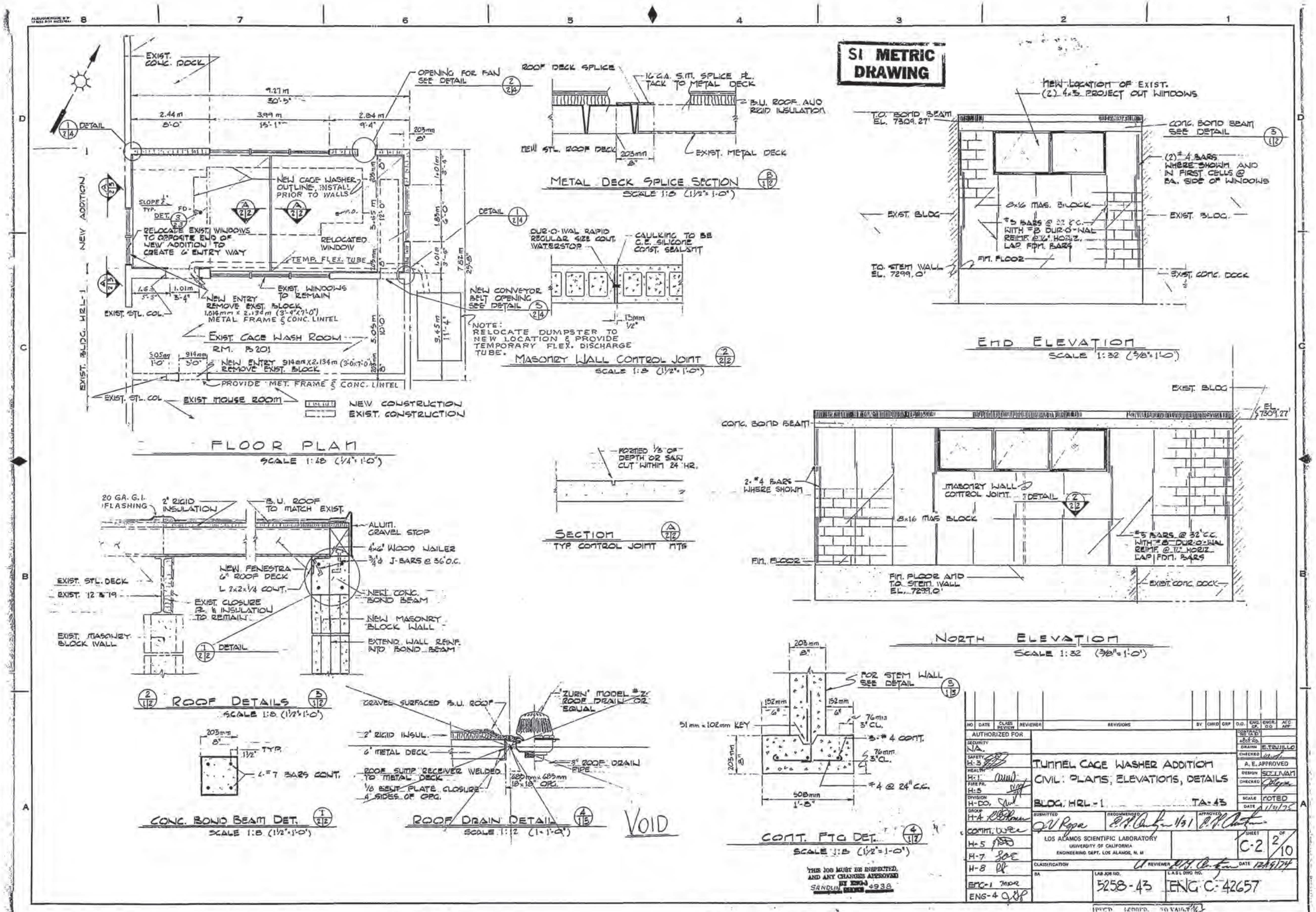
SUBMITTED Philippe Register ARCHITECT-ENGINEER
RECOMMENDED Bryan K. Holbrook A.E.C.
APPROVED A.E.C.

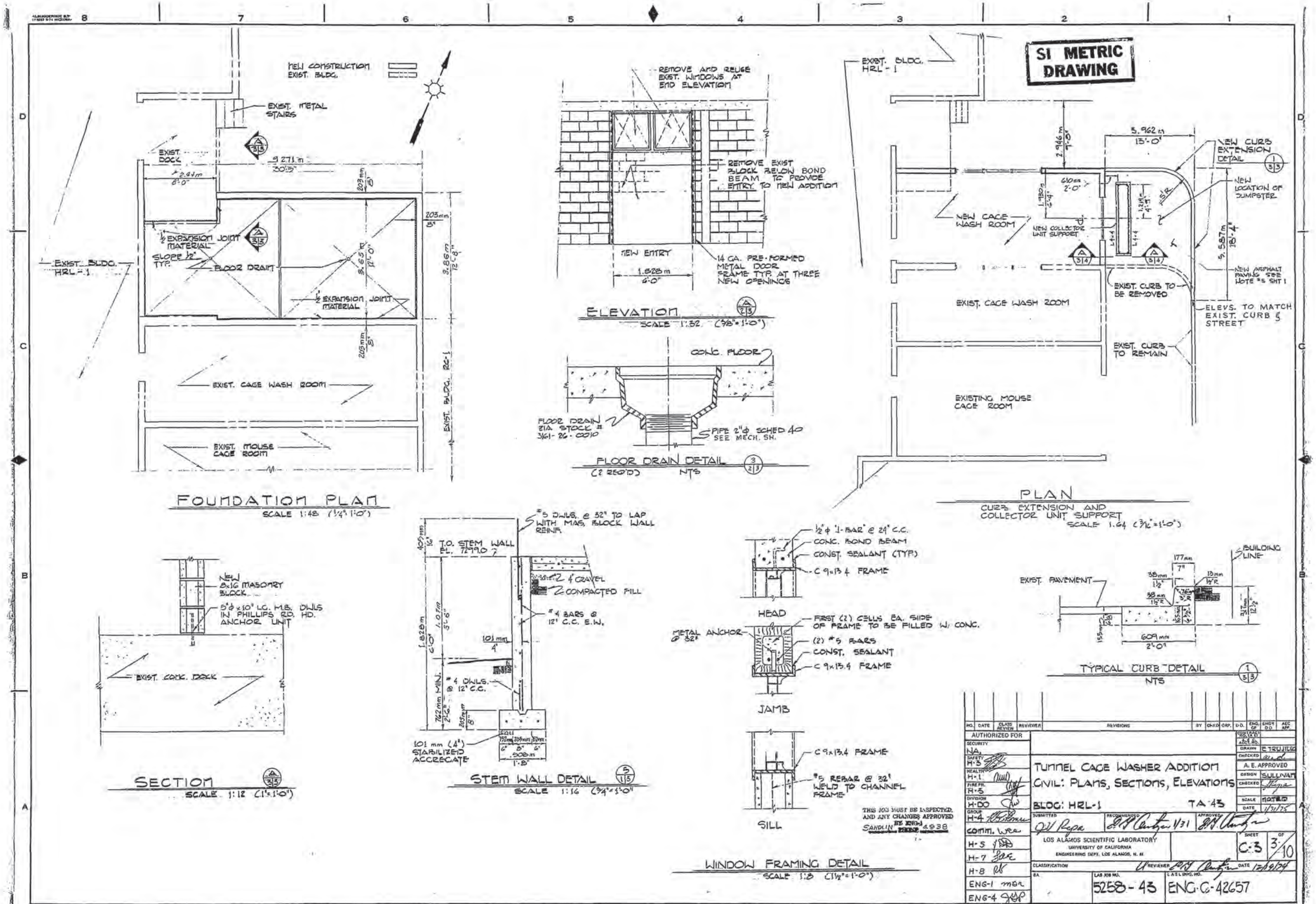
PHILIPPE REGISTER AIA, PA
ARCHITECT-ENGINEER
SANTA FE NEW MEXICO

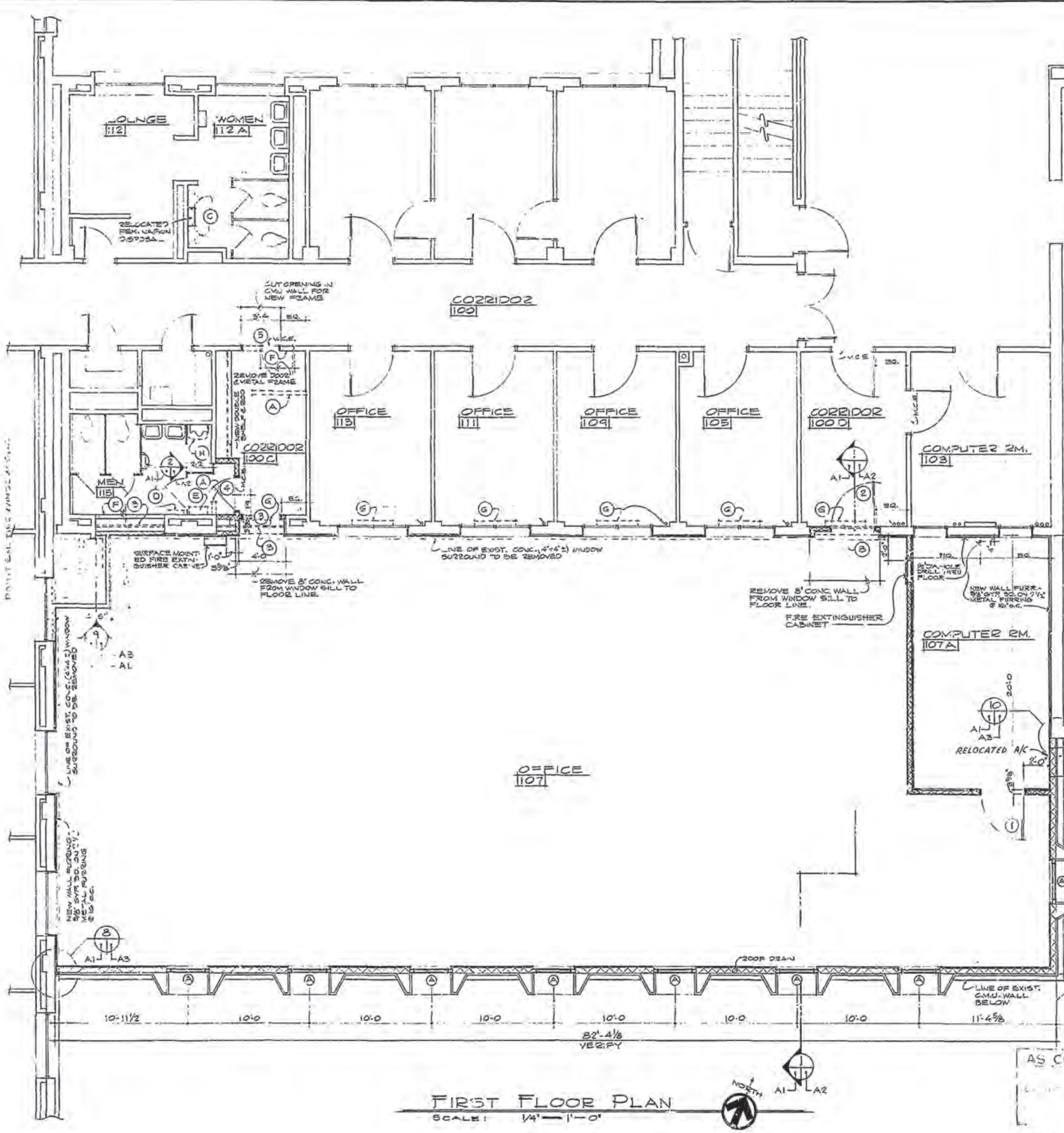
DRAWING NO. LA-MM-A1
SHEET 5 OF 18



Prefix	Drawing number	Sheet number	Sheet suffix	Number of sheets	Revision number
C	42873	6		18	1


SI METRIC DRAWING
FLOOR PLAN
SCALE 1:48 (1/4"=1'-0")
EXIST. CONC. DOCK
OPENING FOR FAN SEE DETAIL
NEW CAGE WASHER OUTLINE, INSTALL PRIOR TO WALLS
RELOCATE EXIST. WINDOWS TO OPPOSITE END OF NEW ADDITION TO CREATE 6' ENTRY WAY
RELOCATED WINDOW
TEMP. FLEX. TUBE
EXIST. WINDOWS TO REMAIN
NEW ENTRY REMOVE EXIST. BLOCK 1.014mm x 2.134m (3'-4"x7'-0") METAL FRAME & CONC. LINTEL
NEW CONVEYOR BELT OPENING SEE DETAIL
EXIST. CAGE WASH ROOM RM. B201
NEW ENTRY 914mm x 2.134m (3'-0"x7'-0") REMOVE EXIST. BLOCK
PROVIDE MET. FRAME & CONC. LINTEL
EXIST. MOUSE ROOM
EXIST. STL. COL.
EXIST. BLDG. HRL-1
NEW ADDITION
NOTE: RELOCATE DUMPSTER TO NEW LOCATION & PROVIDE TEMPORARY FLEX. DISCHARGE TUBE.
NEW CONSTRUCTION
EXIST. CONSTRUCTION
METAL DECK SPLICE SECTION
SCALE 1:8 (1 1/2"=1'-0")
ROOF DECK SPLICE
16 GA. S.M. SPLICE PL. TACK TO METAL DECK
B.U. ROOF AND RGID INSULATION
NEW STL. ROOF DECK
EXIST. METAL DECK
MASONRY WALL CONTROL JOINT
SCALE 1:8 (1 1/2"=1'-0")
DUR-O-WAL RAPID REGULAR SIZE CONT. WATERSTOP
CAULKING TO BE G.E. SILICONE CONST. SEALANT
SECTION
TYP. CONTROL JOINT NTS
FORMED 1/3 OF DEPTH OR SAW CUT WITHIN 24 HR.
END ELEVATION
SCALE 1:32 (3/8"=1'-0")
NEW LOCATION OF EXIST. (2) 4x5 PROJECT OUT WINDOWS
T.O. BOND BEAM EL. 7309.27'
CONC. BOND BEAM SEE DETAIL
(2) #4 BARS WHERE SHOWN AND IN FIRST CELLS @ EA. SIDE OF WINDOWS
8x16 MAS. BLOCK
#5 BARS @ 32" C.C. WITH #8 DUR-O-WAL REINF. @ 16" HORIZ. LAP FDN. BARS
EXIST. BLDG.
FIN. FLOOR
T.O. STEM WALL EL. 7299.0'
EXIST. CONC. DOCK
NORTH ELEVATION
SCALE 1:32 (3/8"=1'-0")
CONC. BOND BEAM
2-#4 BARS WHERE SHOWN
MASONRY WALL CONTROL JOINT DETAIL
8x16 MAS BLOCK
FIN. FLOOR AND T.O. STEM WALL EL. 7299.0'
EXIST. CONC. DOCK
ROOF DETAILS
SCALE 1:8 (1 1/2"=1'-0")
20 GA. G.I. FLASHING
2" RIGID INSULATION
B.U. ROOF TO MATCH EXIST.
ALUM. GRAVEL STOP
4x6 WOOD NAILER
3/4 J-BARS @ 36" O.C.
NEW FENESTRA 6" ROOF DECK
L 2x2x1/4 CONT.
NEW CONC. BOND BEAM
NEW MASONRY BLOCK WALL
EXTEND WALL REINF. INTO BOND BEAM
EXIST. STL. DECK
EXIST. 12 B 19
EXIST. CLOSURE PL. & INSULATION TO REMAIN
EXIST. MASONRY BLOCK WALL
CONC. BOND BEAM DET.
SCALE 1:8 (1 1/2"=1'-0")
4-#7 BARS CONT.
ROOF DRAIN DETAIL
SCALE 1:12 (1"=1'-0")
GRAVEL SURFACED B.U. ROOF
2" RIGID INSUL.
6" METAL DECK
ROOF SUMP RECEIVER WELDED TO METAL DECK
1/8 BENT PLATE CLOSURE 4 SIDES OF OPG.
"ZURN" MODEL #Z ROOF DRAIN OR EQUAL
3" ROOF DRAIN PIPE
457mm x 457mm 18"x18" OPG.
VOID
CONT. FTG DET.
SCALE 1:8 (1 1/2"=1'-0")
FOR STEM WALL SEE DETAIL
51mm x 102mm KEY
3-#4 CONT.
#4 @ 24" C.C.
THIS JOB MUST BE INSPECTED, AND ANY CHANGES APPROVED BY ENG-4
TUNNEL CAGE WASHER ADDITION
CIVIL: PLANS, ELEVATIONS, DETAILS
BLDG. HRL-1
TA-43
LOS ALAMOS SCIENTIFIC LABORATORY
UNIVERSITY OF CALIFORNIA
ENGINEERING DEPT. LOS ALAMOS, N. M.
C-2
2/10
5258-43
ENG C 42657


SI METRIC DRAWING
NEW CONSTRUCTION
EXIST. BLDG.
EXIST. METAL STAIRS
EXIST. DOCK
9.271 m 30'-5"
2.44 m 8'-0"
EXIST. BLDG. HRL-1
1/2" EXPANSION JOINT MATERIAL
SLOPE 1/2" TYP.
FLOOR DRAIN
1/2" EXPANSION JOINT MATERIAL
EXIST. CAGE WASH ROOM
EXIST. MOUSE CAGE ROOM
EXIST. BLDG. RC-1
FOUNDATION PLAN
SCALE 1:48 (1/4"=1'-0")
REMOVE AND REUSE EXIST. WINDOWS AT END ELEVATION
REMOVE EXIST. BLOCK BELOW BOND BEAM TO PROVIDE ENTRY TO NEW ADDITION
NEW ENTRY
1.828 m 6'-0"
14 GA. PRE-FORMED METAL DOOR FRAME TYP. AT THREE NEW OPENINGS
ELEVATION
SCALE 1:32 (3/8"=1'-0")
CONC. FLOOR
FLOOR DRAIN ZIA STOCK # 3161-26-0010
PIPE 2"φ SCHED 40 SEE MECH. SH.
FLOOR DRAIN DETAIL
(2 REQ'D) NTS
EXIST. BLDG. HRL-1
5.962 m 13'-0"
2.946 m 9'-8"
610 mm 2'-0"
NEW CURB EXTENSION DETAIL
NEW LOCATION OF DUMPSTER
NEW CAGE WASH ROOM
NEW COLLECTOR UNIT SUPPORT
5.587 m 18'-4"
NEW ASPHALT PAVING SEE NOTE #5 SHT 1
EXIST. CURB TO BE REMOVED
EXIST. CAGE WASH ROOM
ELEVS. TO MATCH EXIST. CURB & STREET
EXIST. CURB TO REMAIN
EXISTING MOUSE CAGE ROOM
PLAN
CURB EXTENSION AND COLLECTOR UNIT SUPPORT
SCALE 1:64 (3/16"=1'-0")
NEW 8x16 MASONRY BLOCK
5/8"φ x 10" LG. M.B. DWLS IN PHILLIPS RD. HD. ANCHOR UNIT
EXIST. CONC. DOCK
SECTION
SCALE 1:12 (1"=1'-0")
#5 DWLS. @ 32" TO LAP WITH MAS. BLOCK WALL REINF.
T.O. STEM WALL EL. 72'-9.0"
4" GRAVEL
COMPACTED FILL
#4 BARS @ 12" C.C. E.W.
101 mm 4"
#4 DWLS. @ 12" C.C.
101 mm (4") STABILIZED AGGREGATE
STEM WALL DETAIL
SCALE 1:16 (3/4"=1'-0")
1/2"φ 'J-BAR' @ 24" C.C.
CONC. BOND BEAM
CONST. SEALANT (TYP.)
C 9x13.4 FRAME
HEAD
METAL ANCHOR @ 32"
FIRST (2) CELLS EA. SIDE OF FRAME TO BE FILLED W/ CONC.
(2) #5 BARS
CONST. SEALANT
C 9x13.4 FRAME
JAMB
C 9x13.4 FRAME
#5 REBAR @ 32" WELD TO CHANNEL FRAME
SILL
WINDOW FRAMING DETAIL
SCALE 1:8 (1 1/2"=1'-0")
BUILDING LINE
EXIST. PAVEMENT
177 mm 7"
609 mm 2'-0"
TYPICAL CURB DETAIL
NTS
THIS JOB MUST BE INSPECTED AND ANY CHANGES APPROVED BY ENG-4
TUNNEL CAGE WASHER ADDITION
CIVIL: PLANS, SECTIONS, ELEVATIONS
BLDG: HRL-1
TA-43
LOS ALAMOS SCIENTIFIC LABORATORY
UNIVERSITY OF CALIFORNIA
ENGINEERING DEPT. LOS ALAMOS, N. M.
DRAWN E. TRUJILLO
A. E. APPROVED
DESIGN SULLIVAN
SCALE NOTED
DATE 1/31/75
SHEET C-3
3/10
5258-43
ENG-C-42657



FIRST FLOOR PLAN
SCALE: 1/4" — 1'-0"

ROOM FINISH SCHEDULE

NAME	NO.	FLOOR: CARPET	FLOOR: QUARRY TILE	FLOOR: CONDUCTIVE TILE	BASE: VINYL	BASE: GLAZED FACING TILE	WAIN.: GLAZED FACING TILE	WALLS: CONC. MASONRY UNITS	WALLS: CONCRETE	WALLS: GYPSUM BOARD	CEIL.: SUSP. ACOUST. LAY-IN	CEIL.: CONCRETE	CEIL.: MINERAL ACOUST. TILE	REMARKS
														● NEW ○ EXISTING
CORRIDOR	100C	●			●	○	○	○		●	●			NEW C.G. HT.- 9'-8
CORRIDOR	100D	●			●			○	○	●			○	
OFFICE	107	●			●					●	●			
COMPUTER RM.	107A			●	●					●	●			CLG. HT. - 10'-0
MEN	115		○			○	○	○	○			○		

NOTE: REPAINT EXIST. WALLS, DOOR FRAMES, ETC. IN CORRIDOR 100C, CORRIDOR 100D & MEN 115

GENERAL NOTES:

1. THE EXISTING CONDITIONS ARE SHOWN AS OBSERVED BY SURVEY & AS SHOWN ON RECORD DRAWINGS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IDENTIFYING ANY FEATURES OTHER THAN SHOWN & REPORTING IMMEDIATELY TO THE CONTRACTING OFFICER.
2. STRUCTURAL MEMBERS SHALL NOT BE CUT, NOTCHED OR IN ANY WAY ALTERED WITHOUT NOTIFYING THE CONTRACTING OFFICER.
3. THE CONTRACTOR SHALL REPAIR ALL DAMAGED C.M.U. & GLAZED FACING TILE BY REMOVING THE ENTIRE UNIT & REPLACING W/ NEW UNIT TO MATCH EXISTING.
4. ALL INTERIOR METAL STUD PARTITIONS SHALL BE 3 5/8" METAL STUDS @ 16" O.C. & SHALL EXTEND & BE FASTENED TO UNDERSIDE OF STRUCTURAL MEMBERS ABOVE.

NOTES:

(A) REMOVE C.M.U. PARTITION
(B) REMOVE WINDOW & METAL FRAME
(C) REMOVE EXIST. URINALS. PATCH GLAZED FACING TILE TO MATCH EXISTING. INSTALL ONE URINAL IN MEN 115
(D) REMOVE EXIST. TOWEL DISPENSER & INSTALL ON EXIST. METAL TOILET PARTITION ABOVE EXIST. WASTE RECEPTACLE IN MEN 115
(E) REMOVE EXIST. FEMININE NAPKIN DISPOSAL & INSTALL IN WOMEN 112A
(F) INSTALL SALVAGED GLAZED FACING TILE WITH NEW C.M.U. TO MATCH & LINE-UP WITH EXISTING 4'-6" H. WAINSCOT.
(G) REMOVE EXIST. STEAM CONVECTOR & PIPING. REPAINT ENTIRE WALL. PATCH ALL HOLES WHERE PIPING IS REMOVED. PATCH TO MATCH EXISTING ASPHALT TILE FLOOR AND MINERAL ACOUSTICAL TILE CEILING. PATCH ALL OTHER SURFACES DAMAGED IN REMOVALS.
(H) REMOVE LAVATORY. PATCH GLAZED FACING TILE TO MATCH EXISTING.
(J) REMOVE SECTION OF EXIST. STEEL WINDOW UP TO EXIST. MULLION. CLOSE OPENING W/ C.M.U., STUCCO EXTERIOR & FINISH INTERIOR PER NOTE (F). REPAINT WALL ABOVE WAINSCOT. SEE SHT A-2.

LEGEND:

CONSTRUCTION SHOWN IN OUTLINE IS EXISTING TO REMAIN
CONSTRUCTION SHOWN DASHED IS EXISTING TO BE REMOVED
NEW CONCRETE MASONRY UNITS
NEW METAL STUD PARTITIONS
NEW METAL STUD PARTITION W/SOUND DEADENING BOARD & SOUND ATTENUATION BLANKET
NEW METAL STUD PARTITION W/ SOUND ATTENUATION BLANKET.
C.M.U. CONCRETE MASONRY UNITS
M.C.E. METAL CARPET EDGE

AS CONSTRUCTED DRAWING
EW-12-C-32-4114
16 FEB 1979

NO	DATE	REVISIONS	BY	CK.	PROJ ENGR	ERDA
2	2-22-78	DELETE TELEPHONE BOOTH REVISE ROOM 107A.	MHM	KC		
1	12-8-77	ADDENDUM NO. 1	MHM	KC		

UNITED STATES
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
LOS ALAMOS AREA OFFICE – LOS ALAMOS, NEW MEXICO

CONTRACT NO. AE: EY-77-C-32-2856
DRAWN: M.M.
CHECKED: K.S.G.
A.E. APPROVED
DESIGN: —
PROJ ENGR: —
CHIEF ENGR: —
SCALE: AS NOTED
DATE: 9-2-1977

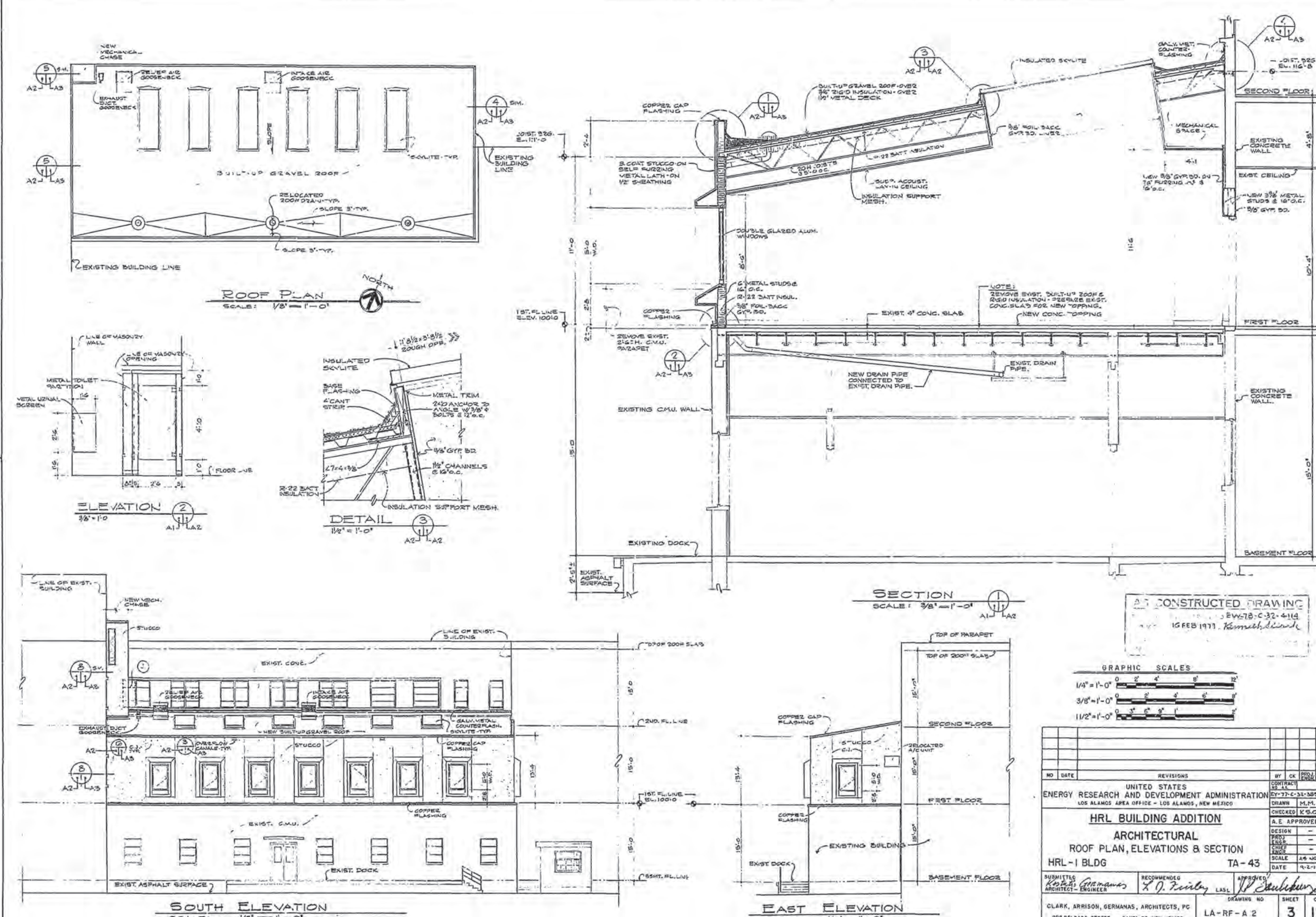
HRL BUILDING ADDITION
ARCHITECTURAL
FLOOR PLAN AND SCHEDULE
HRL-1 BLDG TA-43

SUBMITTED: ARCHITECT–ENGINEER
RECOMMENDED: LASL
APPROVED: ERDA

CLARK, ARRISON, GERMANAS, ARCHITECTS, PC
208 DELGADO STREET SANTA FE, NEW MEXICO

DRAWING NO. LA-RF-A 1 SHEET 2 OF 16

C-43632 L.J. 5632-43



AS CONSTRUCTED DRAWING
EY-78-C-32-4114
16 FEB 1977

NO	DATE	REVISIONS	BY	CK	PROJ ENGR	ERDA

UNITED STATES
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
LOS ALAMOS AREA OFFICE - LOS ALAMOS, NEW MEXICO

HRL BUILDING ADDITION

ARCHITECTURAL

ROOF PLAN, ELEVATIONS & SECTION

HRL-1 BLDG — TA-43

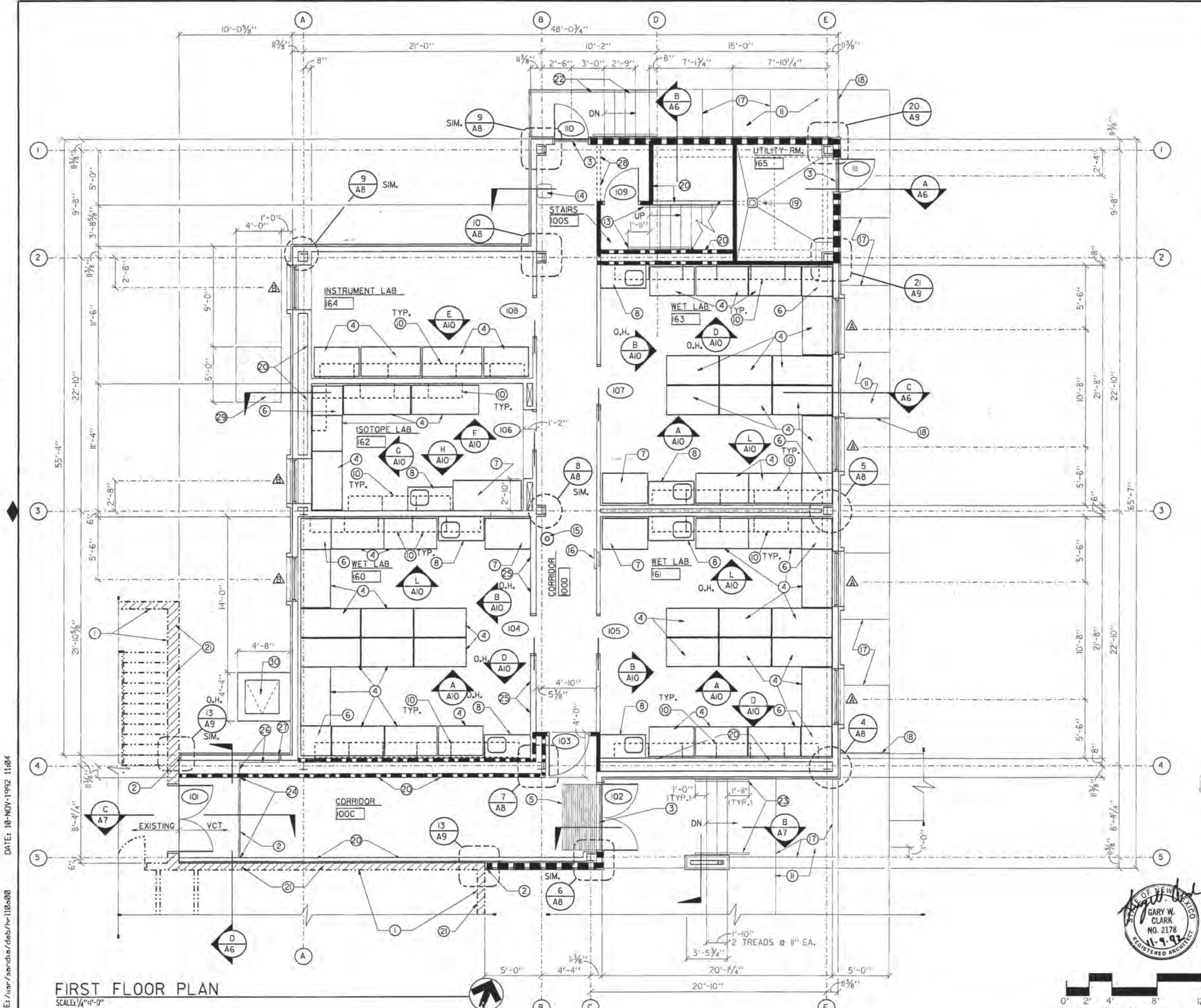
CONTRACT NO. A.E.	EY-77-C-32-3858
DRAWN	M.M.
CHECKED	K.S.C.
A.E. APPROVED	
DESIGN	-
PROJ ENGR.	-
CHIEF ENGR.	-
SCALE	AS NOTED
DATE	9-2-1977

SUBMITTED: Kostis Germanas, ARCHITECT-ENGINEER
RECOMMENDED: L. J. Fairley, LASL
APPROVED: J. P. Saulsbury, ERDA

CLARK, ARRISON, GERMANAS, ARCHITECTS, PC
208 DELGADO STREET SANTA FE, NEW MEXICO

DRAWING NO: LA-RF-A 2 | SHEET 3 OF 16

C-43632 L.J. 5632-43



FIRST FLOOR PLAN
SCALE: 1/4"=1'-0"

GRAPHIC SCALE: 1/4"=1'-0"

LEGEND

- 1HR FIRE RATED PARTITION WITH 3 5/8" X 22 GA. MET. STUDS @ 16" O.C. WITH 5/8" TYPE 'X' GYP. BD. FULL HEIGHT BOTH SIDES TO MTL. DECK ABOVE. INSTALL FIRE SAFING BETWEEN TOP TRACK AND METAL DECK.
- 1HR FIRE RATED PARTITION ASSEMBLY WITH 3 5/8" X 22 GA. METAL STUDS @ 16" O.C. WITH 5/8" TYPE 'X' GYP. BD. ONE SIDE TO METAL DECK ABOVE. INSTALL FIRE SAFING BETWEEN TOP TRACK AND METAL DECK.
- PARTITION WITH 3 5/8" X 22 GA. MET. STUDS @ 16" O.C. WITH 5/8" GYP. BD. BOTH SIDES (ONE SIDE IN THE CASE OF A DOUBLE STUD WALL) TO 6" ABOVE CEILING LINE.
- 1HR FIRE RATED EXTERIOR WALL WITH 6" X 18 GA. MET. STUDS @ 16" O.C. WITH 5/8" TYPE 'X' GYP. BD. EA. SIDE - SEE DETAIL 2/A7 FOR GYP. BD. FURRING AT FLOOR BEAM ASSEMBLY.

KEYED NOTES

1. EXISTING HRL-1 BUILDING
2. EXPANSION JOINT - SEE DETAIL 18/A9
3. METAL THRESHOLD
4. LAB FURNISHINGS - ADDITIVE ALTERNATE NO. 1 SEE INTERIOR ELEVATION SHEET A10
5. SURFACE MOUNTED FLOOR MAT. (3'-0" X 6'-0")
6. CORNER UNIT FOR LAB FURNISHINGS MODEL #XFT-10020-ST, TYP. ADD. ALT NO. 1
7. FUMEHOOD
8. SINK (4'-0" LENGTH MAX.)
9. NOT USED.
10. OVERHEAD STORAGE CABINETS - ADDITIVE ALTERNATE NO. 2 SEE INTERIOR ELEVATION SHEET A10
11. CONCRETE SIDEWALK
12. NOT USED.
13. 1 1/2" DIA. STANDARD PIPE HANDRAIL - WALL MOUNTED SEE DETAIL 15/A9
14. ELECTRIC WATER COOLER
15. EMERGENCY EYE WASH & SHOWER
16. SEMI-RECESSED FIRE EXTINGUISHER CABINET
17. SIDEWALK CONTROL JOINT.
18. SIDEWALK EXPANSION JOINT.
19. FLOOR SINK
20. INTERIOR PARTITION NOT TO RECEIVE SOUND ATTENUATION BATTS.
21. EXISTING 8" & 12" THICK CONC. WALL (2 HR AREA SEPARATION WALL).
22. 1 1/2" DIA. STANDARD PIPE GUARDRAIL & HANDRAIL - MOUNT IN CONCRETE WALKS - SEE DETAIL 14/A8
23. 1 1/2" DIA. STANDARD PIPE HANDRAIL - SEE WALL DETAIL B/A7
24. WALL EXPANSION JOINT - SEE DETAIL 16/A9
25. 6" X 22 GA. MTL. STUD @ 16" O.C. @ LAB. NO. 160
26. LINE OF EXIST. CONC. STRUCTURE @ FIN. FLR. LEVEL.
27. VERTICAL EXPANSION JOINT - SEE DETAIL 2/A5
28. LINE OF GYP. BD. SOFFIT ABOVE.
29. CONCRETE PAD FOR ELEC. TRANSFORMER.
30. CRAWL SPACE ACCESS MANHOLE

GENERAL NOTES

1. ALL DIMENSIONS ARE FROM FACE OF STUD & STRUCTURAL COLUMN CENTER LINES, UNLESS OTHERWISE NOTED.
2. ALL INTERIOR PARTITIONS ARE TO RECEIVE 3 1/2" SOUND ATTENUATION BATTS FULL HEIGHT OF PARTITION, UNLESS OTHERWISE NOTED.

NO.	DATE	CLASS REV.	REVISIONS	DWN	DES	CHK'D	REL	SUB	REC	APP
1	6/92	LM	AS-BUILT W/CHANGES	DG	H&N	MB	MB	MB	LM	EC

Holmes & Narver
ALBUQUERQUE, NEW MEXICO

HRL BUILDING ADDITION

FIRST FLOOR PLAN

DRAWN	MSJ
DESIGN	GWC
CHECKED	JS
RELEASED	MLB
DATE	10/30/90

BLDG. 1 TA-43

SUBMITTED M. BLACKMAN | RECOMMENDED L. MARTINEZ | APPROVED E. CAULDER

STATE OF NEW MEXICO GARY W. CLARK NO. 2178 REGISTERED ARCHITECT 11-9-92

Los Alamos — Los Alamos National Laboratory, Los Alamos, New Mexico 87545

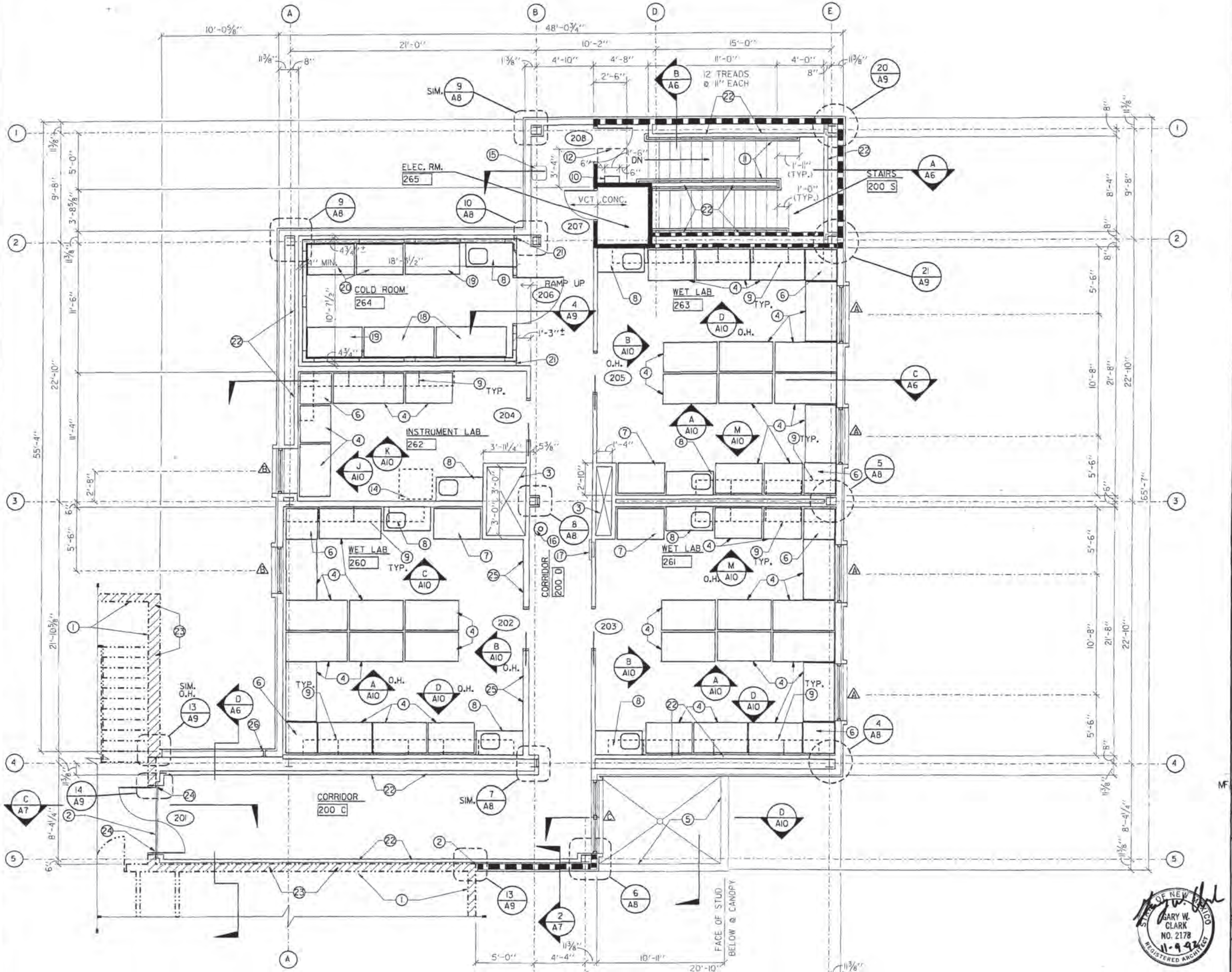
SHEET A1 10 OF 51

CLASSIFICATION UNC. REVIEWER L. MARTINEZ DATE 9/18/92

LAB JOB NO.	DRAWING NO.	REV.
8571	C45632	1

DATE: 10-NOV-1992 11:04

FILE: /usr/sandie/deb/hr110600



SECOND FLOOR PLAN
SCALE: 1/4"=1'-0"

GRAPHIC SCALE: 1/4"=1'-0"

LEGEND

- 1HR FIRE RATED PARTITION WITH 3 5/8" X 22 GA. MET. STUDS @ 16" O.C. WITH 5/8" TYPE 'X' GYP. BD. FULL HEIGHT BOTH SIDES TO METAL ROOF DECK ABOVE. INSTALL FIRE SAFING BETWEEN TOP TRACK AND METAL ROOF DECK.
- 1HR FIRE RATED PARTITION ASSEMBLY WITH 3 5/8" X 22 GA. METAL STUDS @ 16" O.C. WITH 5/8" TYPE 'X' GYP. BD. ONE SIDE TO METAL ROOF DECK ABOVE. INSTALL FIRE SAFING BETWEEN TOP TRACK AND METAL ROOF DECK.
- PARTITION WITH 3 5/8" X 22 GA. MET. STUDS @ 16" O.C. WITH 5/8" GYP. BD. BOTH SIDES (ONE SIDE IN THE CASE OF A DOUBLE STUD WALL) TO 6" ABOVE CEILING LINE.
- 1HR FIRE RATED EXTERIOR WALL WITH 6" X 18 GA. MET. STUDS @ 16" O.C. WITH 5/8" TYPE 'X' GYP. BD. EA. SIDE - SEE DETAIL 1/A7 FOR GYP. BD. FURRING AT ROOF BEAM ASSEMBLY.

KEYED NOTES

1. EXISTING HRL-1 BUILDING
2. EXPANSION JOINT - SEE DETAIL 18/A9
3. MECH. CHASE
4. LAB FURNISHINGS - ADDITIVE ALTERNATE NO. 1 SEE INTERIOR ELEVATION SHEET A10
5. CANOPY ROOF BELOW
6. CORNER UNIT FOR LAB FURNISHINGS MODEL #XFT-10020-ST, TYP. ADD. ALT. NO. 1
7. FUMEHOOD
8. SINK (4'-0" LENGTH MAX.)
9. OVERHEAD STORAGE CABINETS - ADDITIVE ALTERNATE NO. 2 SEE INTERIOR ELEVATION SHEET A10
10. ROOF ACCESS LADDER - SEE DETAIL 19/A9
11. 1 1/2" DIA. STANDARD PIPE HANDRAIL - WALL MOUNTED. SEE DETAIL 15/A9
12. LINE OF ROOF HATCH ACCESS SHAFT ABOVE
13. NOT USED
14. G.F.E. STILL LOCATION
15. ELECTRIC WATER COOLER
16. EMERGENCY EYEWASH & SHOWER
17. SEMI-RECESSED FIRE EXTINGUISHER CABINET
18. WORKSTATION MODEL NO. FT10111-18 (ADD. ALT. NO. 1)
19. WORKSTATION MODEL NO. FT10111-14 (ADD. ALT. NO. 1)
20. WORKSTATION MODEL NO. FT10111-12 (ADD. ALT. NO. 1)
21. INSTALL SHEET METAL ENCLOSURE PANEL FULL HEIGHT, PAINT TO MATCH GYP. BD. WALLS.
22. INTERIOR PARTITION NOT TO RECEIVE SOUND ATTENUATION BATTS.
23. EXISTING 8" & 12" THICK CONC. WALL (2 HR AREA SEPARATION WALL)
24. WALL EXPANSION JOINT - SEE DETAIL 16/A9
25. 6" X 22 GA. MTL. STUDS @ 16" O.C. @ LAB. NO. 260
26. VERTICAL EXPANSION JOINT - SEE DETAIL 2/A5

GENERAL NOTES

1. ALL DIMENSIONS ARE FROM FACE OF STUD & STRUCTURAL COLUMN CENTER LINES, UNLESS OTHERWISE NOTED.
2. ALL WORKSTATIONS ARE "FLEXTECH" LINE BY KEWAUNEE TECHNICAL WORKSTATION DIVISION.
3. ALL INTERIOR PARTITIONS ARE TO RECEIVE 3 1/2" SOUND ATTENUATION BATTS FULL HEIGHT OF PARTITION, UNLESS OTHERWISE NOTED.

NO.	DATE	CLASS REV.	REVISIONS	DWN	DES	CHK'D	REL	SUB	REC	APP
1	6/92	LM	AS-BUILT W/O CHANGES	DG	H&N	MB	MB	MB	LM	EC

Holmes & Narver
ALBUQUERQUE, NEW MEXICO

HRL BUILDING ADDITION

SECOND FLOOR PLAN

DRAWN	MSJ
DESIGN	GWC
CHECKED	JS
RELEASED	MLB
DATE	10/30/90

BLDG. 1 — TA-43

SUBMITTED M. BLACKMAN — RECOMMENDED L. MARTINEZ — APPROVED E. CAULDER

STATE OF NEW MEXICO — GARY W. CLARK — NO. 2178 — 11-9-92 — REGISTERED ARCHITECT

Los Alamos — Los Alamos National Laboratory, Los Alamos, New Mexico 87545

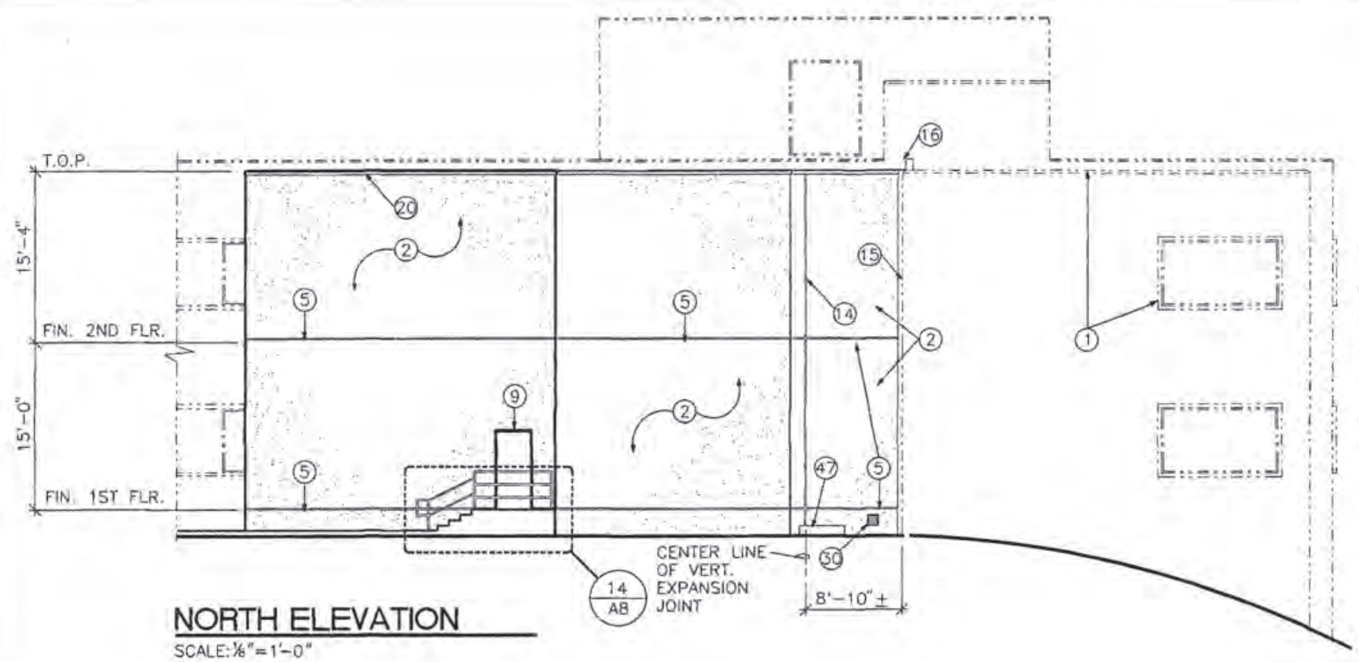
SHEET A2 — 11 OF 51

CLASSIFICATION UNC. — REVIEWER L. MARTINEZ — DATE 9/18/92

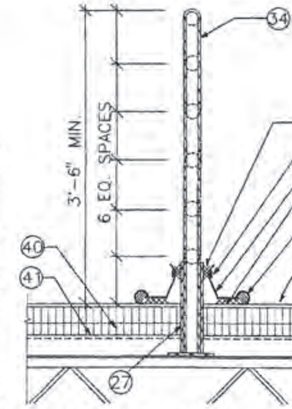
LAB JOB NO. 8571 — DRAWING NO. C45632 — REV. 1

DATE: 06-NOV-1992 14:48

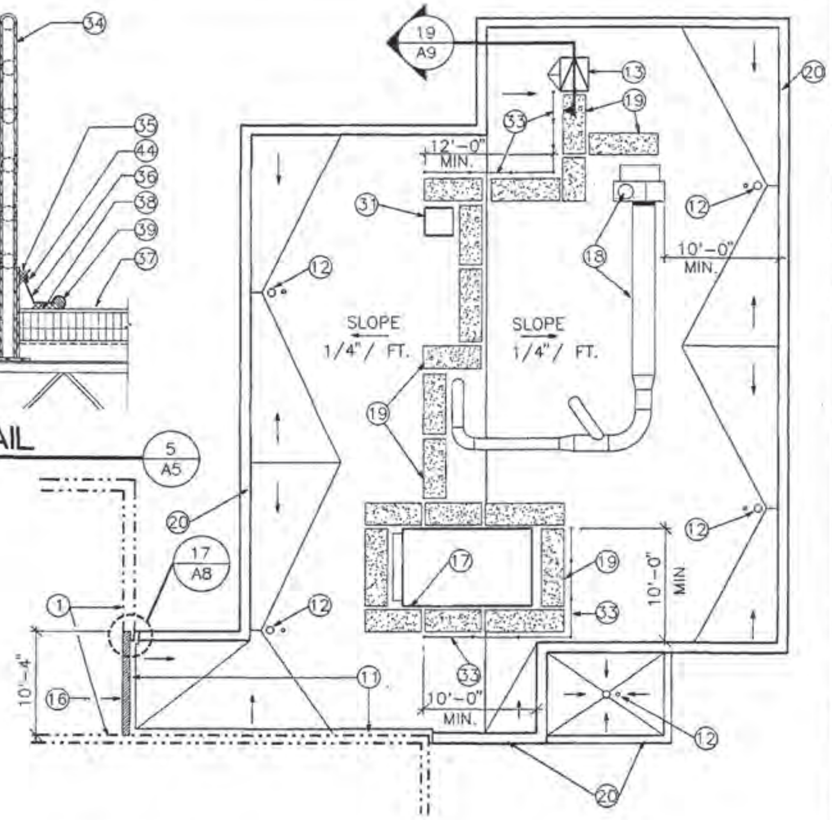
FILE: /usr/sandia/dab/hr118600



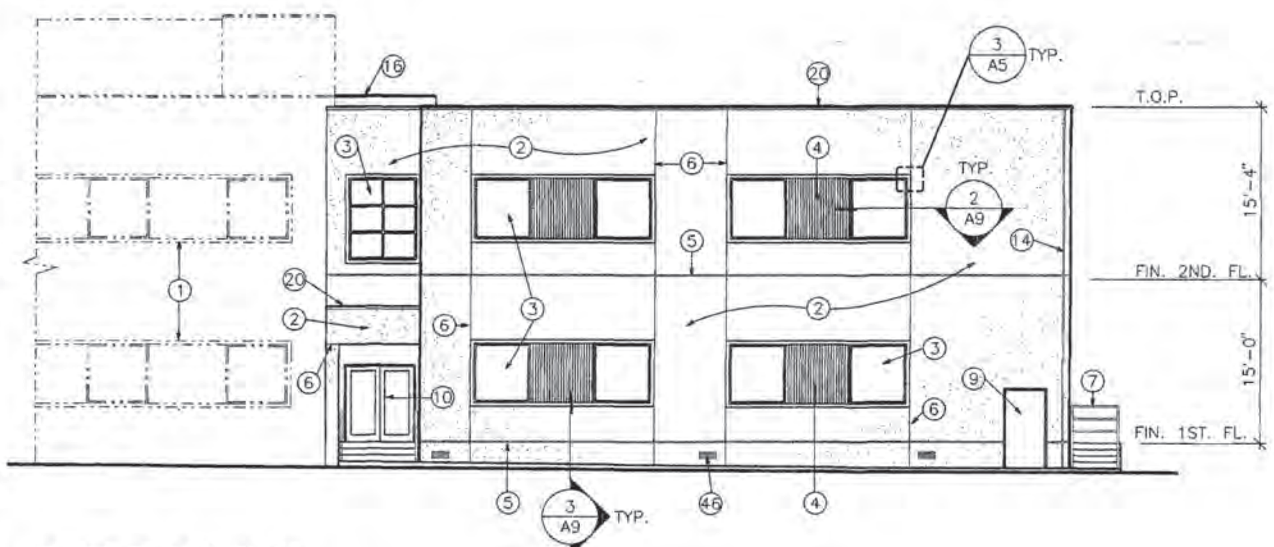
NORTH ELEVATION
SCALE: 1/8"=1'-0"



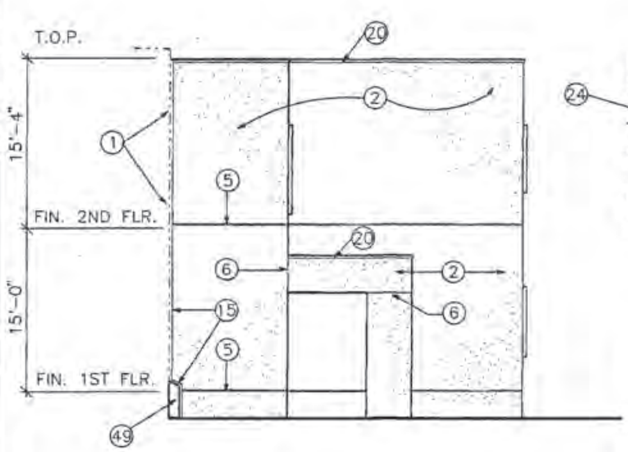
GUARDRAIL
SCALE: 1"=1'-0"



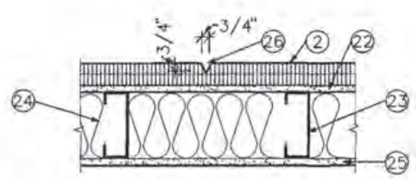
ROOF PLAN
SCALE: 1/8"=1'-0"



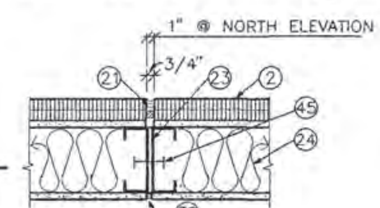
EAST ELEVATION
SCALE: 1/8"=1'-0"



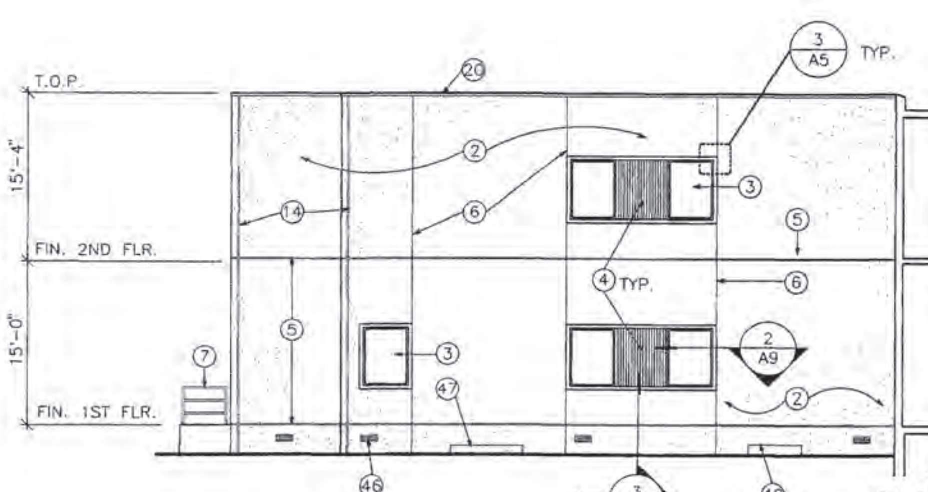
SOUTH ELEVATION
SCALE: 1/8"=1'-0"



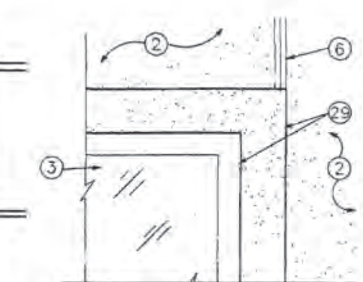
CONTROL JOINT
SCALE: 1 1/2"=1'-0"



VERTICAL EXPANSION JOINT
SCALE: 1 1/2"=1'-0"



WEST ELEVATION
SCALE: 1/8"=1'-0"



CONTROL JOINT LOCATION
SCALE: 1 1/2"=1'-0"

GRAPHIC SCALE: 1 1/2"=1'-0"

GRAPHIC SCALE: 1/8"=1'-0"

KEYED NOTES

1. EXISTING HRL-1 BUILDING.
2. EXTERIOR FINISH SYSTEM-COLOR TO MATCH EXISTING HRL-1 BUILDING.
3. 1" INSULATED GLASS IN ALUMINUM FRAME.
4. CORRUGATED EXTERIOR FINISH SYSTEM TO MATCH CORRUGATION SECTION & COLOR OF EXISTING CORRUGATED CONCRETE PANELS BETWEEN EXISTING HRL-1 WINDOWS.
5. HORIZONTAL EXPANSION JOINT-SEE DETAILS 2/A8 & 3/A8
6. CONTROL JOINT- SEE DETAIL 1/A5.
7. GUARDRAIL/HANDRAIL- SEE DETAIL 14/A8
8. NOT USED.
9. HOLLOW METAL EXTERIOR DOOR.
10. ALUMINUM ENTRY DOOR.
11. ROOF EXPANSION JOINT- SEE DETAIL 11/A8.
12. ROOF & OVERFLOW DRAINS.
13. ROOF HATCH.
14. VERTICAL EXPANSION JOINT SEE DETAIL 2/A5.
15. EXPANSION JOINT COVER-SEE DETAIL 13/A9. EXPANSION JOINT @ NORTH ELEV. SIM. TO 13/A9.
16. CONCRETE PARAPET EXTENSION-SEE DETAIL 11/A8.
17. MECHANICAL UNIT.
18. EXHAUST SYSTEM & DUCT WORK.
19. PROTECTIVE WALKWAY.
20. ALUMINUM COPING.
21. BACK-UP ROD & SEALANT.
22. 5/8" EXTERIOR GYPSUM BOARD SHEATHING.
23. 6"x18 GA. METAL STUDS.
24. R-19 BATT INSULATION.
25. 5/8" GYPSUM BOARD.
26. ROUTER CONTROL JOINT.
27. 2" DIA. STL. PIPE SLEEVE-WELD TO GRARDRAIL & ROOF STRUCTURE. SEE STRUCT. DWGS. FOR PIPE SLEEVE LOCATIONS.
28. NOT USED.
29. WINDOW SURROUND WITH EXTERIOR FINISH SYSTEM.
30. EXTEND EXISTING VENT GRILLE THROUGH NEW EXTERIOR FINISH SYSTEM AND TRIM.
31. CONDENDING UNIT-SEE SHT M3.
32. SEALANT
33. GUARD RAIL-SEE DETAIL 5/A5.
34. 1 1/2" ϕ STD. STL. PIPE GUARDRAIL/HANDRAIL – GRIND ALL WELDS SMOOTH AND PAINT.
35. WATER CUT-OFF MASTIC
36. PRE-MOLDED PIPE SEAL.
37. MEMBRANE ROOFING.
38. SPLICING CEMENT.
39. LAP SEALANT.
40. RIGID INSULATION.
41. METAL DECK.
42. NOT USED.
43. NOT USED.
44. STAINLESS STL. CLAMPING RING.
45. BOLTED CONNECTION W/ 1 1/4" SLOT VERTICALLY @ 16" O.C. MAX. @ VERTICAL EXPANSION JT. @ NORTH ELEVATION ONLY.
46. ALUMN. CRAWL SPACE VENTS-SEE DETAIL 3/A8 (7 TOTAL).
47. CONC. PAD FOR ELEC. TRANSFORMER.
48. CRAWL SPACE ACCESS MANHOLE.
49. CONC. REINFORCEMENT WALL SEE SHT. S11. ADDITIVE ALTERNATE NO. 4.

GENERAL NOTES

1. REFERENCE MECHANICAL & ELECTRICAL DRAWINGS FOR ADDITION ROOF PENETRATIONS & ROOF OR PARAPET MOUNTED EQUIPMENT.
2. IMPACT RESISTANT EXTERIOR FINISH SYSTEM SHALL BE FROM FINISH GRADE TO 2nd FLOOR HORIZONTAL EXPANSION JOINT AROUND ENTIRE BUILDING ADDITION.

NO.	DATE	CLASS REV.	REVISIONS	DWN	DES	CHK'D	REL	SUB	REC	APP
1	6/92	LM	AS-BUILT W/CHANGES	DG	H&N	MB	MB	MB	LM	EC

Holmes & Narver
ALBUQUERQUE, NEW MEXICO

HRL BUILDING ADDITION

BUILDING ELEVATIONS AND ROOF PLAN

DRAWN	TMS,SEG
DESIGN	GWC
CHECKED	JS
RELEASED	MLB
DATE	10/30/90

BLDG. 1 TA-43

SUBMITTED M. BLACKMAN — RECOMMENDED L. MARTINEZ — APPROVED E. CAULDER

Los Alamos — Los Alamos National Laboratory, Los Alamos, New Mexico 87545

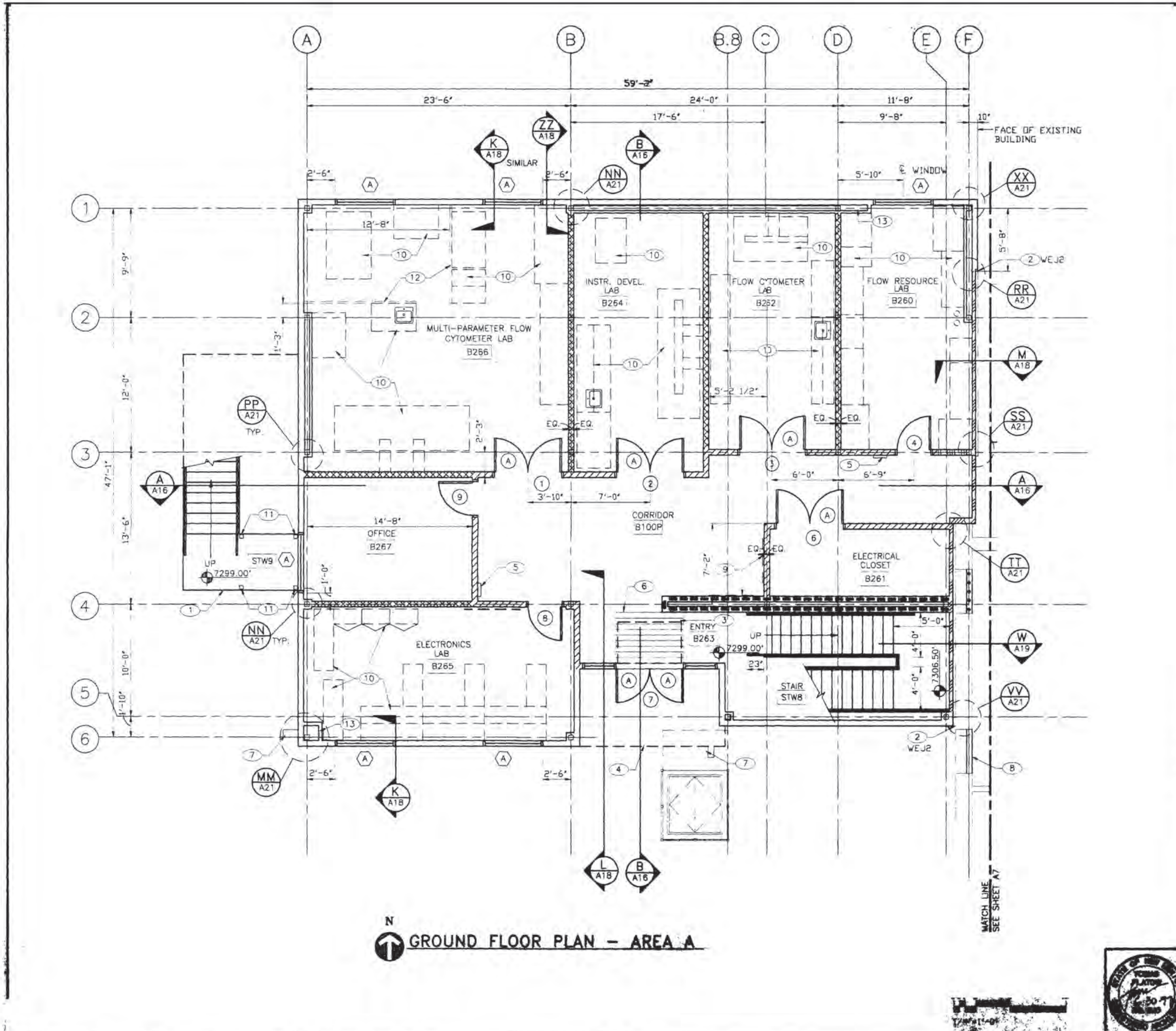
SHEET A5 — 14 OF 51

CLASSIFICATION UNC. REVIEWER L. MARTINEZ DATE 9/18/92

LAB JOB NO.	DRAWING NO.	REV.
8571	C45632	1

GARY W. CLARK NO. 2178 REGISTERED ARCHITECT STATE OF NEW MEXICO 11-9-92

1/8"=1'-0"



N

GROUND FLOOR PLAN – AREA A

GENERAL NOTES

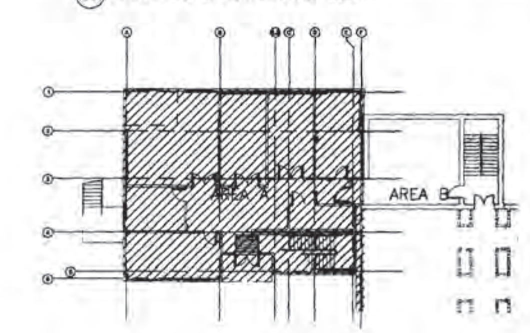
A. ALL DIMENSION ARE TO FACE OF STUD, UNLESS [illegible]
B. CONTRACTOR TO VERIFY EXISTING CONDITIONS AND NOTIFY [illegible] OF ANY DISCREPANCIES BETWEEN EXISTING AND THESE [illegible]

KEYED NOTES

1. CONCRETE STOOP.
2. EXPANSION JOINT COVER.
3. SKYLIGHT ABOVE
4. LINE OF CANOPY ABOVE.
5. 22"X28"X8" SEMI-RECESSED FIRE EXTINGUISHER CABINET. MOUNT DOOR HANDLE AT 42" A.F.F.
6. RECESSED ENTRY MAT
7. 8"X16" CONCRETE SPLASH BLOCK
8. FILL OPENING WITH 1" EIFS SYSTEM OVER 5/8" GYPSUM BOARD SHEATHING OVER 6" METAL STUDS. COLOR TO MATCH EXISTING.
9. 4'-0 X 5'-0" WHITE BOARDS GFE, UNIVERSITY INSTALLED
10. GFE SUPPLIED EQUIPMENT
11. STRUCTURAL STEEL COLUMNS
12. GFE FULL HEIGHT PARTITION.
13. 24" X 24" ACCESS DOOR

LEGEND

- PARTITION TYPE P-1 – 1 HR. FIRE RATED PARTITION.
- PARTITION TYPE P-2 – SOUND PARTITION.
- PARTITION TYPE P-3 – 2 HR. FIRE RATED SHAFT WALL PARITION.
- PARTITION TYPE P-5 – FURRED WALL.
- PARTITION TYPE P-6 – 2HR. RATED PARTITION.
- PARTITION TYPE P-7 – 1HR. RATED PARTITION.
- (A) DENOTES ACTIVE DOOR LEAF



KEYPLAN

NOT FOR CONSTRUCTION

NO	DATE	CLASS REV.	REVISIONS	DWN	DES	CHKD	REL	SUB	REC	APP
1	4/97		RECORD DRAWINGS WITH CHANGES							

CHAVEZ-GRIEVES CONSULTING ENGINEERS INC.
BRIDGERS & PAXTON CONSULTING ENGINEERS INC.
FLATOW MOORE SHAFFER McCABE – CONSULTING ARCHITECTS

BIOPHYSICS LAB ADDITION

ARCH: GROUND FLOOR PLAN – AREA A

DRAWN J. [illegible]
DESIGN T. [illegible]
CHECKED [illegible]
RELEASED [illegible]
DATE [illegible]

BLDG. 01 TA-43

SUBMITTED L. WEBSTER
APPROVED B. BURTSCHELL

Los Alamos — LOS ALAMOS NATIONAL LABORATORY, LOS ALAMOS, NEW MEXICO 87545

SHEET A6 25 of 72

CLASSIFICATION REVIEWER

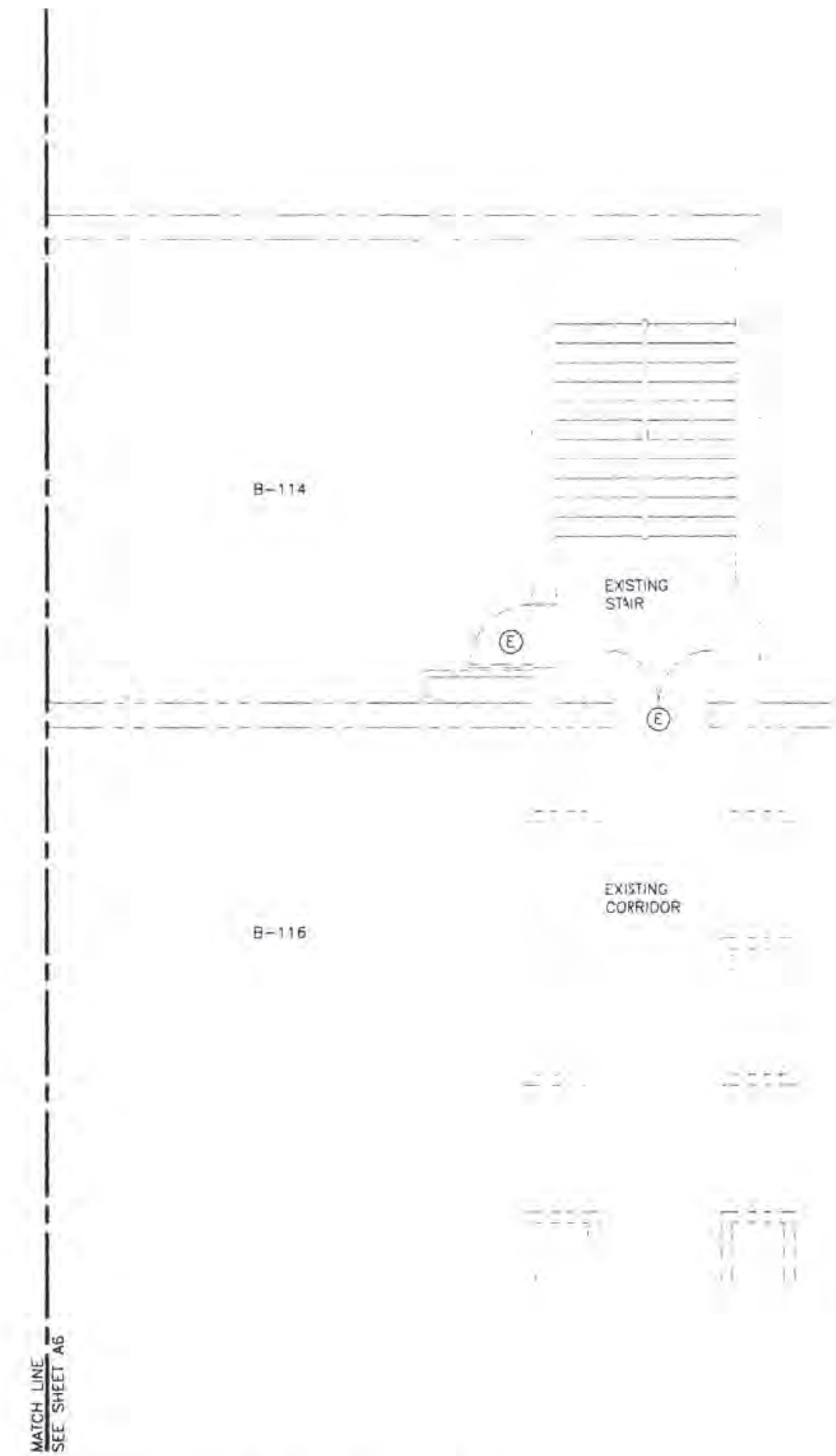
PROJECT I.D. NO. 13178

DRAWING NO. C49784

REV

GENERAL NOTES

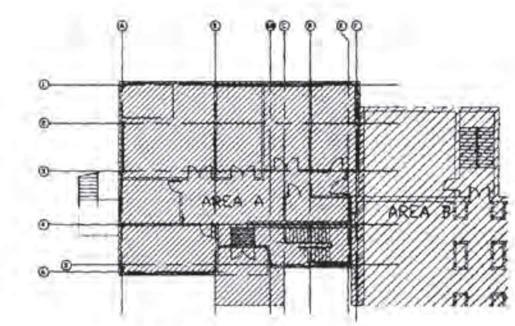
A. CONTRACTOR TO VERIFY EXISTING CONDITIONS AND NOTIFY UNIVERSITY OF ANY DISCREPANCIES BETWEEN EXISTING AND THESE DOCUMENTS.



N

GROUND FLOOR PLAN – AREA B

1/4" = 1'



KEYPLAN

NO	DATE	CLASS REV	REVISIONS	DWN	DES	CHKD	REL	SUB	REC	APP
1	4/97		RECORD DRAWINGS WITH CHANGES							

CHAVEZ–GRIEVES CONSULTING ENGINEERS INC.
BRIDGERS & PAXTON CONSULTING ENGINEERS INC.
FLATOW MOORE SHAFFER McCABE – CONSULTING ARCHITECTS

BIOPHYSICS LAB ADDITION

ARCH: GROUND FLOOR PLAN – AREA B

DRAWN	J. GONZALES
DESIGN	T. WILBER
CHECKED	T. FLATOW
RELEASED	D. GRIEVES
DATE	02-26-96

BLDG. 01 — TA-35

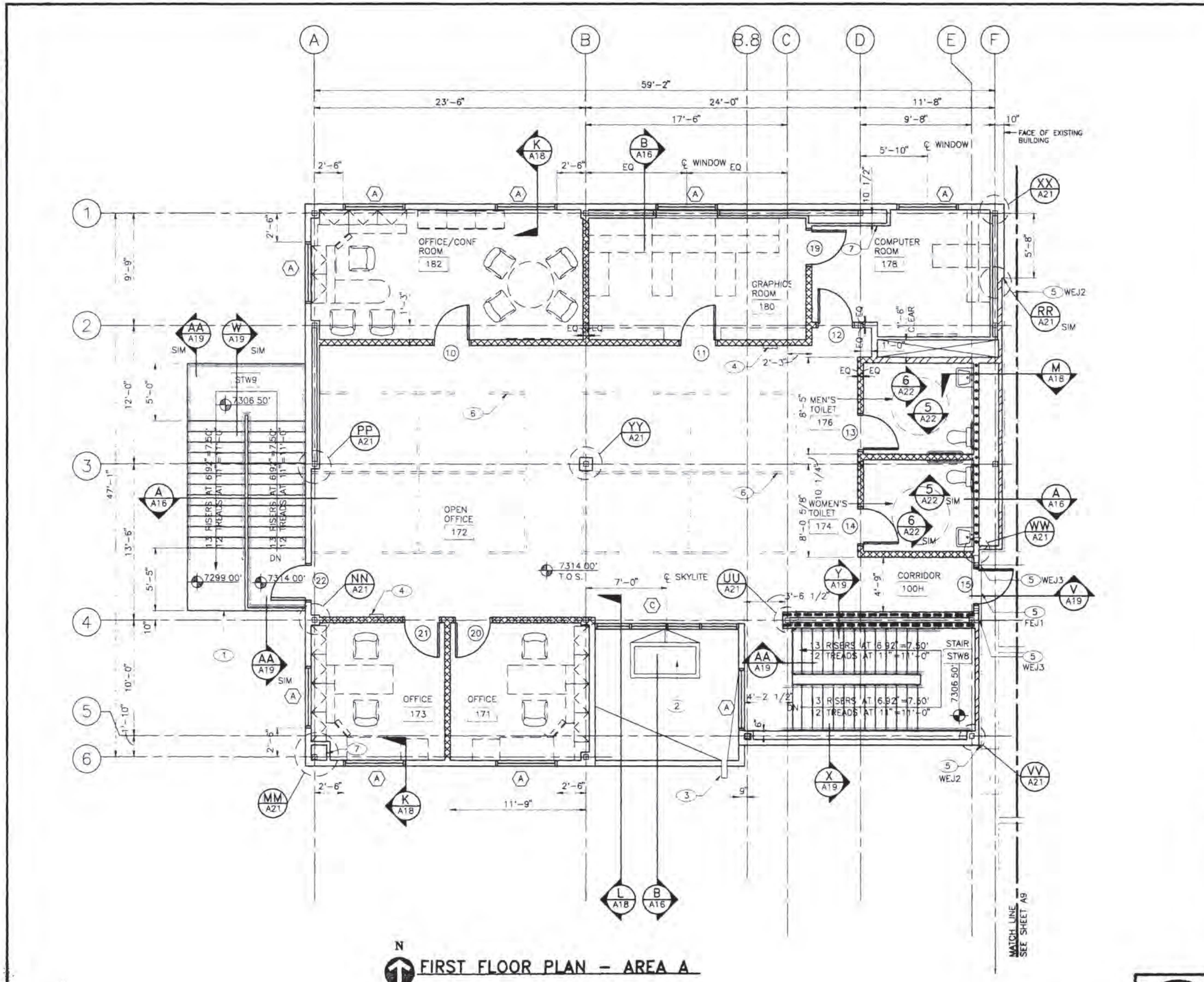
SUBMITTED L. WEBSTER — APPROVED B. BURTSCHELL

Los Alamos — LOS ALAMOS NATIONAL LABORATORY, LOS ALAMOS, NEW MEXICO 87545

SHEET 26 OF 72 — A7

CLASSIFICATION — REVIEWER — DATE

PROJECT I.D. NO. 13178 — DRAWING NO. C49784



FIRST FLOOR PLAN - AREA A

GENERAL NOTES

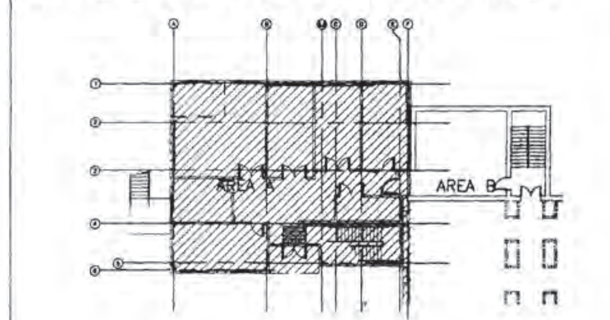
A. ALL DIMENSIONS ARE FROM FACE OF STUD, UNLESS NOTED OTHERWISE.
A. CONTRACTOR TO VERIFY EXISTING CONDITIONS AND NOTIFY UNIVERSITY OF ANY DISCREPANCIES BETWEEN EXISTING AND THESE DOCUMENTS.

KEYED NOTES

1. CONCRETE STOOP
2. SKYLIGHT.
3. SCUPPER. SEE DETAIL FF/A20
4. FIRE EXTINGUISHER CABINET.
5. EXPANSION JOINT COVER
6. OFFICE PARTITIONS, GFE AND INSTALLED.
7. 24" X 24" ACCESS DOOR

LEGEND

- PARTITION TYPE P-1 – 1 HR. FIRE RATED PARTITION.
- PARTITION TYPE P-2 – SOUND PARTITION
- PARTITION TYPE P-3 – 2 HR. FIRE RATED SHAFT WALL PARITION.
- PARTITION TYPE P-4 – 1 HR. FIRE RATED SHAFT WALL PARITION.
- PARTITION TYPE P-5 – FURRED WALL.
- PARTITION TYPE P-6 – 2HR. RATED PARTITION.
- PARTITION TYPE P-7 – 1HR. RATED PARTITION.



KEYPLAN

NOT FOR CONSTRUCTION

NO	DATE	CLASS REV	REVISIONS	DWN	DES	CHKD	REL	SUB	REC	APP
1	4/97		RECORD DRAWINGS WITH CHANGES							

CHAVEZ–GRIEVES CONSULTING ENGINEERS INC.
BRIDGERS & PAXTON CONSULTING ENGINEERS INC.
FLATOW MOORE SHAFFER McCABE – CONSULTING ARCHITECT

BIOPHYSICS LAB ADDITION
ARCH. FIRST FLOOR PLAN – AREA A

BLDG 01 TA-43

DRAWN	J. GONZALES
DESIGN	T. WILBER
CHECKED	T. FLATOW
RELEASED	D. GREVES
DATE	02-[illegible]

SUBMITTED L. WEBSTER
APPROVED B. BURTSCHELL

Los Alamos — LOS ALAMOS NATIONAL LABORATORY, LOS ALAMOS, NEW MEXICO

SHEET 27 A8

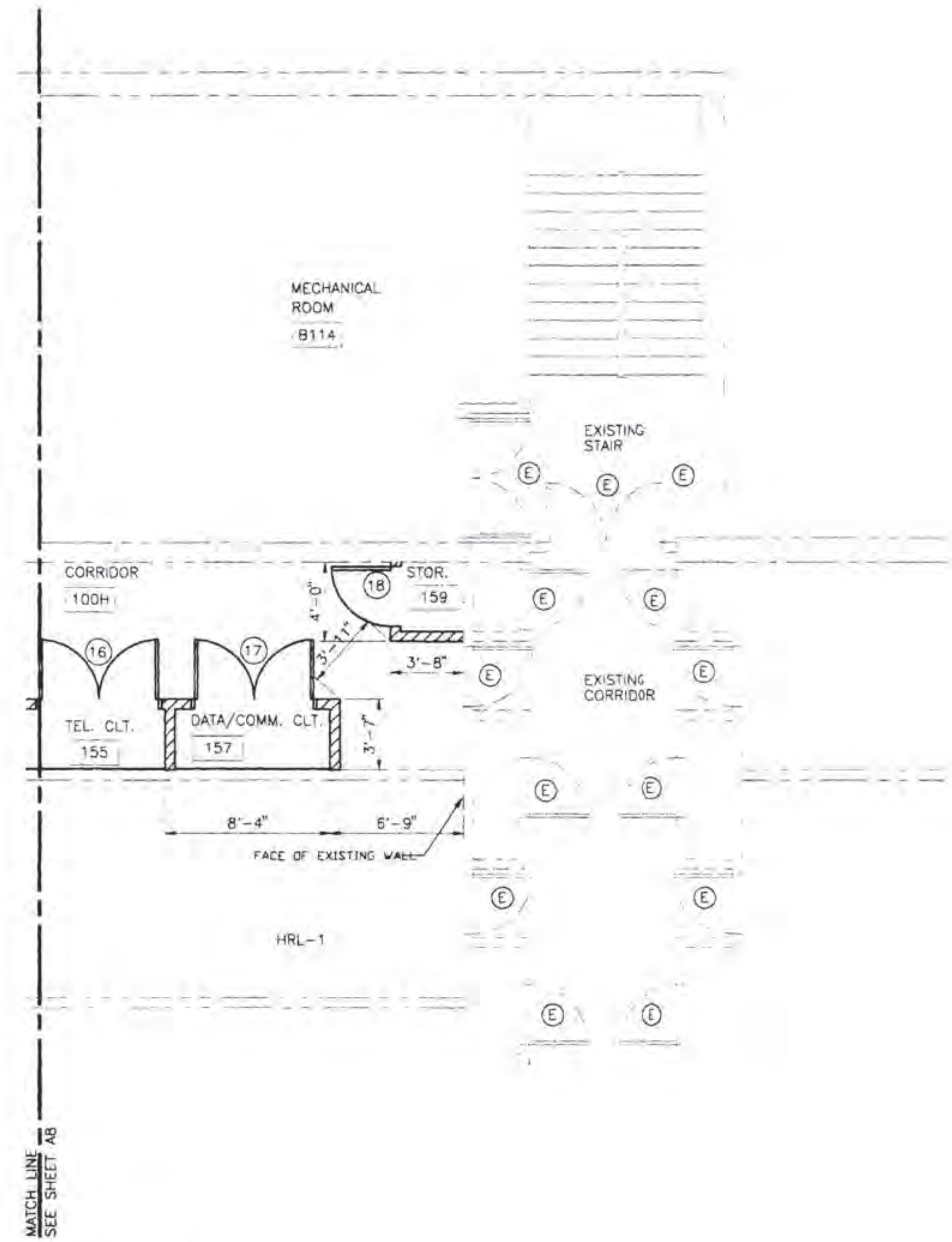
CLASSIFICATION — REVIEWER
PROJECT I.D. NO. 13178
DRAWING NO. C49784

GENERAL NOTES

A. CONTRACTOR TO VERIFY EXISTING CONDITIONS AND NOTIFY [illegible] OF ANY DISCREPANCIES BETWEEN EXISTING AND THESE DOCUMENTS.

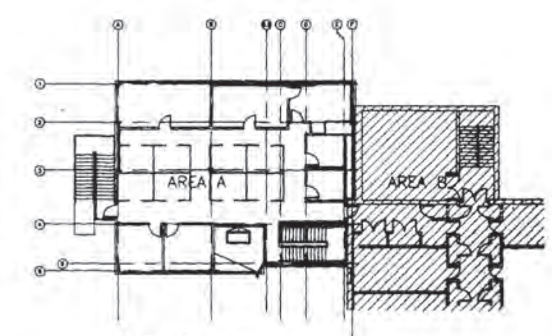
LEGEND

PARTITION TYPE P-1 - 1 HR. FIRE RATED PARTITION



N

FIRST FLOOR PLAN - AREA B



KEYPLAN

1/4"=1'-0"

NO	DATE	CLASS REV.	REVISIONS	DWN	DES	CHKD	REL	SUB	REC'D
1	4/97		RECORD DRAWINGS WITHOUT CHANGES						

CHAVEZ-GRIEVES CONSULTING ENGINEERS INC.
BRIDGERS & PAXTON CONSULTING ENGINEERS INC.
FLATOW MOORE SHAFFER McCABE - CONSULTING ARCHITECTS

BIOPHYSICS LAB ADDITION

ARCH: FIRST FLOOR PLAN - AREA B

BLDG. 01 TA-35

DRAWN	J. GONZALES
DESIGN	T. WILBER
CHECKED	T. FLATOW
RELEASED	[illegible]
DATE	[illegible]

SUBMITTED L. WEBSTER

APPROVED B. BURTSCHELL

Los Alamos — LOS ALAMOS NATIONAL LABORATORY, LOS ALAMOS, NEW MEXICO 87545

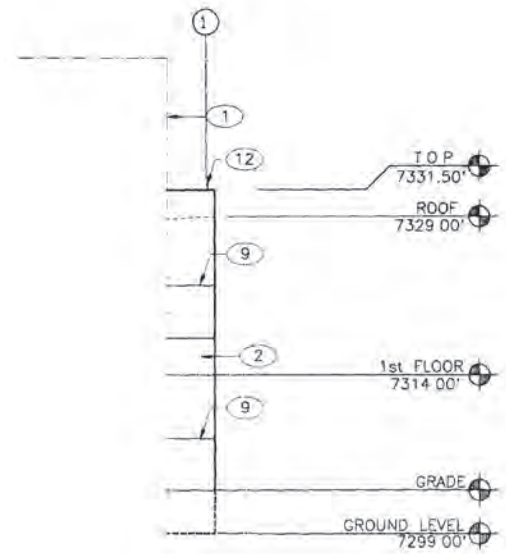
SHEET A9 — 28 OF 72

CLASSIFICATION — REVIEWER

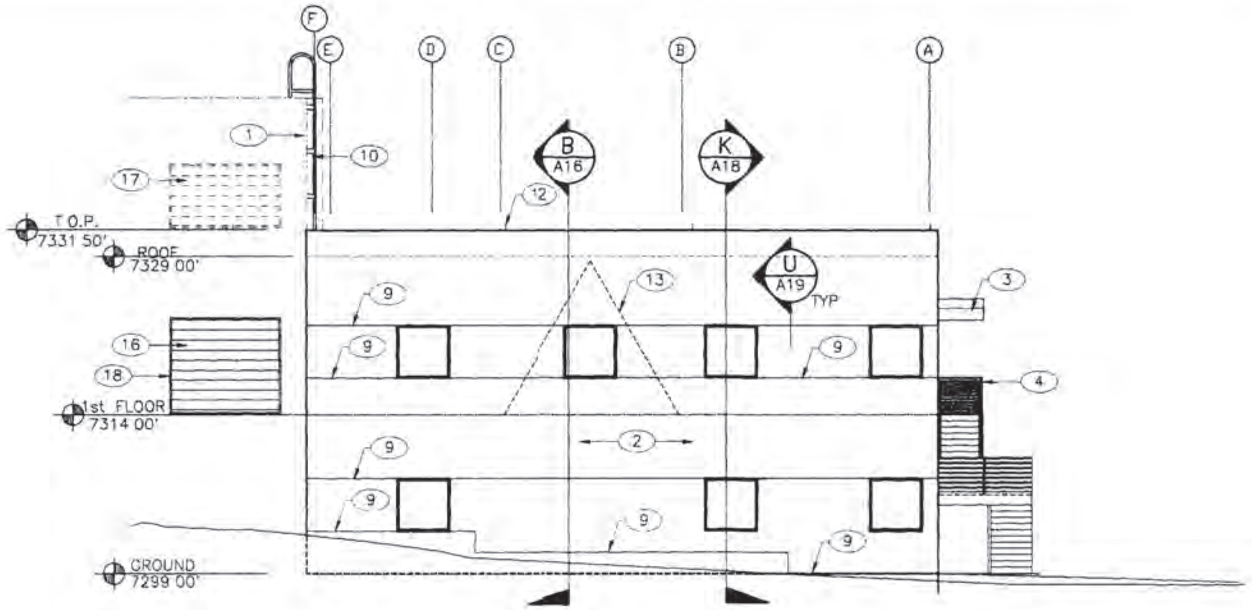
PROJECT I.D. NO. 13178

DRAWING NO. C49784

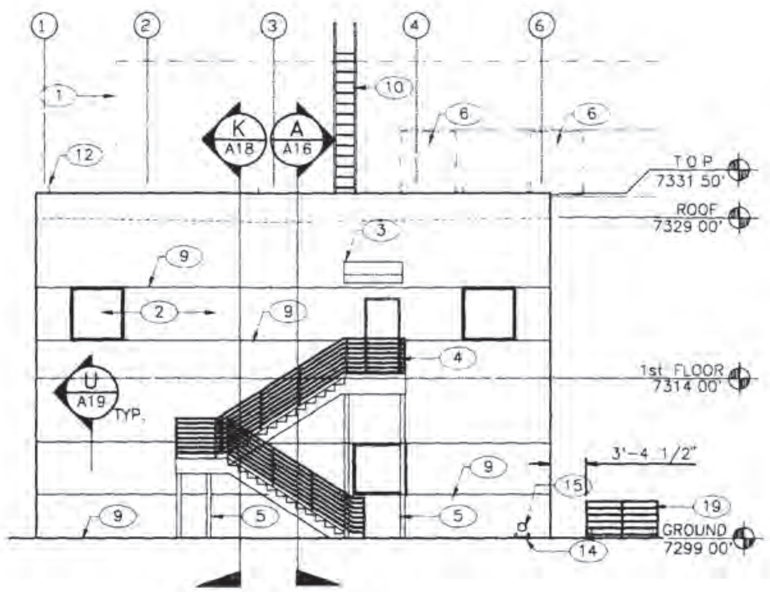
STATE OF NEW MEXICO — TOBIAS FLATOW — 6-30-97 — NO. 1840 — REGISTERED ARCHITECT



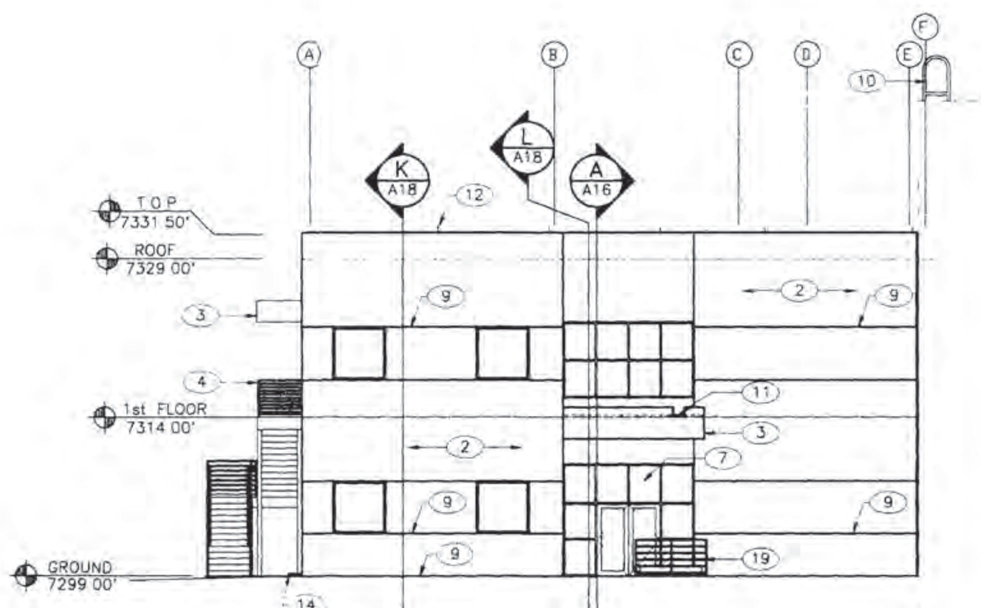
EAST ELEVATION (1/A6)
SCALE 1/8"=1'-0"



NORTH ELEVATION (2/A6)
SCALE 1/8"=1'-0"



WEST ELEVATION (3/A6)
SCALE 1/8"=1'-0"



SOUTH ELEVATION (4/A6)
SCALE 1/8"=1'-0"

1/8"=1'-0"

KEYED NOTES

1. EXISTING BUILDING
2. EXTERIOR INSULATION FINISH SYSTEM. (EIFS)
3. CANOPY
4. 1 1/2" DIA. STEEL PIPE GUARDRAIL
5. T.S. 4 X 4.
6. REPLACE EXISTING GLAZING WITH 1/4" WIRE GLASS
7. STOREFRONT GLAZING SYSTEM
8. NOT USED
9. EIFS REVEAL
10. LADDER
11. SCUPPER. REFERENCE DETAIL FF/A20
12. LIGHTNING PROTECTION ROD
13. LINE OF STRUCTURAL STEEL BRACE
14. 8" X 16" CONCRETE SPLASH BLOCK
15. OVERFLOW DRAIN OUTLET
16. MECHANICAL LOUVER. COORDINATE LOCATION WITH MECHANICAL SHEET M5. PAINT TO MATCH EXISTING LOUVER ABOVE
17. EXISTING LOUVER TO REMAIN
18. PATCH AND REPAIR PERIMETER OF EXISTING WALL. MATCH EXISTING COLOR AND TEXTURE
19. 42" A.F.F. GUARDRAIL AROUND ACCESS HATCH

NO	DATE	CLASS REV	REVISIONS	DWN	DES	CHKD	REL	SUB	REC	APP
1	4/97		RECORD DRAWINGS WITH CHANGES							

CHAVEZ-GRIEVES CONSULTING ENGINEERS INC.
BRIDGERS & PAXTON CONSULTING ENGINEERS INC.
FLATOW MOORE SHAFFER McCABE – CONSULTING ARCHITECT

BIOPHYSICS LAB ADDITION
ARCH BUILDING ELEVATIONS

DRAWN	J. GONZALES
DESIGN	T. WILBER
CHECKED	T. FLATOW
RELEASED	D. GRIEVES
DATE	02-26-96

BLDG 01 TA-43

SUBMITTED L. WEBSTER
APPROVED B. BURTSCHELL

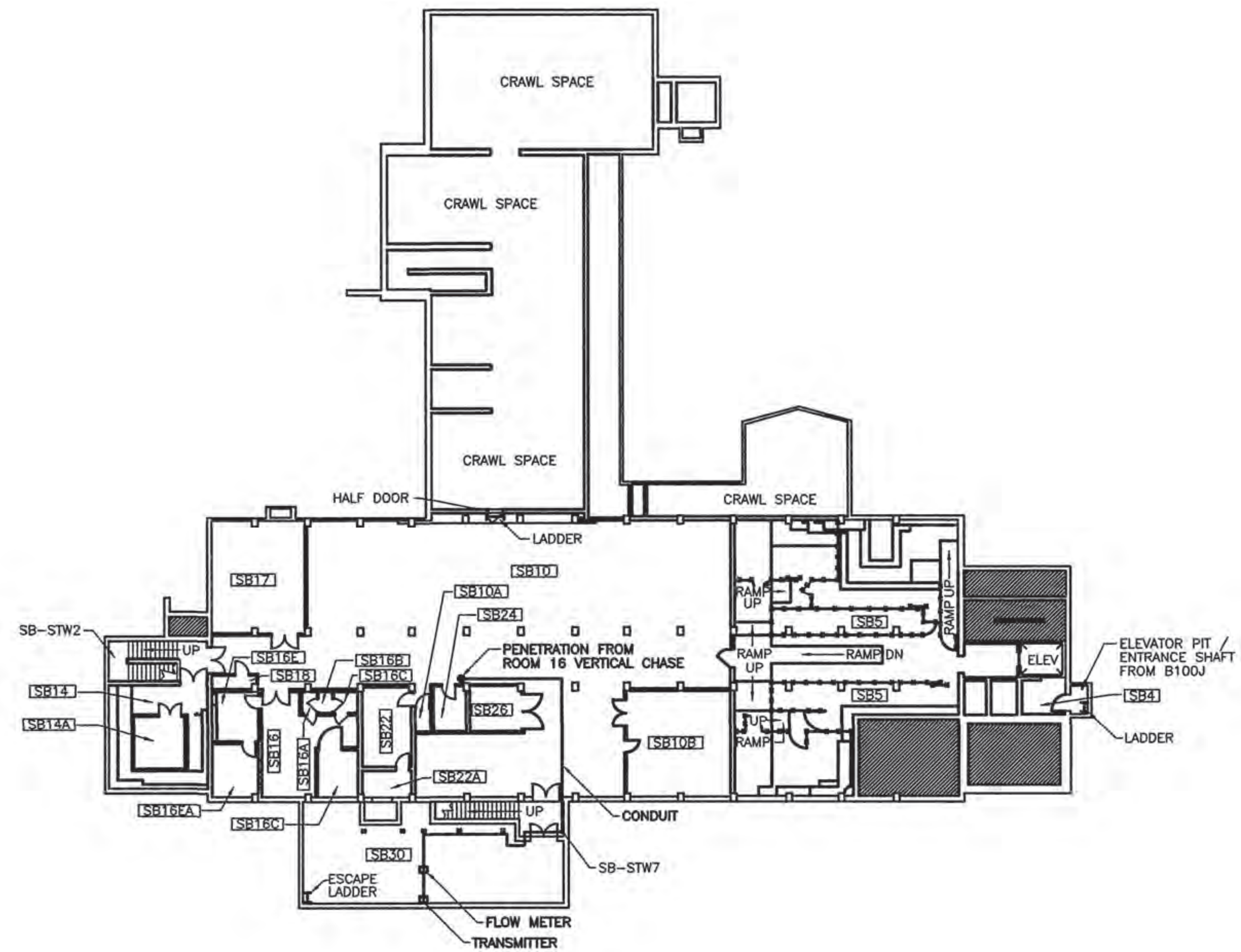
STATE OF NEW MEXICO TOBIAS FLATOW NO. 1940 REGISTERED ARCHITECT 6-30-97

Los Alamos LOS ALAMOS NATIONAL LABORATORY LOS ALAMOS, NEW MEXICO 87545

SHEET A15 34 OF 72

CLASSIFICATION REVIEWER DATE

PROJECT I.D. NO. 13178
DRAWING NO. C-049784 REV. 1



SUB BASEMENT FLOOR PLAN

SCALE 1/16" = 1'-0"

16 12 8 4 0 16 32 64
GRAPHIC SCALE

FIELD VERIFIED 10-16-92

NO.	DATE	CLASS REV.	REVISIONS	DWN	VER	CHKD	REL	SUB	REC	APP
1	11-13-97		REMOVE WIRE CAGE IN RM. SB10	A.A.	C.S.	C.S.		D.V.		L.B.

JOHNSON CONTROLS WORLD SERVICES INC.

AS-BUILT RECORD FLOOR PLAN
HEALTH RESEARCH LABORATORY

SUB BASEMENT FLOOR PLAN
FLOW METER CONDUIT ROUTING

DRAWN	C. SAMORA
VERIFIED	C.E.S./C.D.S.
CHECKED	H. SALAZAR
RELEASED	H. SALAZAR
DATE	10-30-92

BLDG. 1 TA-43

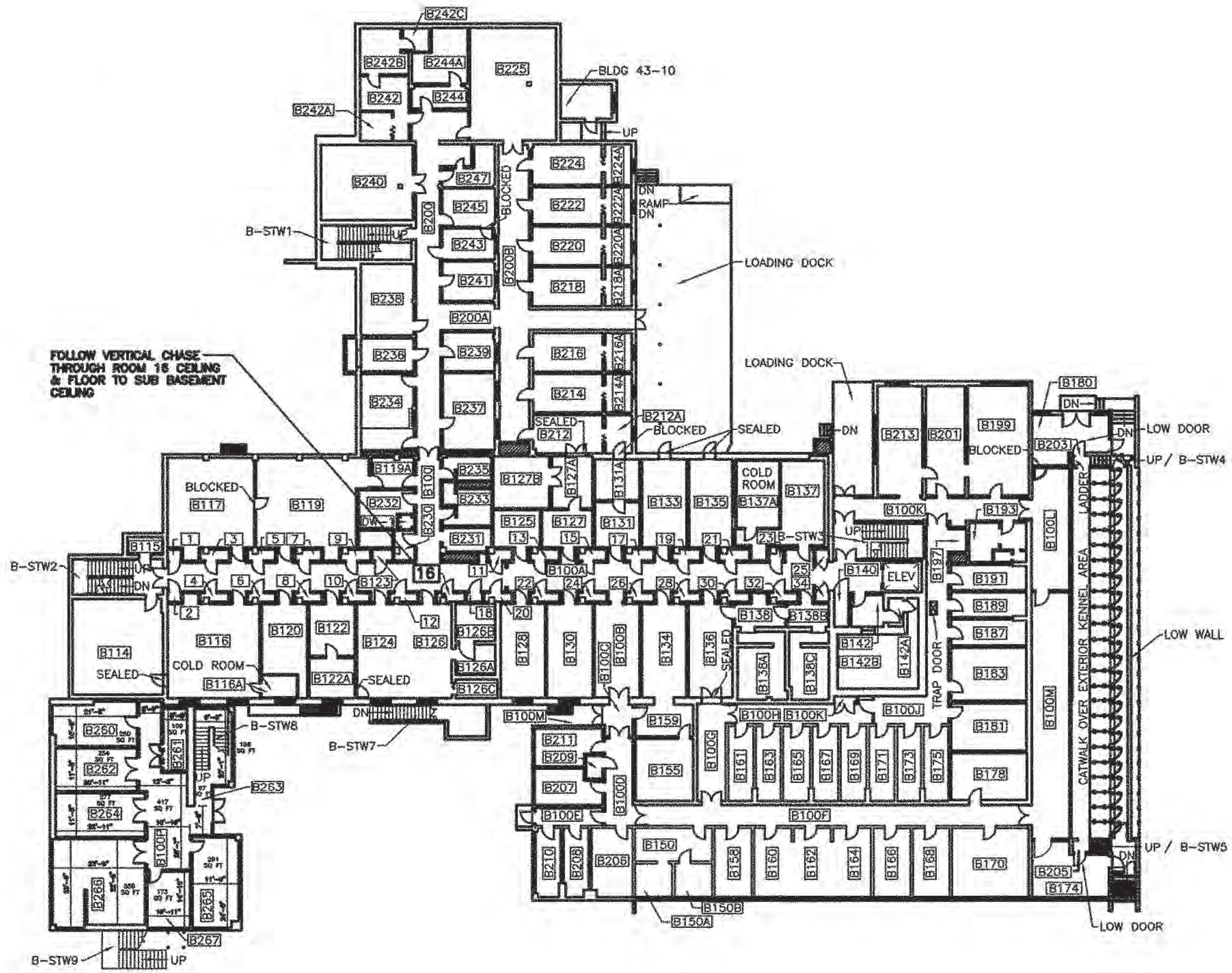
SUBMITTED JERRY FORTE | RECOMMENDED FRED THOMPSON | APPROVED FRED THOMPSON

Los Alamos — Los Alamos National Laboratory, Los Alamos, New Mexico 87545

SHEET 1 — 1 OF 5

CLASSIFICATION | REVIEWER H. SALAZAR | DATE

LAB JOB NO. 7556 | DRAWING NO. AB95-W1E | REV. 1



BASEMENT FLOOR PLAN

SCALE 1/16" = 1'-0"

16 12 8 4 0 16 32 64
GRAPHIC SCALE

N

FIELD VERIFIED 10-16-92

NO.	DATE	CLASS REV.	REVISIONS	DWN	VER	CHKD	REL	SUB	REC	APP
1	11-13-97		ADD NEW BIOPHYSICS ADDITION	A.A. M.V.	C.S.	C.S.		D.V.		L.B.

JOHNSON CONTROLS WORLD SERVICES INC.

AS-BUILT RECORD FLOOR PLAN
HEALTH RESEARCH LABORATORY

BASEMENT FLOOR PLAN
FLOW METER CONDUIT ROUTING

DRAWN	C. SAMORA
VERIFIED	C.E.S./C.D.S.
CHECKED	H. SALAZAR
RELEASED	H. SALAZAR
DATE	10-30-92

BLDG. 1 AND 10 TA-43

SUBMITTED	RECOMMENDED	APPROVED
JERRY FORTE	FRED THOMPSON	FRED THOMPSON

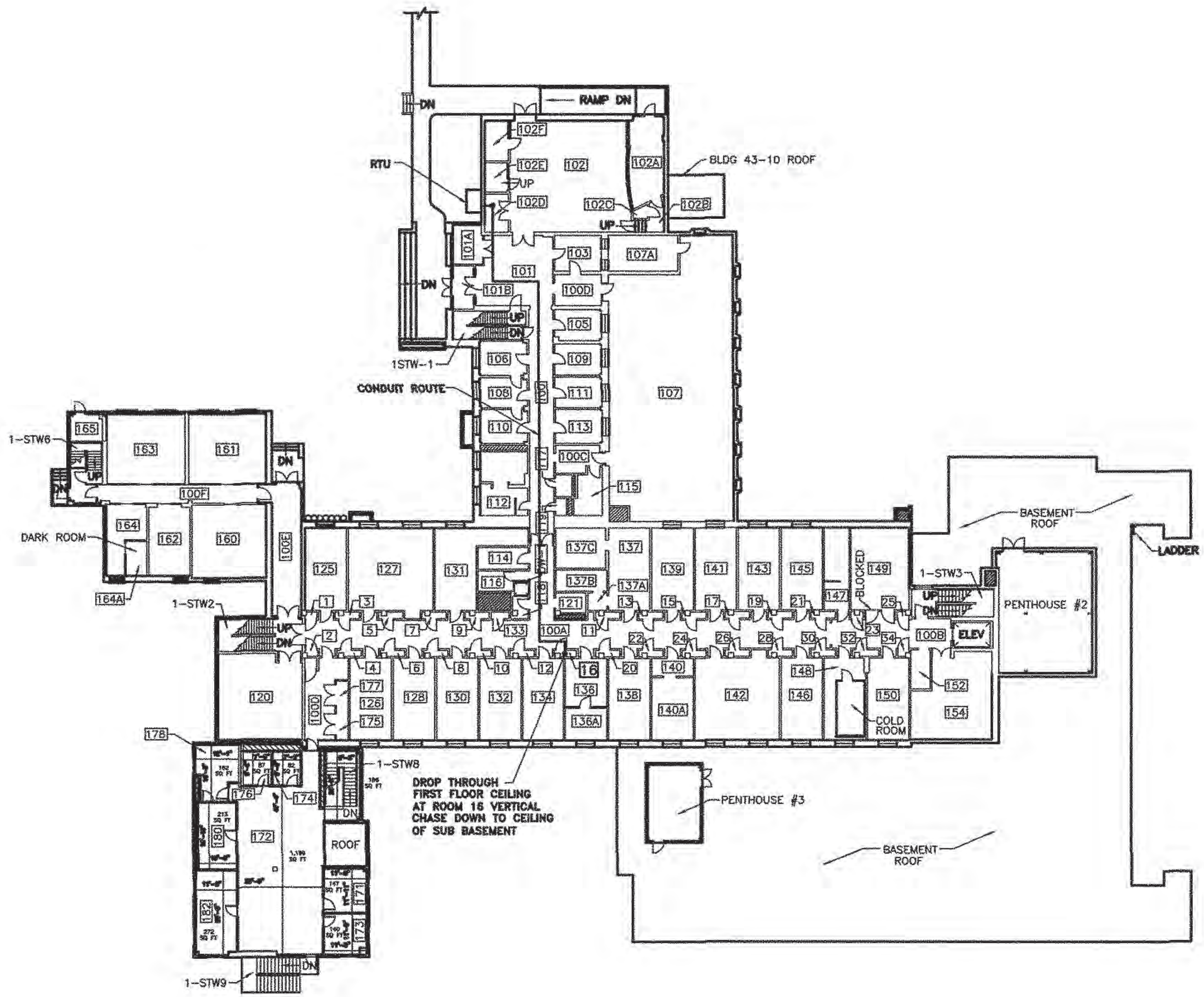
Los Alamos — Los Alamos National Laboratory, Los Alamos, New Mexico 87545

SHEET 2 OF 5

CLASSIFICATION REVIEWER H. SALAZAR DATE

LAB JOB NO.	DRAWING NO.	REV.
7556	AB95-W1D	1

Scanned



PENTHOUSE #2, PENTHOUSE #3, AND FIRST FLOOR PLAN

SCALE 1/16" = 1'-0"

16 12 8 4 0 16 32 64
GRAPHIC SCALE

N

FIELD VERIFIED 10-16-92

NO.	DATE	CLASS REV.	REVISIONS	DWN	VER	CHKD	REL	SUB	REC	APP
1	11-13-97		ADD NEW BIOPHYSICS ADDITION	A.A. M.V.	C.S.	C.S.		D.V.		L.B.

JOHNSON CONTROLS WORLD SERVICES INC.

AS-BUILT RECORD FLOOR PLAN
HEALTH RESEARCH LABORATORY

PENTHOUSE #2, PENTHOUSE #3, AND FIRST FLOOR PLAN
FLOW METER CONDUIT ROUTING

BLDG. 1 TA-43

DRAWN	C. SANDOVAL
VERIFIED	C.D.S./C.E.S.
CHECKED	H. SALAZAR
RELEASED	H. SALAZAR
DATE	10-30-92

SUBMITTED	RECOMMENDED	APPROVED
JERRY FORTE	FRED THOMPSON	FRED THOMPSON

Los Alamos — Los Alamos National Laboratory, Los Alamos, New Mexico 87545

SHEET 3 — 3 OF 5

CLASSIFICATION — REVIEWER H. SALAZAR — DATE

LAB JOB NO.	DRAWING NO.	REV.
7556	AB95-W1C	1

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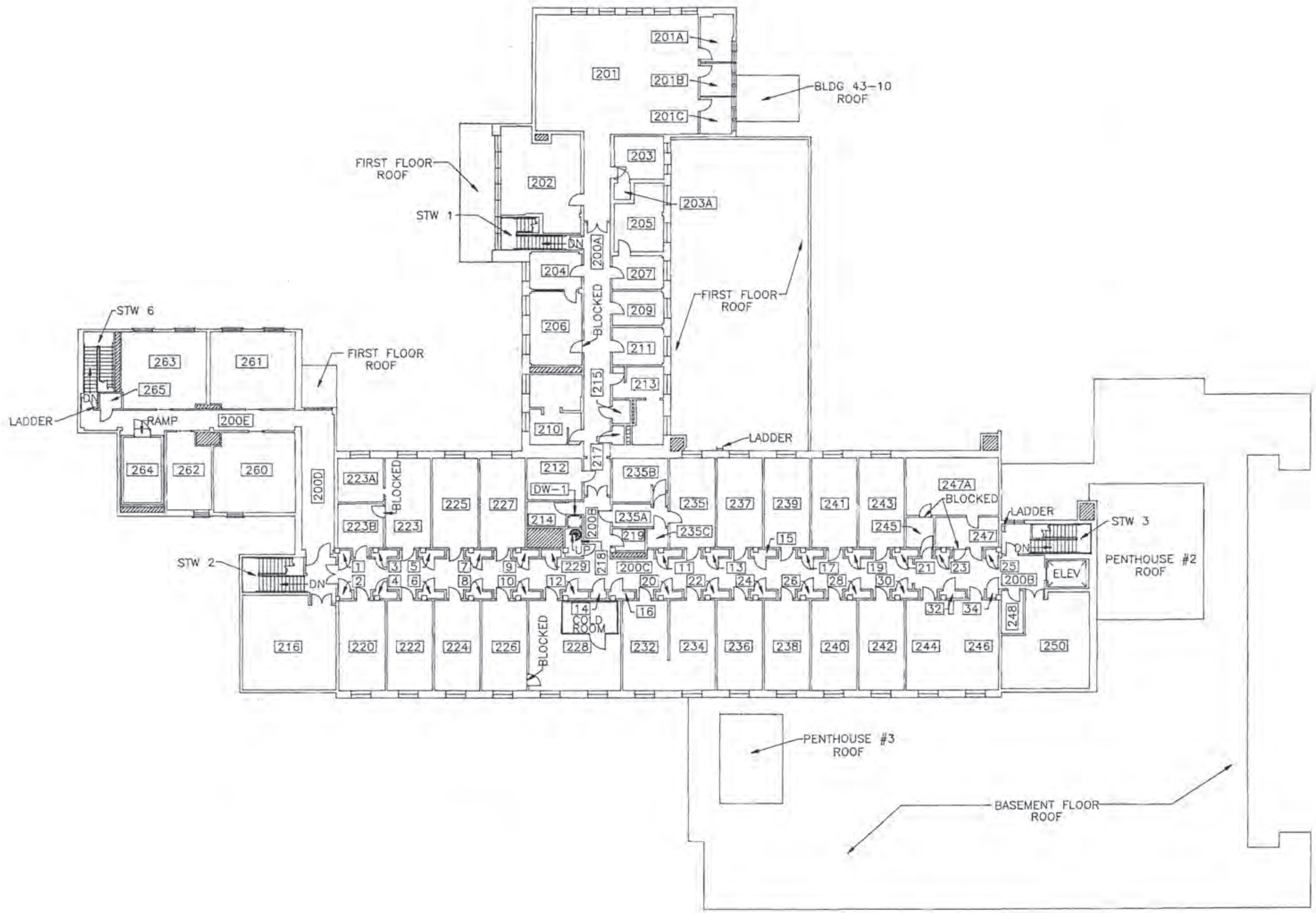


SECOND FLOOR PLAN

SCALE 1/16" = 1'-0"

16 12 8 4 0 16 32 64
GRAPHIC SCALE

N

FIELD VERIFIED 10-16-92

NO.	DATE	CLASS REV.	REVISIONS	DWN	VER	CHKD	REL	SUB	REC	APP

JOHNSON CONTROLS WORLD SERVICES INC.

AS-BUILT RECORD FLOOR PLAN
HEALTH RESEARCH LABORATORY

SECOND FLOOR PLAN

DRAWN	R. SAMORA
VERIFIED	R.D.S. / C.E.S.
CHECKED	H. Salazar H. SALAZAR
RELEASED	H. Salazar H. SALAZAR
DATE	10-30-92

BLDG. 1 TA-43

SUBMITTED JERRY FORTE Jerry Forte
RECOMMENDED FRED THOMPSON 11/16/92
APPROVED FRED THOMPSON 11/16/92

Los Alamos — Los Alamos National Laboratory, Los Alamos, New Mexico 87545

SHEET 4 — 4 OF 5

CLASSIFICATION UNC REVIEWER H. SALAZAR H. Salazar DATE 11-16-92

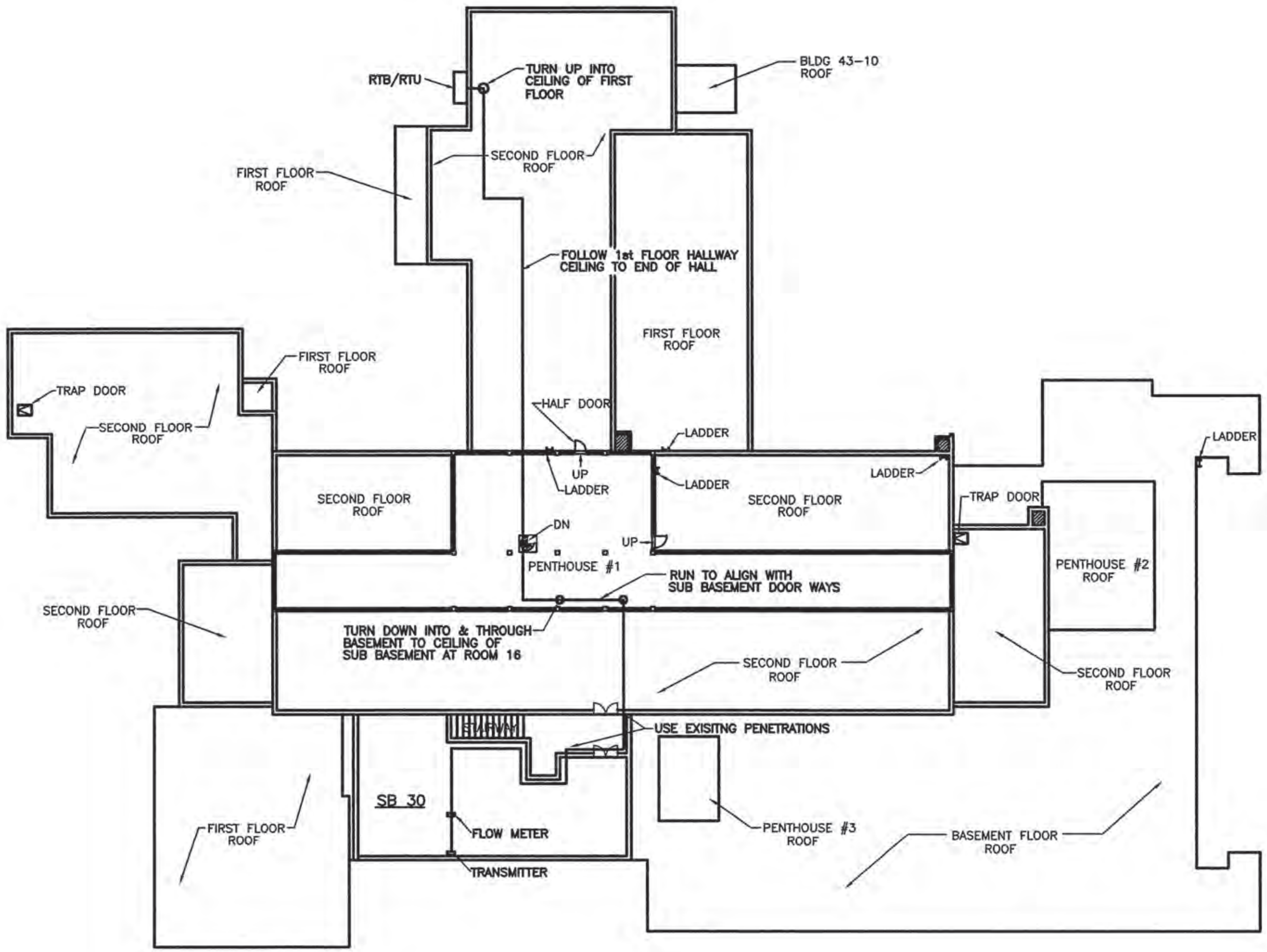
LAB JOB NO. 7556

DRAWING NO. AB95

REV.

JCI #91-011

REC'D TO VAULT



PENTHOUSE #1 FLOOR PLAN

SCALE 1/16"= 1'-0"

16 12 8 4 0 16 32 64
GRAPHIC SCALE

N

FIELD VERIFIED 10-16-92

NO.	DATE	CLASS REV.	REVISIONS	DRN	VER	CHKD	REL	SUB	REC	APP
1	11/13/97									

JOHNSON CONTROLS WORLD SERVICES INC.

AS-BUILT RECORD FLOOR PLAN
HEALTH RESEARCH LABORATORY

PENTHOUSE #1 FLOOR PLAN
FLOW METER CONDUIT ROUTING

DRAWN	C. SAMORA
VERIFIED	C.D.S./C.E.S.
CHECKED	H. SALAZAR
RELEASED	H. SALAZAR
DATE	10-30-92

BLDG. 1 TA-43

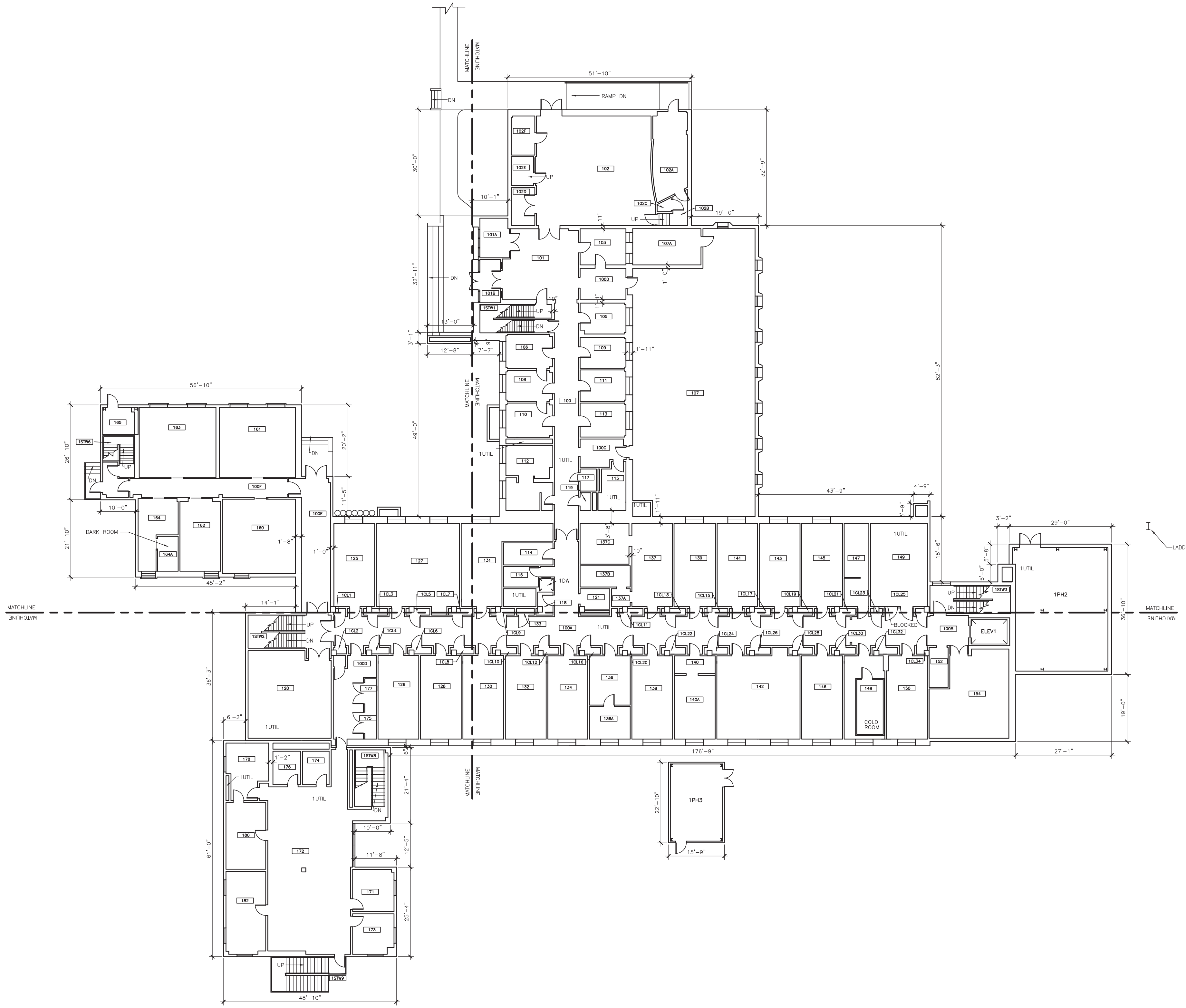
SUBMITTED	RECOMMENDED	APPROVED
JERRY FORTE	FRED THOMPSON	FRED THOMPSON

Los Alamos — Los Alamos National Laboratory, Los Alamos, New Mexico 87545

SHEET 5 — 5 OF 5

CLASSIFICATION — REVIEWER H. SALAZAR — DATE

LAB JOB NO.	DRAWING NO.	REV.
7556	AB95-W1B	



FIRST FLOOR PLAN

4' 0 4' 8' 12' 16'
1/16"=1'-0"

TOTAL EXTERIOR GROSS AREA = 103,369 SF

TOTAL INTERIOR GROSS AREA = 95,675 SF

GENERAL NOTES:

1. IF THIS SHEET IS NOT 24"X36" USE GRAPHIC SCALE ACCORDINGLY
2. EXTERIOR WALL THICKNESS IS 12" UNLESS OTHERWISE NOTED
3. INTERIOR WALL THICKNESS IS 6" UNLESS OTHERWISE NOTED
4. INTERIOR GROSS MEASURED AREA SHALL MEAN THE TOTAL AREA OF A BUILDING ENCLOSED BY THE DOMINANT PORTION, EXCLUDING PARKING AREAS AND LOADING DOCKS (OR PORTION OF SAME) OUTSIDE THE BUILDING CALCULATED BY A FLOOR BY FLOOR BASIS
5. ANAI/BOMA Z65.1-2010 STANDARD METHOD USED FOR MEASURING FLOOR AREA IN BUILDINGS
6. FIELD VALIDATION DATE: 01-14-2004

"PRIORITY DRAWING"

NO	DATE	CLASS REV	DC	DESCRIPTION	DWN	DSGN	CHKD	SUB	APP
0				INITIAL ISSUE					

FACILITY PLANNING

FLOOR PLAN OF RECORD
HEALTH RESEARCH LABORATORY
ARCH: FIRST FLOOR PLAN

DRAWN	E. SEAWALT
VERIFIED	V. GALLEGOS
CHECKED	E. SEAWALT
DATE	9/20/2005

TA-43 BLDG 0001

SUBMITTED RICHARD TROUT

APPROVED FOR RELEASE EDWARD J SEAWALT

Los Alamos NATIONAL LABORATORY

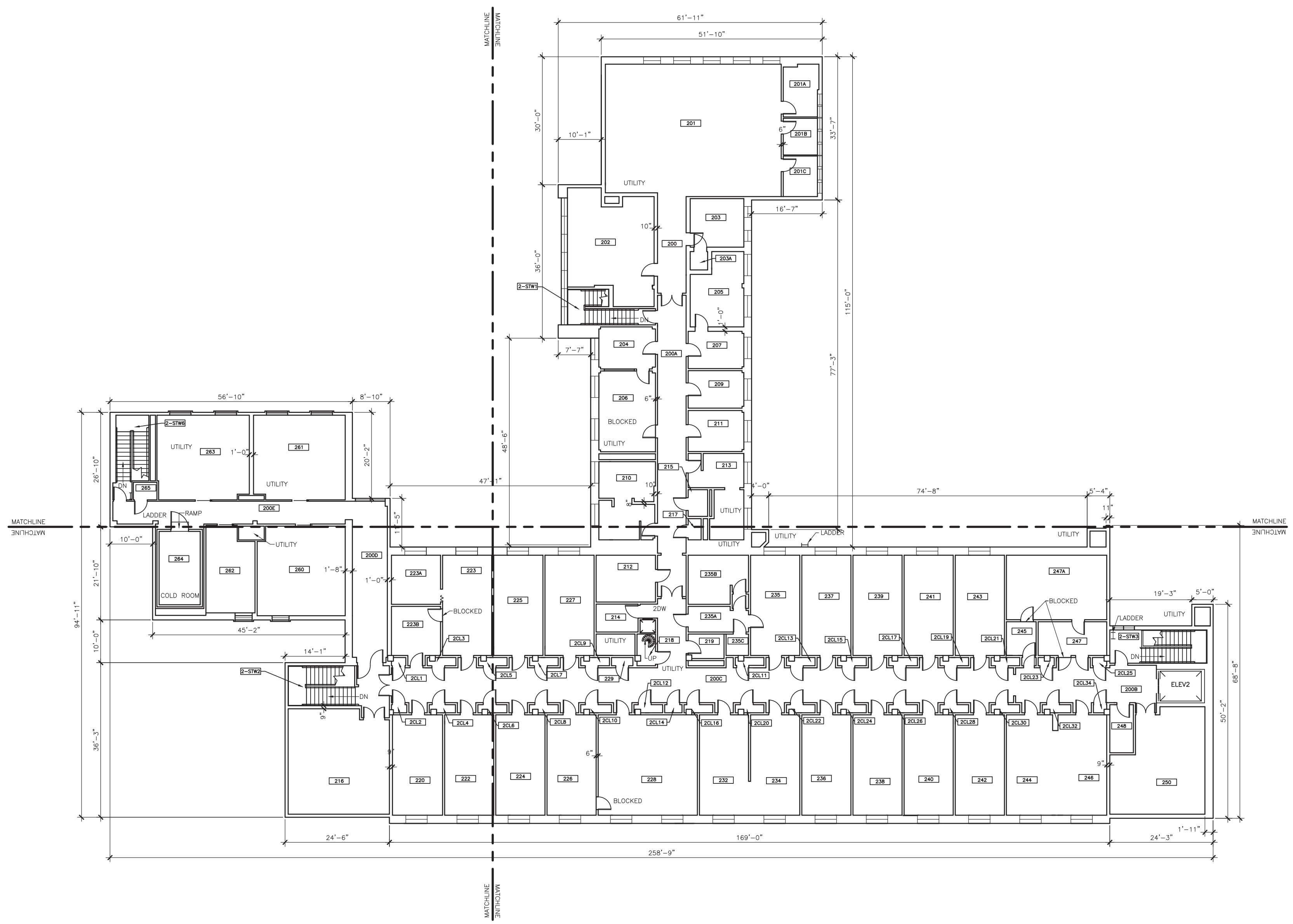
PO Box 1663
Los Alamos, New Mexico 87545

SHEET A-1001
1 OF 1

D.C.: UNCLASSIFIED REVIEWER: EDWARD J SEAWALT DATE: 9/20/2005

PROJECT ID CHAPTER 4 | DRAWING NO FPR_43_0001_01 | REV 0

1	2	3	4	5	6



SECOND FLOOR PLAN

4' 0 4' 8' 12' 16'

1/16"=1'-0"

TOTAL EXTERIOR GROSS AREA = 103,369 SF

TOTAL INTERIOR GROSS AREA = 95,675 SF

GENERAL NOTES:

1. IF THIS SHEET IS NOT 24"X36" USE GRAPHIC SCALE ACCORDINGLY
2. EXTERIOR WALL THICKNESS IS 12" UNLESS OTHERWISE NOTED
3. INTERIOR WALL THICKNESS IS 6" UNLESS OTHERWISE NOTED
4. INTERIOR GROSS MEASURED AREA SHALL MEAN THE TOTAL AREA OF A BUILDING ENCLOSED BY THE DOMINANT PORTION, EXCLUDING PARKING AREAS AND LOADING DOCKS (OR PORTION OF SAME) OUTSIDE THE BUILDING CALCULATED BY A FLOOR BY FLOOR BASIS
5. ANAI/BOMA Z65.1-2010 STANDARD METHOD USED FOR MEASURING FLOOR AREA IN BUILDINGS
6. FIELD VALIDATION DATE: 01-14-2004

"PRIORITY DRAWING"

NO	DATE	CLASS REV	DC	DESCRIPTION	DWN	DSGN	CHKD	SUB	APP
0				INITIAL ISSUE					

FACILITY PLANNING

FLOOR PLAN OF RECORD
HEALTH RESEARCH LABORATORY

ARCH: SECOND FLOOR PLAN

TA-43 BLDG 0001

DRAWN	E. SEAWALT
VERIFIED	V. GALLEGOS
CHECKED	E. SEAWALT
DATE	9/20/2005

SUBMITTED RICHARD TROUT

APPROVED FOR RELEASE EDWARD J SEAWALT

Los Alamos NATIONAL LABORATORY

P0 Box 1663
Los Alamos, New Mexico 87545

SHEET A-1002

1 OF 1

D.C.: UNCLASSIFIED

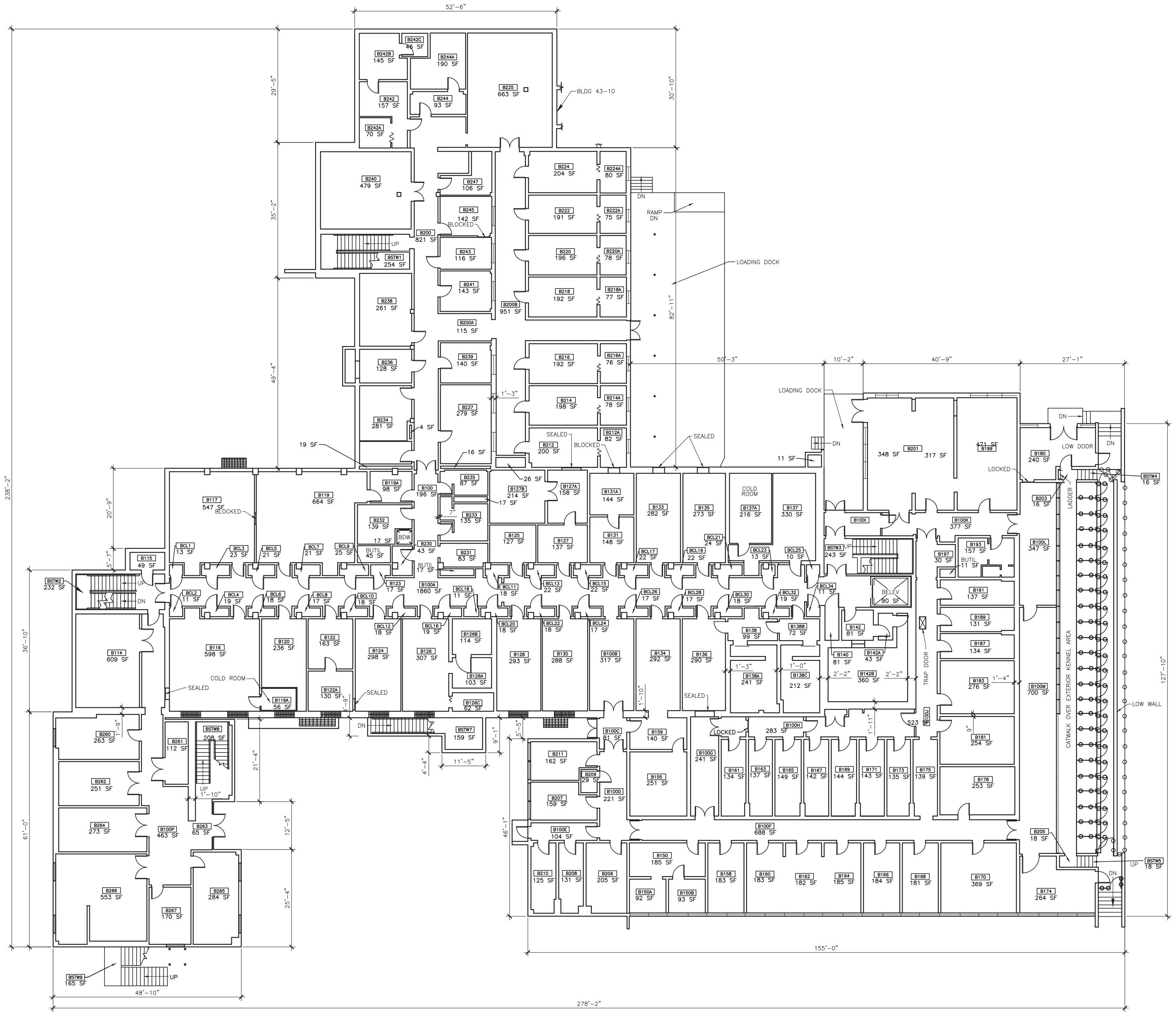
REVIEWER: EDWARD J SEAWALT

DATE: 9/20/2005

PROJECT ID CHAPTER 4

DRAWING NO FPR_43_0001_02

REV 0



BASEMENT PLAN

4' 0 4' 8' 12' 16'

1/16"=1'-0"

TOTAL EXTERIOR GROSS AREA = 103,369 SF

TOTAL INTERIOR GROSS AREA = 95,675 SF

GENERAL NOTES:

1. IF THIS SHEET IS NOT 24"X36" USE GRAPHIC SCALE ACCORDINGLY
2. EXTERIOR WALL THICKNESS IS 12" UNLESS OTHERWISE NOTED
3. INTERIOR WALL THICKNESS IS 6" UNLESS OTHERWISE NOTED
4. INTERIOR GROSS MEASURED AREA SHALL MEAN THE TOTAL AREA OF A BUILDING ENCLOSED BY THE DOMINANT PORTION, EXCLUDING PARKING AREAS AND LOADING DOCKS (OR PORTION OF SAME) OUTSIDE THE BUILDING CALCULATED BY A FLOOR BY FLOOR BASIS
5. ANAI/BOMA Z65.1-2010 STANDARD METHOD USED FOR MEASURING FLOOR AREA IN BUILDINGS
6. FIELD VALIDATION DATE: 01-14-2004

"PRIORITY DRAWING"

NO	DATE	CLASS REV	DC	DESCRIPTION	DWN	DSGN	CHKD	SUB	APP
0				INITIAL ISSUE					

FACILITY PLANNING

FLOOR PLAN OF RECORD
HEALTH RESEARCH LABORATORY

ARCH: BASEMENT PLAN

TA-43 BLDG 0001

DRAWN	E. SEAWALT
VERIFIED	V. GALLEGOS
CHECKED	E. SEAWALT
DATE	9/20/2005

SUBMITTED: RICHARD TROUT

APPROVED FOR RELEASE: EDWARD J SEAWALT

Los Alamos NATIONAL LABORATORY

P0 Box 1663
Los Alamos, New Mexico 87545

SHEET A-1000

1 OF 1

D.C.: UNCLASSIFIED

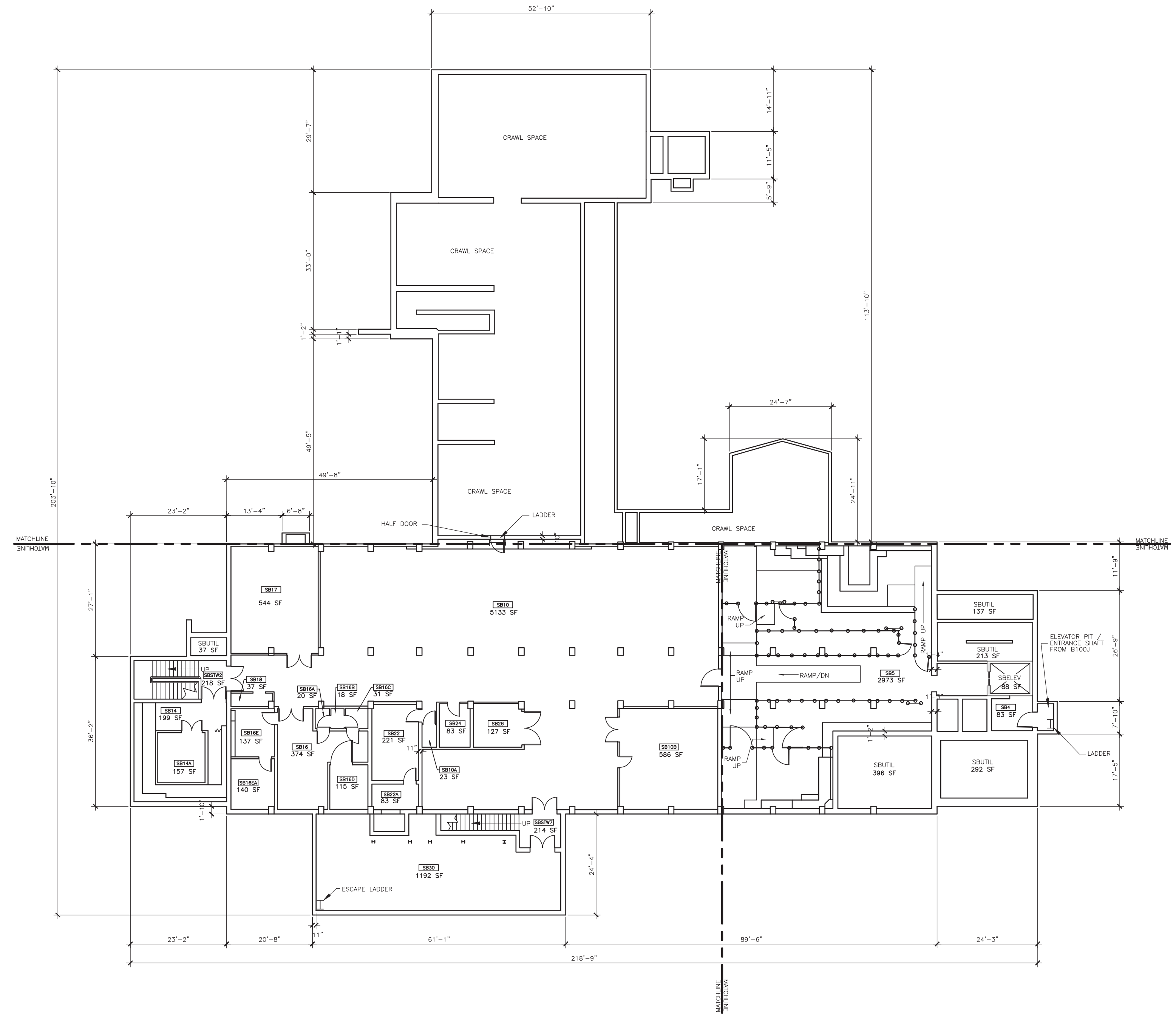
REVIEWER: EDWARD J SEAWALT

DATE: 9/20/2005

PROJECT ID: CHAPTER 4

DRAWING NO: FPR_43_0001_B1

REV: 0



SUB-BASEMENT PLAN

1/16"=1'-0"

TOTAL EXTERIOR GROSS AREA = 103,369 SF

TOTAL INTERIOR GROSS AREA = 95,675 SF

GENERAL NOTES:

1. IF THIS SHEET IS NOT 24"X36" USE GRAPHIC SCALE ACCORDINGLY
2. EXTERIOR WALL THICKNESS IS 12" UNLESS OTHERWISE NOTED
3. INTERIOR WALL THICKNESS IS 6" UNLESS OTHERWISE NOTED
4. INTERIOR GROSS MEASURED AREA SHALL MEAN THE TOTAL AREA OF A BUILDING ENCLOSED BY THE DOMINANT PORTION, EXCLUDING PARKING AREAS AND LOADING DOCKS (OR PORTION OF SAME) OUTSIDE THE BUILDING CALCULATED BY A FLOOR BY FLOOR BASIS
5. ANAI/BOMA Z65.1-2010 STANDARD METHOD USED FOR MEASURING FLOOR AREA IN BUILDINGS
6. FIELD VALIDATION DATE: 01-14-2004

"PRIORITY DRAWING"

NO	DATE	CLASS REV	DC	DESCRIPTION	DWN	DSGN	CHKD	SUB	APP
0				INITIAL ISSUE					

FACILITY PLANNING

FLOOR PLAN OF RECORD
HEALTH RESEARCH LABORATORY

ARCH: SUB-BASEMENT PLAN

DRAWN	E. SEAWALT
VERIFIED	V. GALLEGOS
CHECKED	E. SEAWALT
DATE	9/20/2005

TA-43 BLDG 0001

SUBMITTED RICHARD TROUT

APPROVED FOR RELEASE EDWARD J SEAWALT

Los Alamos NATIONAL LABORATORY
PO Box 1663
Los Alamos, New Mexico 87545

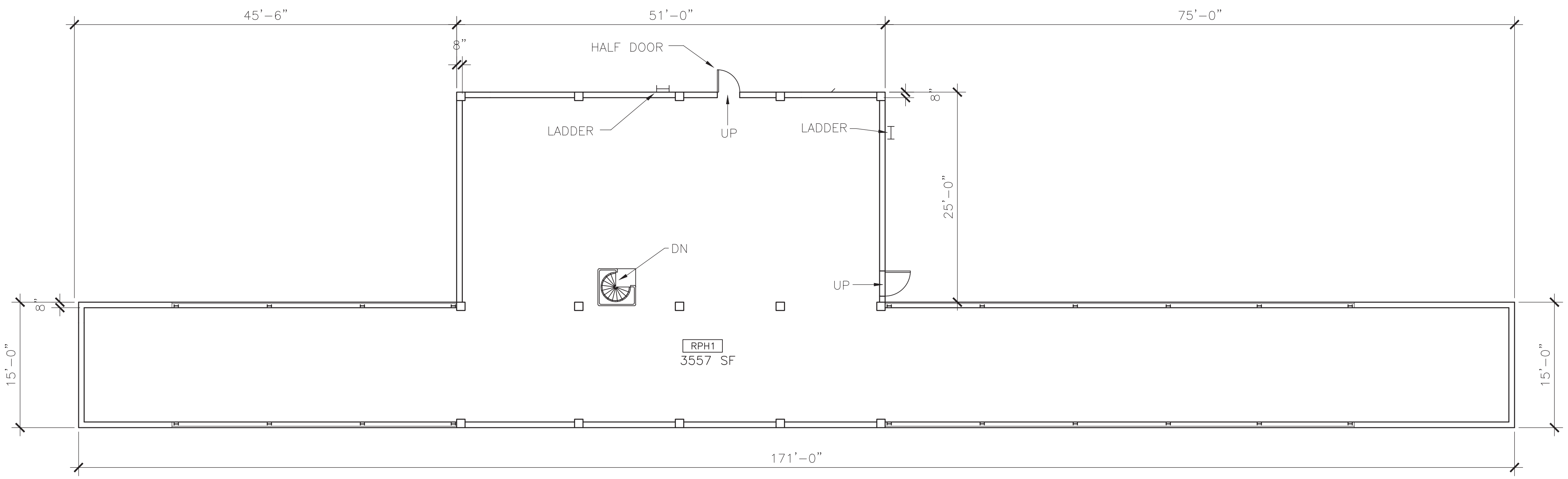
SHEET A-1000 1 OF 1

D.C.: UNCLASSIFIED REVIEWER: EDWARD J SEAWALT DATE: 9/20/2005

PROJECT ID CHAPTER 4

DRAWING NO FPR_43_0001_B2

REV 0



PENTHOUSE FLOOR PLAN

4' 2' 0 4' 8' 12'
1/8"=1'-0"

TOTAL EXTERIOR GROSS AREA = 103,369 SF

TOTAL INTERIOR GROSS AREA = 95,675 SF

GENERAL NOTES:

1. IF THIS SHEET IS NOT 24"X36" USE GRAPHIC SCALE ACCORDINGLY
2. EXTERIOR WALL THICKNESS IS 8" UNLESS OTHERWISE NOTED.
3. INTERIOR WALL THICKNESS IS 5" UNLESS OTHERWISE NOTED.
4. INTERIOR GROSS MEASURED AREA SHALL MEAN THE TOTAL AREA OF A BUILDING ENCLOSED BY THE DOMINANT PORTION,EXCLUDING PARKING AREAS AND LOADING DOCKS (OR PORTION OF SAME) OUTSIDE THE BUILDING CALCULATED BY A FLOOR BY FLOOR BASIS
5. ANSI/BOMA Z65.1-2010 STANDARD METHOD USED FOR MEASURING FLOOR AREA IN BUILDINGS
6. FIELD VALIDATION DATE: 01-14-04

"PRIORITY DRAWING"

NO	DATE	CLASS REV	DC	DESCRIPTION	DWN	DSGN	CHKD	SUB	APP
0				INITIAL ISSUE					

FACILITY PLANNING

FLOOR PLAN OF RECORD
HEALTH RESEARCH LABORATORY
ARCH: PENTHOUSE FLOOR PLAN

DRAWN	K.BREWER
VERIFIED	G.LOPEZ
CHECKED	E.SEAWALT
DATE	02-02-05

TA-43 BLDG 0001

SUBMITTED RICHARD TROUT
APPROVED FOR RELEASE EDWARD J SEAWALT

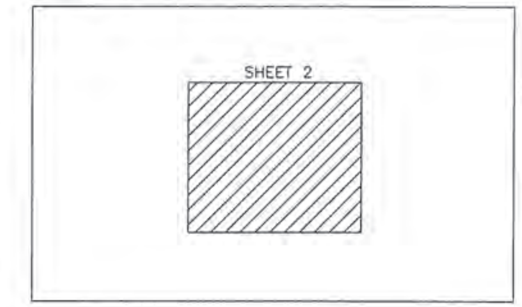
Los Alamos NATIONAL LABORATORY
PO Box 1663
Los Alamos, New Mexico 87545

SHEET A-1003
1 OF 1

D.C.: UNCLASSIFIED
REVIEWER: EDWARD J SEAWALT
DATE: 07-29-02

PROJECT ID CHAPTER 4
DRAWING NO FPR_43_0001_PH1
REV 0

KEY MAP



STRUCTURE LOCATION INDEX

STRUCTURE TA NUMBER	STRUCTURE DESIGNATION	STRUCTURE NOMENCLATURE	LOCATOR SHEET NO.	LOCATOR MAP KEY
43-1	43-1	HEALTH RESEARCH LABORATORY	2	B-3
43-10	43-10	SEWAGE LIFT STATION	2	B-2
43-12	43-12	WAREHOUSE	2	B-3
43-22	43-22	METAL SHED	2	B-3
43-28	43-28	GARAGE SHED	2	B-3
43-36	43-36	STORAGE SHED	2	B-3
43-37	43-37	TRAILER	2	B-2
43-44	43-44	COOLING TOWER	2	A-3
43-46	43-46	STORAGE BLDG.	2	B-3
43-47	43-47	SAFETY STORAGE SHED	2	B-3
43-49	43-49	SAFETY STORAGE SHED	2	B-3
43-61	43-61	SAFETY STORAGE SHED	2	B-3

SCALE: 1:1200 IN

100 0 100 200

FEET

N

NO	DATE	CLASS REV	DESCRIPTION	DWN	VER	CHKD	SUB	APP
7	07-02-13	LL HS	REVISED TO REMOVE STRUCTURE 20	RDG	RDG	RAG	HMS	GFB
6	06-26-12		REVISED TO REMOVE STRUCTURES 24 & 45	RDG	RDG	RAG	HMS	GFB
5	01-31-08		REVISED TO STATUS OF 01-31-08	LHV	HPR	RAG	HMS	MGB
4	03-26-01		REVISED TO STATUS OF 03-26-01	HPR	SAD	CES	HMS	LAB

UTILITIES AND INSTITUTIONAL FACILITIES

AS-BUILT STRUCTURE LOCATION MAPS

TA-43

HEALTH RESEARCH LAB & DOE HDQRS

DRAWN	M. GALLEGOS
VERIFIED	M. GALLEGOS
CHECKED	H. SALAZAR
DATE	02-22-95

SUBMITTED HAROLD SALAZAR

APPROVED FOR RELEASE LARRY BAYS

Los Alamos NATIONAL LABORATORY PO Box 1663 Los Alamos, New Mexico 87545

SHEET 2

2 OF 2

CLASSIFICATION

REVIEWER H. SALAZAR

DATE

PROJECT ID JCI NO 91-020 11952

DRAWING NO. AB33

REV 7

LANL TA- Building # 43-0012

Camera 1712499

Frame #s DSCN1566–DSCN1570

Surveyor(s) C. Gregory

Date 5/11/2022

Los Alamos National Laboratory
Historic Building Survey Form

Building Name: HRL Warehouse | UTMs easting: 380835 | northing: 3971519 | zone: 13

Legal Description: Map: Guaie Mountain Ouad | tnsp: 19N | range: 6E | sec: 17

Current Use/ Function: Warehouse | Original Use/ Function: Warehouse

Date (estimated): | Date (actual): 1978 | Property Type: Support

Type of Construction

Pre-Engineered ☐ Steel Frame ☑ Wood Frame ☐ CMU ☐ Reinforced Concrete ☐

Other Type of Construction: | # of Stories: 1

Foundation Concrete Slab

Exterior CMU-Exterior ☐ Reinforced Concrete-Exterior ☐ Steel (galvanized) ☐ Steel (corrugated) ☑

Wood Siding ☐ Asbestos Shingles-Exterior ☐ In-Fill Panels ☐ Other-Exterior:

Exterior Treatment (painted, stuccoed, etc): painted

Exterior Features (docks, speakers, lights, signs, etc): metal-framed louvered vents

Addition CMU-Addition ☐ Reinforced Concrete-Addition ☐ Steel (galvanized)- Addition ☐ Wood ☐

Steel (corrugated)-Addition ☐ Asbestos Shingles-Addition ☐ Other- Addition:

Exterior Treatment-Addition:

Exterior Features-Addition:

Roof Form Slanted/Shed ☐ Gable ☑ Other Roof Type:

Degree of Pitch/ Slope: Moderate

Roof Materials Corrugated Metal ☑ Rolled Asphalt ☐ Asbestos Shingles ☐ 4-Ply Built Up ☐

Other Roof Materials:

Window Type Casement ☐ Single Hung Sash ☐ Double Hung Sash ☐ Fixed Window ☐

Other Window Type:

# of Each Window Type/ Comments:

Glass Type Clear ☐ Wire Glass ☐ Opaque ☐ Painted Glass ☐ Glass Block ☐

Light Pattern:

Door Type Personnel Door Types Exterior Fire Door ☐ Single ☑ Double ☑ Roll-up ☐ Sliding ☐

Hollow Metal ☑ Solid Wood ☐ 1/2 Glazed ☐ Paneled ☐

Louvered ☐ Painted ☐

Interior: Fire Door ☐ Single ☐ Double ☐ Roll-up ☐ Sliding ☐
Hollow Metal ☐ Solid Wood ☐ 1/2 Glazed ☐ Paneled ☐
Louvered ☐ Painted ☐

Equipment Door Types

Exterior: Fire Door ☐ Single ☐ Double ☐ Roll-up ☐ Sliding ☐
Hollow Metal ☐ Solid Wood ☐ 1/2 Glazed ☐ Paneled ☐
Louvered ☐ Painted ☐

Interior: Fire Door ☐ Single ☐ Double ☐ Roll-up ☐ Sliding ☐
Hollow Metal ☐ Solid Metal ☐ 1/2 Glazed ☐ Paneled ☐
Louvered ☐ Painted ☐

# of Each Door Type/Comments: 1 single, metal-panel personnel door; and 1 set of paired, metal-panel personnel doors

Interior Wall Gypsum Board ☐ Reinforced Concrete- Interior ☐

CMU- Interior ☐ Plywood ☐ Other- Interior

In-Wall Electrical Wiring ☐ On-Wall Electrical Wiring ☐

Ceiling Drop Ceiling ☐

Interior Comments (Equipment, etc)

Degree of Remodeling Unknown/None

Condition Excellent ☑ Good ☐ Fair ☐ Deteriorating ☐ Contaminated ☐ Burned ☐

Associated Buildings ☑

If yes, list building names and #s: TA-43-1 Health Research Laboratory; exempt facilities TA-43-10 Sewage Lift Station; TA-43-22 Shed; TA-43-28 Storage Shed; TA-43-44 Cooling Tower; TA-43-47 Chemical Shed; TA-43-49 Chemical Shed; and TA-43-61 Safety Storage Shed

Integrity Excellent

Significance None

Eligible Under Criterion A ☐ B ☐ C ☐ D ☐ Not Eligible ☑

DOE Themes

Nuclear Weapon Components and Assembly ☐ Nuclear Weapon Design and Testing ☐ Nuclear Propulsion ☐

Peaceful Uses: Plowshare, Nuclear Medicine, Nuclear Energy, Nuclear Science ☐ Energy and Environment: Research and Design Projects ☐

LANL Themes

Weapons Research and Design, Testing, and Stockpile Support ☐ Super Computing ☐

Reactor Technology ☐ Biomedical/Health Physics ☐ Strategic and Supporting Research ☐

Environment/Waste Management ☐ Administration and Social History ☐ Architectural History ☐

Recommendations/ Additional Comments

Architectural Features (elevations)

TA-43-0012 is a one-story building located behind (southeast of) HRL at the edge of the Los Alamos Canyon escarpment. The building is a pre-engineered, rigid-frame steel building constructed on a poured-concrete foundation. Rectangular in plan, the facility measures 60 by 24 feet and is oriented east-northeast by west-southwest. The walls are constructed of metal, standing-seam siding. The facility has a low-pitched gabled roof clad in metal sheeting with extremely narrow eaves provided by an enclosed gutter system. The roof ridgeline supports three evenly spaced exhaust fans. Access to the building is provided through a single and paired metal-panel personnel doors. The three doors are centered on the north-northwest façade under an extremely narrow, hollow, metal canopy. The gabled ends feature metal-framed louvered vents. The Laboratory does not appear to have made any modifications since the facility's original construction. TA-43-0012 has structural integrity, and the exterior is in good condition. The building is utilitarian in character, and its character-defining features include low massing, corrugated siding, windowless walls, and a gabled roof.

Total sq ft 1,440

Architect/ Builder Los Alamos Scientific Laboratory/Apache

Alterations none

List of Selected Drawings (Cntrl + Enter for paragraph break)

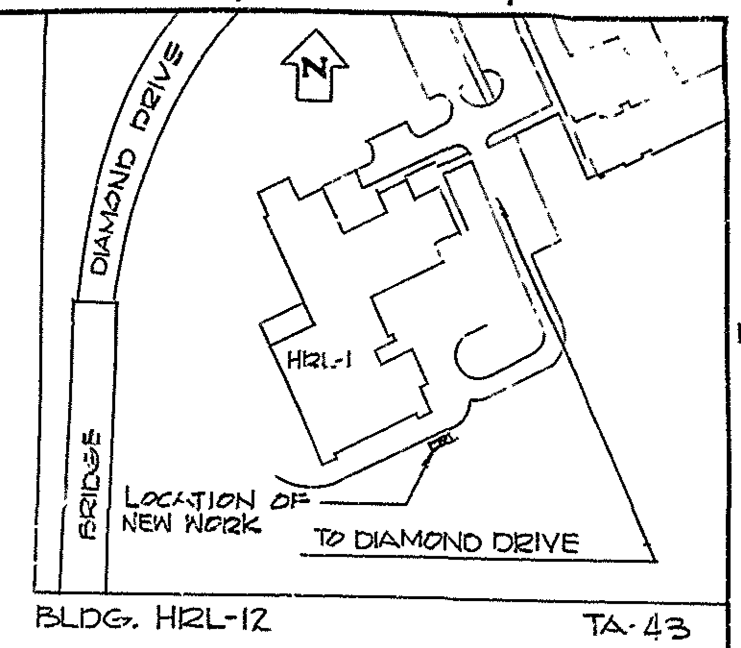
ENG-C43406, Sheet 3 of 14
Warehouse Facility
Plot Plan and Location Plan
November 1, 1977; construction completed in 1978 (Los Alamos Scientific Laboratory)

ENG-C43406, Sheet 6 of 14
Warehouse Facility
Floor Plan, Elevation, and Section
November 1, 1977; construction completed in 1978 (Los Alamos Scientific Laboratory)

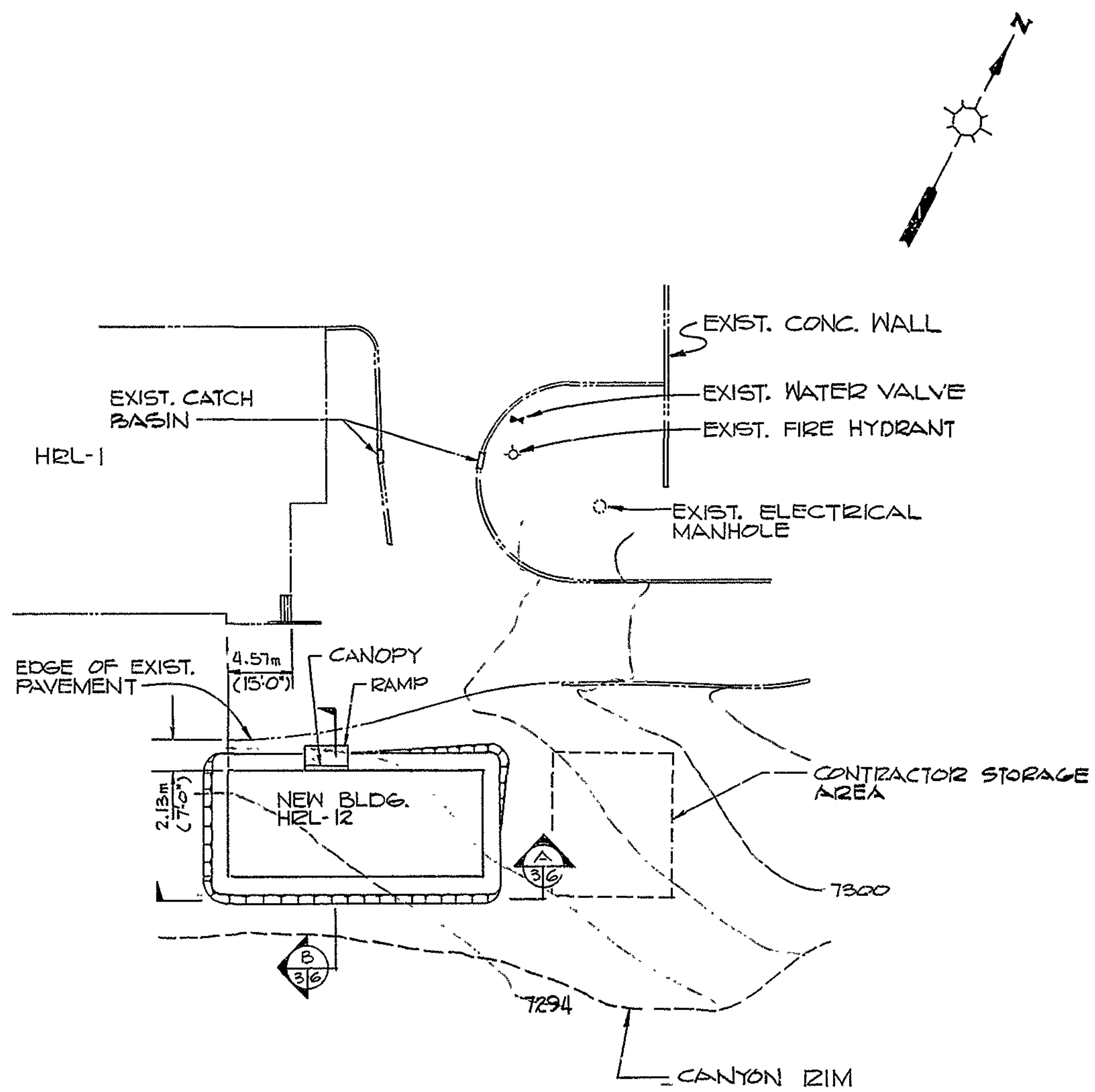
ENG-R5252, Sheet 1 of 1
Warehouse
Floor Plan
October 31, 1983 (Los Alamos National Laboratory, Facilities Engineering Division)


TA-43-0012, view to the south-southwest, June 16, 2021 (LANL image, file no. DSCN1611).


TA-43-0012, view to the south-southeast, February 14, 2021 (LANL image, file no. DSCN1567).



LOCATION PLAN
NTS



PLOT PLAN BLDG. HRL-12
SCALE 1:240 (1"=20'-0")
CONTOUR INTERVAL = 2'-0"

SI METRIC DRAWING

NO	DATE	CLASS REVIEW	REVIEWER	REVISIONS	BY	CHKD	GRP	D O	ENG GP	ENGR D O	ERDA APP.

AUTHORIZED FOR		
SECURITY NA		
SAFETY H-3 DRZ	32786	
HEALTH H-1	32785	
FIRE PR H-3	32788	
DIVISION H-DO		
GROUP H-4		
COMM. E-1	32794	
ENG-1	32775	
ENG-4	32782	
H-5	32796	
H-7	32787	
H-7	32789	
H-8	32790	

UNITED STATES
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
LOS ALAMOS AREA OFFICE - LOS ALAMOS, NEW MEXICO

WAREHOUSE FACILITY
CIVIL: PLOT PLAN & LOCATION PLAN

BLDG. HRL-12 TA 43

CONTRACT NO (A-E)
ERDA ACCT NO
DRAWN E. TRUJILLO
CHECKED BK
A. E. APPROVED
DESIGN ROMERO
CHECKED
SECTION
SCALE NOTED
DATE 1/27/78

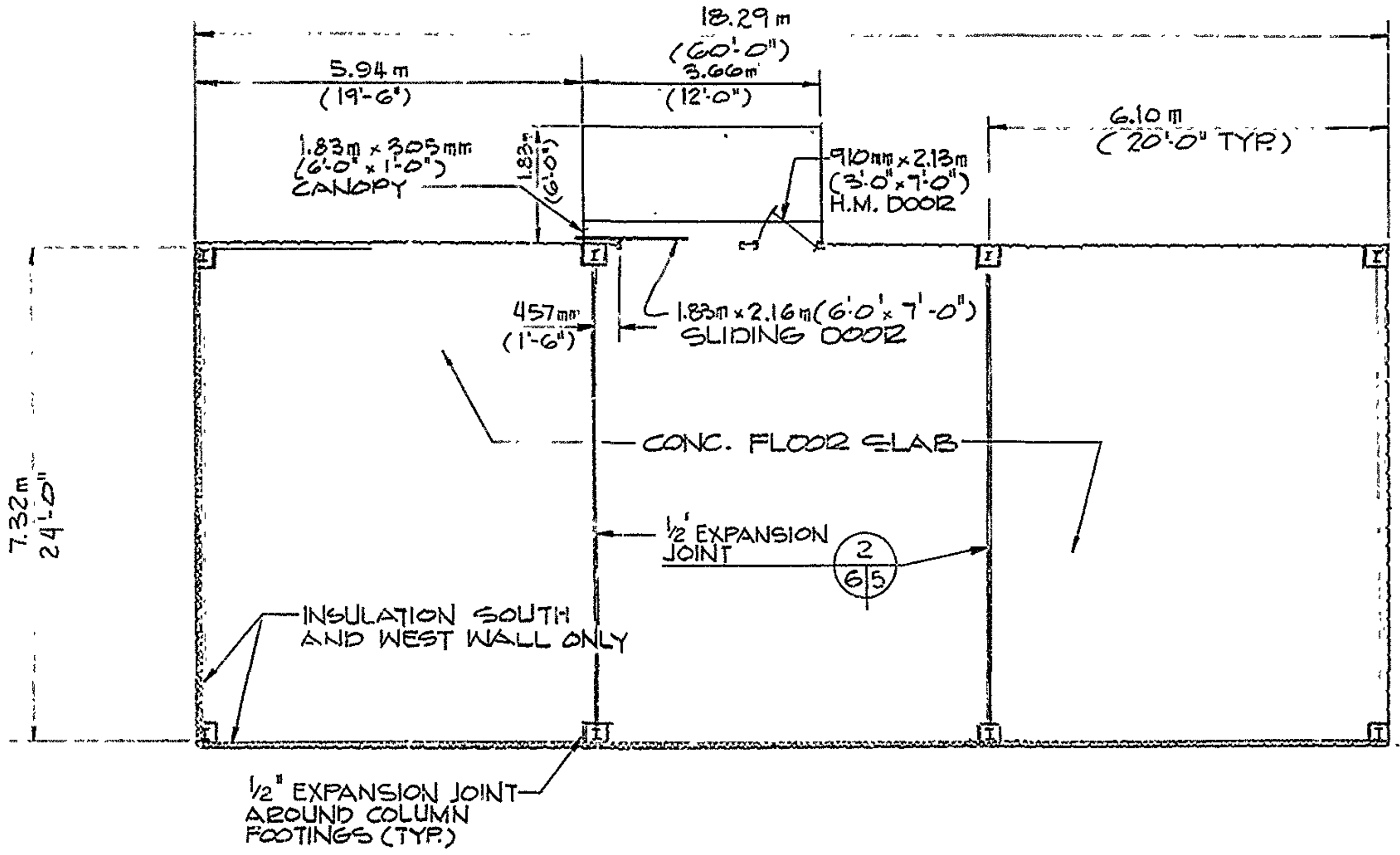
SUBMITTED
RECOMMENDED 1/27/78
APPROVED 1/27 ERDA

LOS ALAMOS SCIENTIFIC LABORATORY
UNIVERSITY OF CALIFORNIA
ENGINEERING DEPT LOS ALAMOS, N. M.

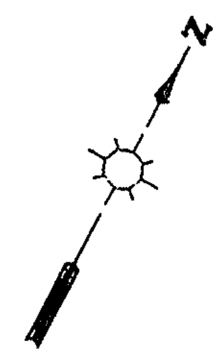
ERDA DRAWING NO LA-SJ-C-2.0
SHEET C-2 3 OF 14

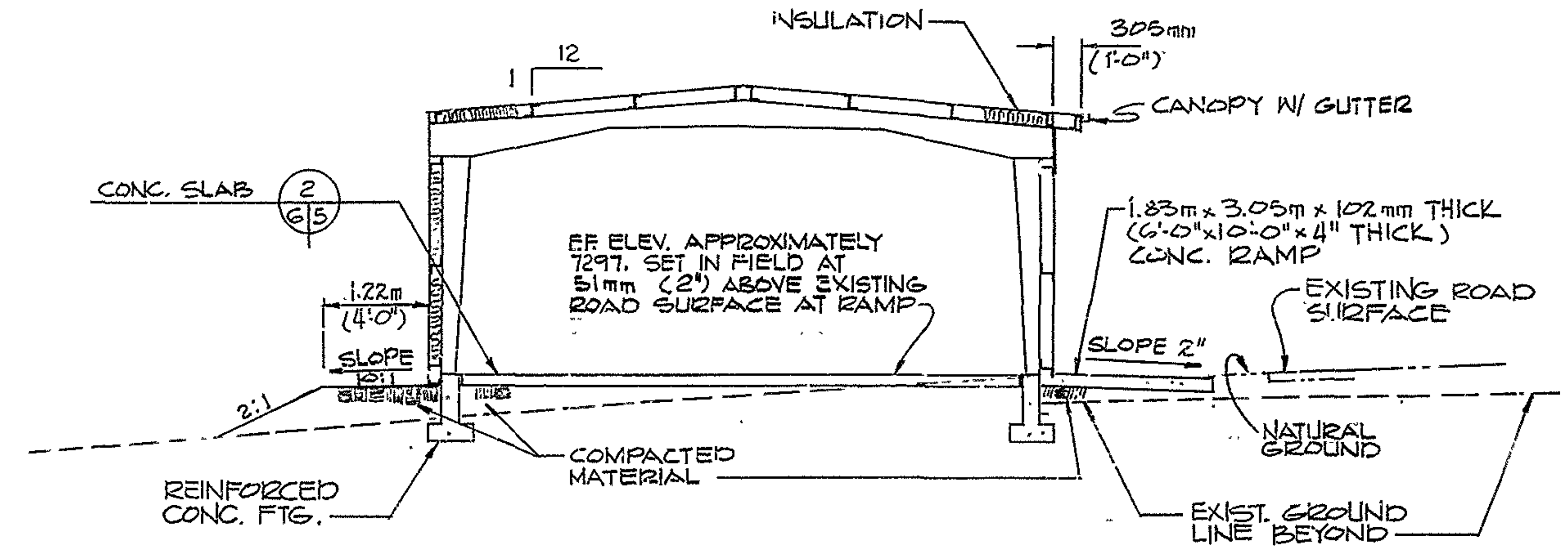
CLASSIFICATION U REVIEWER W. T. DATE 11-1-77

BA
LAB JOB NO 5693-3 5692-43
L A S L DWG NO ENG-C43406



FLOOR PLAN BLDG. HRL-12
SCALE 1:64 (3/16" = 1'-0")

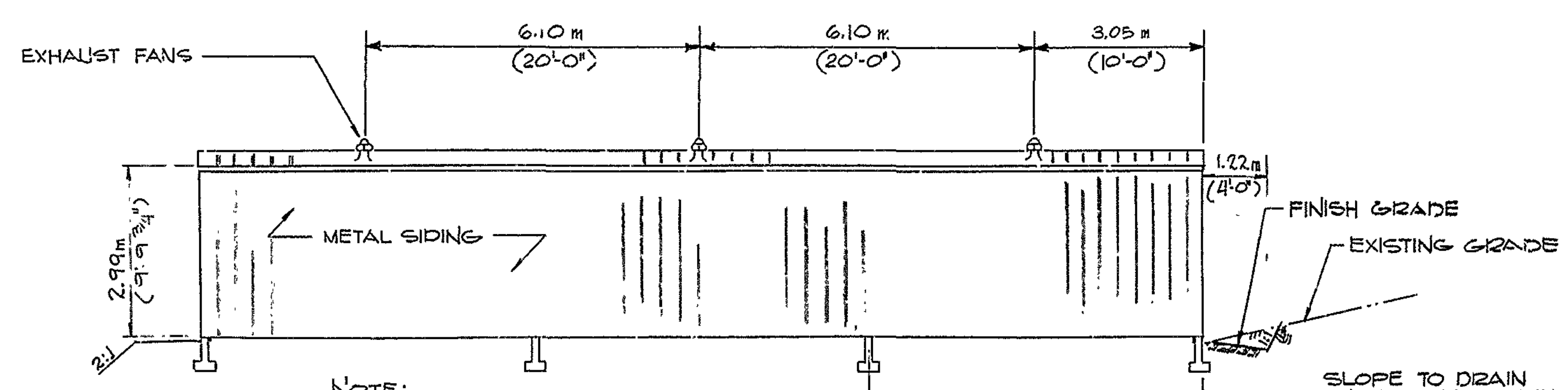




SECTION B 3/6
SCALE 1:48 (1/4" = 1'-0")

WIND LOAD: ANSI A58.1
50 YEAR MEAN RECCURANCE
INTERNAL (82 MPH EXPOSURE C.
EARTHQUAKE LOAD: UBC SECT. 2312
ZONE 2 I=1.0
SNOW LOAD: 30PSF PER ANSI A-58.1

NOTE:
BUILDING TO BE RODENT PROTECTED
NO OPENINGS GREATER THAN 3/8"
WILL BE PERMITTED



SLOPE TO DRAIN AWAY FROM BUILDING

NOTE:
CONTRACTOR TO SIZE FOOTING
FOR MANUFACTURERS
LOAD SOIL BEARING
CAPACITY 2000#/FT²
MIN. DEPTH OF FOOTING
24" BELOW FINISH GRADE

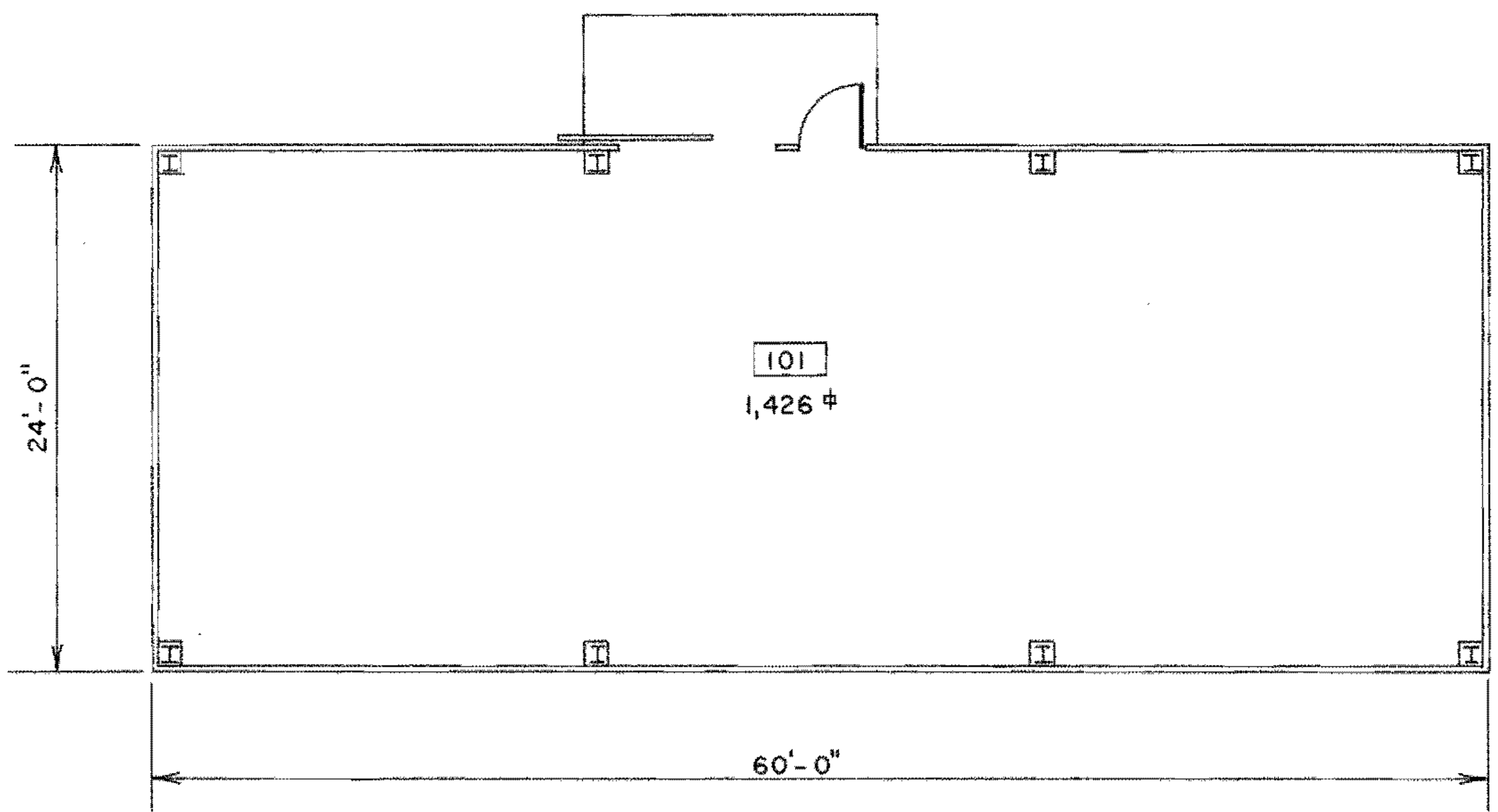
EXTERIOR ELEVATION A 3/6
SCALE 1:64 (3/16" = 1'-0")

SI METRIC DRAWING

NO	DATE	CLASS REVIEW	REVIEWER	REVISIONS	BY	CHKD	GRP	D O	ENG GP	ENGR D O	ERDA APP

AUTHORIZED FOR	UNITED STATES ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION LOS ALAMOS AREA OFFICE - LOS ALAMOS, NEW MEXICO	CONTRACT NO (A E): / ERDA ACCT NO:
SECURITY NA		DRAWN E.TRUJILLO
SAFETY H-3 DRR 32786	WAREHOUSE FACILITY	CHECKED KR
HEALTH H-1 32785	ARCH: FLOOR PLAN, ELEVATION AND SECTION	A. E. APPROVED
FIRE PR H-3 32788		DESIGN ROMERO
DIVISION H-DO		CHECKED R. Caramer
GROUP H-4	BLDG. HRL-12 TA 43	SECTION / SCALE Noted / DATE 1/27/78
COMM. E-1 32794	SUBMITTED / RECOMMENDED 1/27/78 / APPROVED Michael H. McFadden ERDA	
ENG-1 32775		
ENG-4 32782	LOS ALAMOS SCIENTIFIC LABORATORY UNIVERSITY OF CALIFORNIA ENGINEERING DEPT LOS ALAMOS, N M	ERDA DRAWING NO LA-SJ-A-2.0 / SHEET A-2 / 6 OF 14
H-5 32796	CLASSIFICATION U REVIEWER W.T. / DATE 11-1-77	
H-7 32787	BA / LAB JOB NO 5693-3 5692-43	LASL DWG NO ENG-C43406
H-7 32789		
H-8 32790		

83489



(1/8" = 1'-0")

0' 1' 2' 3' 4' 5' 10' 20'

GRAPHIC SCALE

TOTAL ft² 1,426

MF 1	9-28-83	REDRAWN & REVISED TO STATUS OF 9-28-83	H&N	ET	D
REV.	DATE	REVISION	BY	CKD.	APP.

UNIVERSITY OF CALIFORNIA

Los Alamos

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

FACILITIES ENGINEERING DIVISION

WAREHOUSE
FLOOR PLAN

BLDG. HRL-12 TA-43

SEC. CLASSIFICATION	
CLASS.	U
REVIEWER	Imadeil
DATE	10-31-83

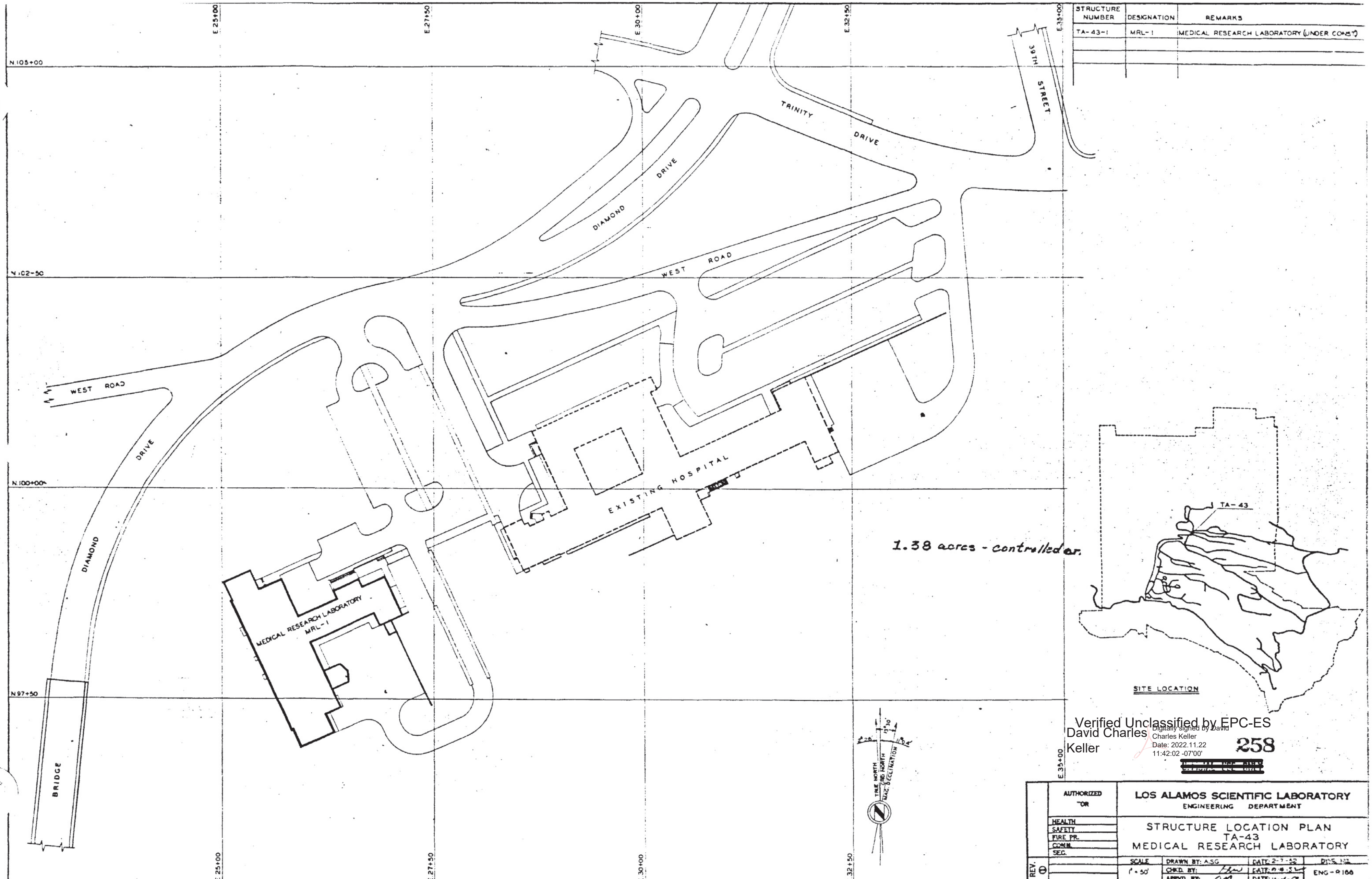
SUBMITTED	RECOMMENDED	APPROVED
E. Trujillo	Damm Rupp	W.T. Eberhard

DRAWN	MARSH H&N	DATE	SHEET NO.	DRAWING NO.
CHECKED	Humble H&N	9-28-83	1 OF 1	ENG-R5252

REC'D LOGGED ✓ TO VAULT 11-23-83

Appendix E: TA-43 Construction History Maps

STRUCTURE NUMBER	DESIGNATION	REMARKS
TA-43-1	MRL-1	MEDICAL RESEARCH LABORATORY (UNDER CONST)



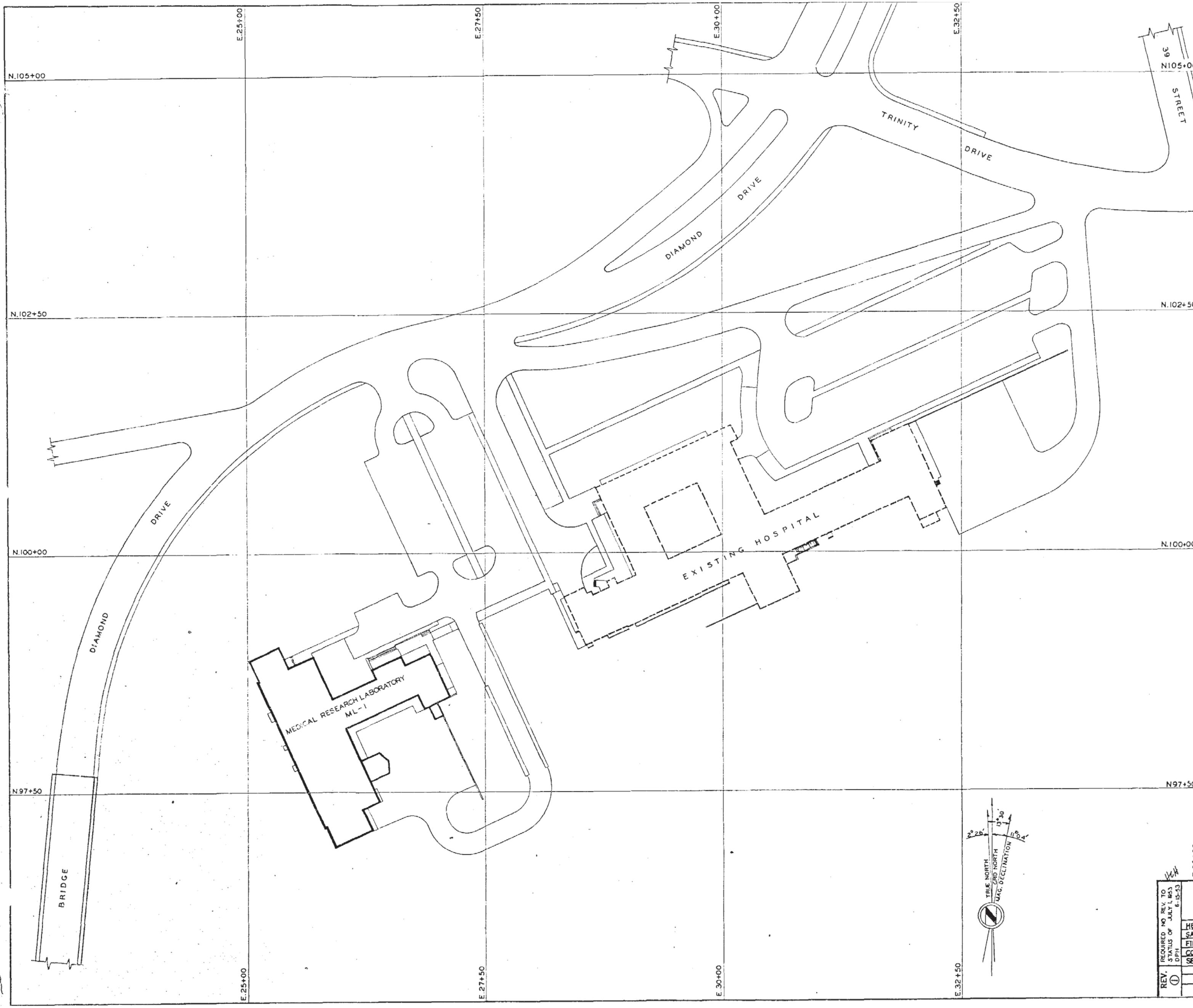
Verified Unclassified by EPC-ES
David Charles Keller
Digitally signed by David Charles Keller
Date: 2022.11.22 11:42:02 -07'00'

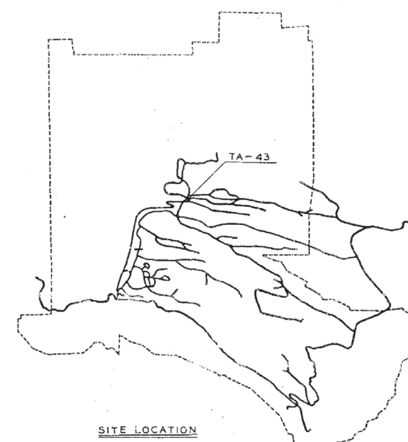
258

AUTHORIZED FOR	LOS ALAMOS SCIENTIFIC LABORATORY ENGINEERING DEPARTMENT
HEALTH SAFETY FIRE PR. COMM. SEC.	STRUCTURE LOCATION PLAN TA-43 MEDICAL RESEARCH LABORATORY

REV.	SCALE	DRAWN BY: A.S.G.	DATE: 2-7-52	DWG. NO.
⊖	1" = 50'	CHKD. BY:	DATE:	ENG-R 188
		APPVD. BY:	DATE: 10-14-52	

STRUCTURE NUMBER	DESIGNATION	REMARKS
TA-43-1	ML-1	MEDICAL RESEARCH LABORATORY





SITE LOCATION

Verified Unclassified by EPC-ES
David Charles Keller
Digitally signed by David Charles Keller
Date: 2022.11.22 11:41:43 -07'00'

[redacted]

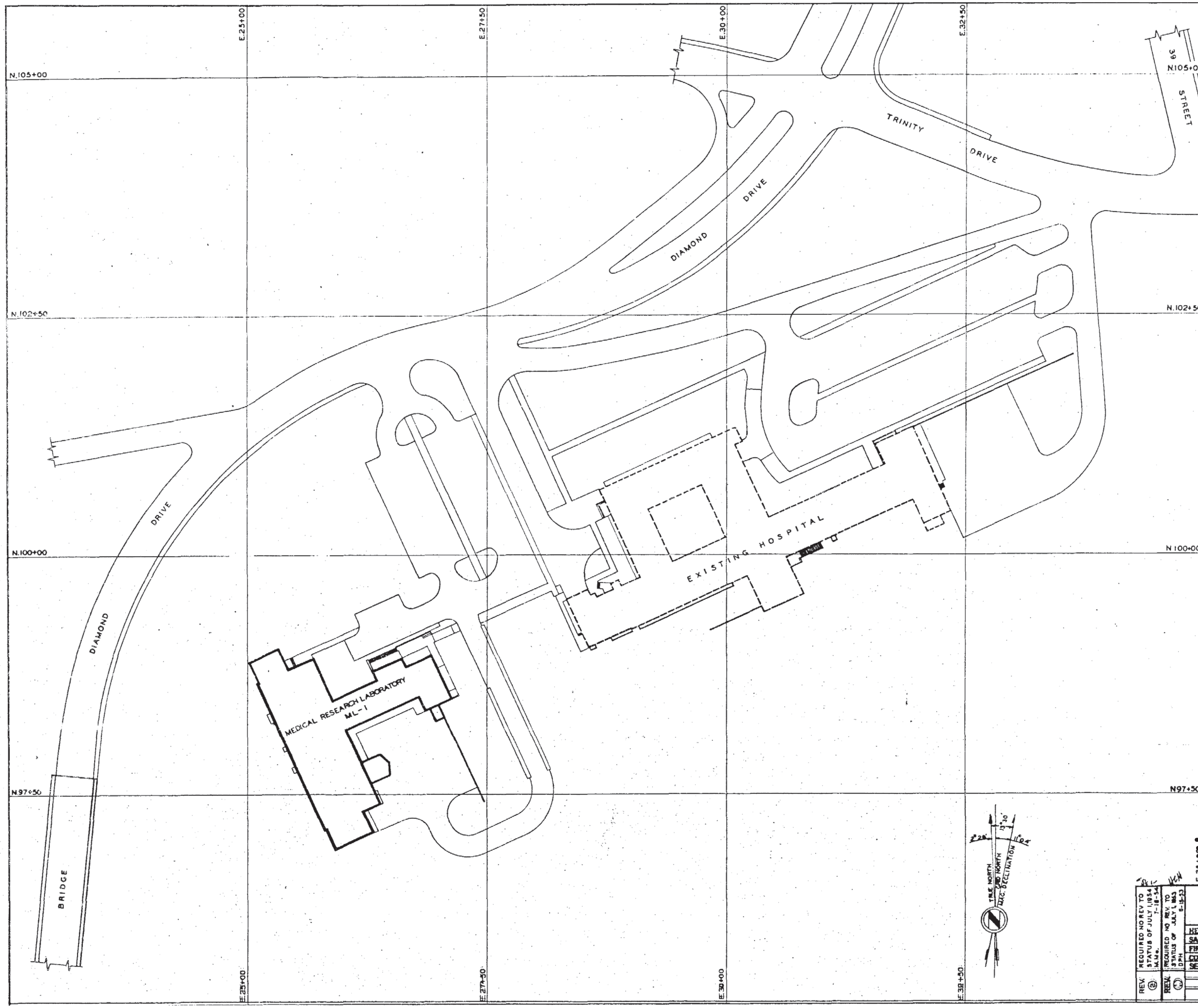
375

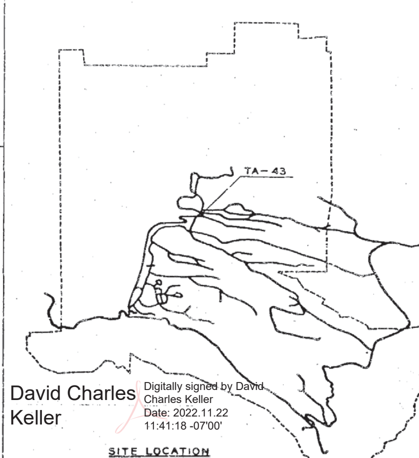
AUTHORIZED FOR	LOS ALAMOS SCIENTIFIC LABORATORY ENGINEERING DEPARTMENT
HEALTH SAFETY FIRE PR. COMM. SEC.	STRUCTURE LOCATION PLAN TA-43 MEDICAL RESEARCH LABORATORY

REQUIRED NO REV. TO STATUS OF JULY 1, 1953 6-15-53

REV.	SCALE	DRAWN BY: A.S.G.	DATE: 2-7-52	DWG. NO.
1	1" = 50'	CHKD. BY:	DATE: 10-16-52	ENG-R188
		APPVD. BY:	DATE: 10-16-52	

STRUCTURE NUMBER	DESIGNATION	REMARKS
TA-43-1	ML-1	MEDICAL RESEARCH LABORATORY





SITE LOCATION

David Charles Keller

Digitally signed by David Charles Keller
Date: 2022.11.22 11:41:18 -07'00'

Verified Unclassified by EPC-ES

~~OFFICIAL USE ONLY~~ 64

REQUIRED NO REV TO STATUS OF JULY 1, 1954 7-18-54 M.M.e.	REV. (2)
REQUIRED NO REV. TO STATUS OF JULY 1, 1953 5-15-53 DPH	REV. (1)

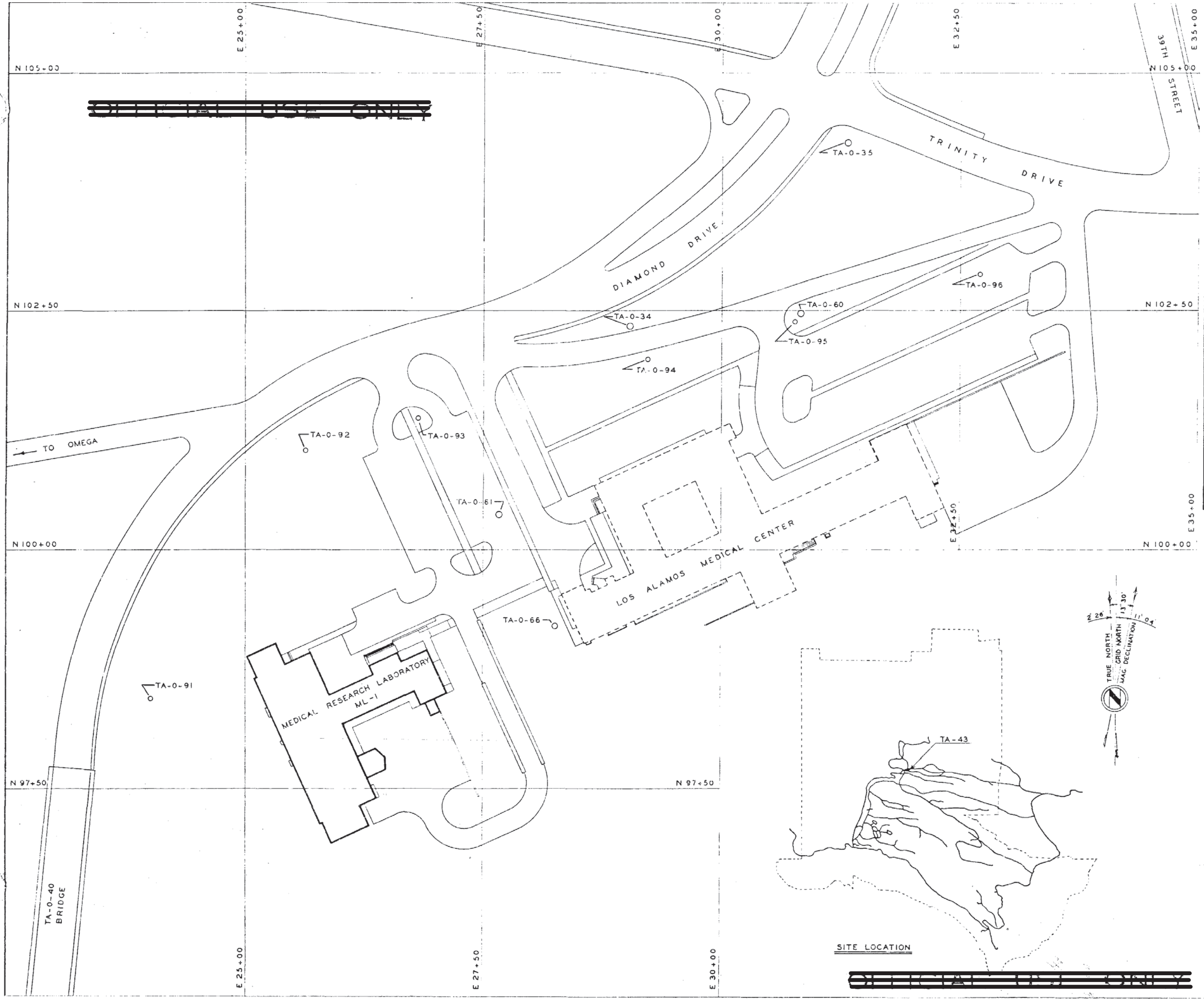
AUTHORIZED FOR
HEALTH
SAFETY
FIRE PR.
COMM.
SEC.

LOS ALAMOS SCIENTIFIC LABORATOR
ENGINEERING DEPARTMENT

STRUCTURE LOCATION PLAN
TA-43
MEDICAL RESEARCH LABORATOR

SCALE	DRAWN BY: A.S.G.	DATE: 2-7-52	DWG.
1" = 50'	CHKD. BY:	DATE:	ENG-F
	APPVD. BY:	DATE: 10-14-52	

~~OFFICIAL USE ONLY~~



STRUCTURE NUMBER	DESIGNATION	REMARKS
TA-43-1	ML-1	MEDICAL RESEARCH LABORATORY

STRUCTURE NUMBER	DESIGNATION	REMARKS
TA-0-34	ULR-34	MANHOLE (ACID SEWER)
TA-0-35	ULR-35	MANHOLE (ACID SEWER)
TA-0-40	ULR-40	BRIDGE
TA-0-60	ULR-60	MANHOLE (ACID SEWER)
TA-0-61	ULR-61	MANHOLE (ACID SEWER)
TA-0-66	ULR-66	MANHOLE (ELECTRICAL)
TA-0-91	ULR-91	MANHOLE (STEAM)
TA-0-92	ULR-92	MANHOLE (STEAM)
TA-0-93	ULR-93	MANHOLE (STEAM)
TA-0-94	ULR-94	MANHOLE (STEAM)
TA-0-95	ULR-95	MANHOLE (STEAM)
TA-0-96	ULR-96	MANHOLE (STEAM)

Verified Unclassified by EPC-ES

David Charles Keller

Digitally signed by David Charles Keller
Date: 2022.11.22 11:40:58 -07'00'

NO.	DATE	REVISIONS	BY	CHKD
3	9/11/55	REDRAWN TO STATUS OF JULY, 1, 1955	NOB	JAS

LOS ALAMOS SCIENTIFIC LABORATORY
UNIVERSITY OF CALIFORNIA
ENGINEERING DEPARTMENT — LOS ALAMOS, N. M.

STRUCTURE LOCATION PLAN
TA-43
MEDICAL RESEARCH LABORATORY

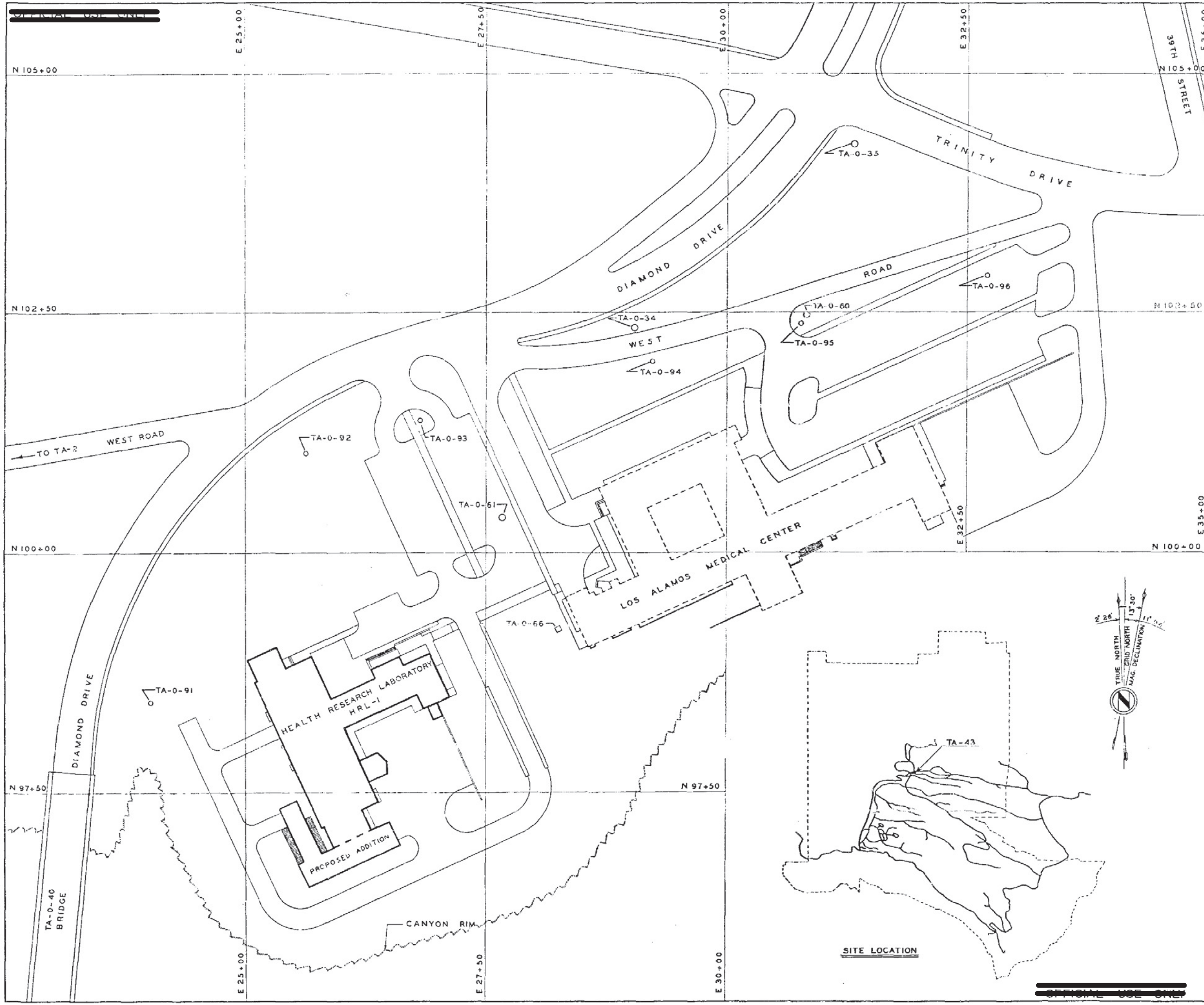
AUTHORIZED FOR: HEALTH, SAFETY, FIRE PROT., SEC.

CHECKED — DESIGNER; RECOMMENDED — GROUP LEADER; APPROVED — ENG. DEPT. OFFICE

DRAWN: N. BYERS — DATE: 8-31-55 — DRAWING NO.: ENG- R 166
SCALE: 1" = 50' — SHEET 1 OF 1

~~OFFICIAL USE ONLY~~

~~OFFICIAL USE ONLY~~



STRUCTURE NUMBER	DESIGNATION	REMARKS
TA-43-1	HRL-1	HEALTH RESEARCH LABORATORY

STRUCTURE NUMBER	DESIGNATION	REMARKS
TA-0-34	ULR-34	MANHOLE (ACID SEWER)
TA-0-35	ULR-35	MANHOLE (ACID SEWER)
TA-0-40	ULR-40	BRIDGE
TA-0-60	ULR-60	MANHOLE (ACID SEWER)
TA-0-61	ULR-61	MANHOLE (ACID SEWER)
TA-0-66	ULR-66	MANHOLE (ELECTRICAL)
TA-0-91	ULR-91	MANHOLE (STEAM)
TA-0-92	ULR-92	MANHOLE (STEAM)
TA-0-93	ULR-93	MANHOLE (STEAM)
TA-0-94	ULR-94	MANHOLE (STEAM)
TA-0-95	ULR-95	MANHOLE (STEAM)
TA-0-96	ULR-96	MANHOLE (STEAM)

Verified Unclassified by EPC-ES

David Charles Keller

Digitally signed by David Charles Keller
Date: 2022.11.22 11:40:40 -07'00'

NO.	DATE	REVISIONS	BY	CHKD	GRP. LDR.	ENG D.O.
4	7-1-57	REVISED TO STATUS OF 7-1-57	DDS	NB		
3	8/11/55	REDRAWN TO STATUS OF JULY 1,1955	KOB	JAS		

AUTHORIZED FOR: HEALTH / SAFETY / FIRE PROT. / SEC.

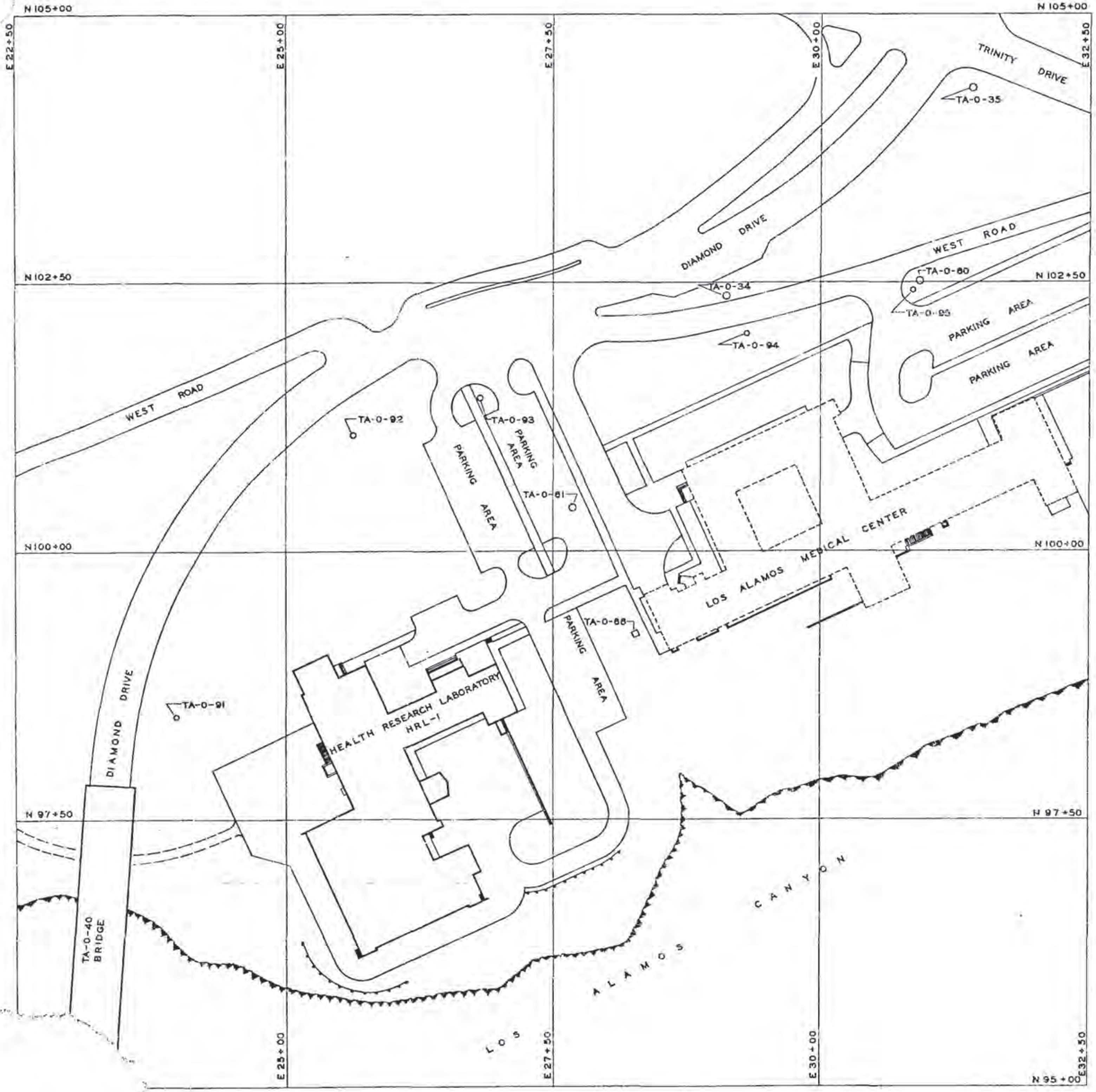
LOS ALAMOS SCIENTIFIC LABORATORY
UNIVERSITY OF CALIFORNIA
ENGINEERING DEPARTMENT — LOS ALAMOS, N. M.

STRUCTURE LOCATION PLAN
TA-43
HEALTH RESEARCH LABORATORY

CHECKED (DESIGNER)	RECOMMENDED (GROUP LEADER)	APPROVED (ENG. DEPT. OFFICE)
J. A. Fizer		

DRAWN	DATE	DRAWING NO.
N. BYERS	8-31-55	ENG- R 166
SCALE 1" = 50'	SHEET 1 OF 1	

~~OFFICIAL USE ONLY~~



STRUCTURE NUMBER	STRUCTURE DESIGNATION	STRUCTURE NOMENCLATURE	REMARKS	APPROXIMATE GRID LOCATION
TA-43-1	HRL-1	HEALTH RESEARCH LAB.		N97+50 E25+00

STRUCTURE NUMBER	STRUCTURE DESIGNATION	STRUCTURE NOMENCLATURE	REMARKS	APPROXIMATE GRID LOCATION
TA-0-34	ULR-34	MANHOLE	ACID	N102+50 E30+00
TA-0-35	ULR-35	MANHOLE	ACID	N105+00 E32+50
TA-0-40	ULR-40	BRIDGE		N 97+50 E22+50
TA-0-60	ULR-60	MANHOLE	ACID	N102+50 E30+00
TA-0-61	ULR-61	MANHOLE	ACID	N100+00 E27+50
TA-0-68	ULR-68	MANHOLE	ELECTRICAL	N100+00 E27+50
TA-0-91	ULR-91	MANHOLE	STEAM	N 97+50 E25+00
TA-0-92	ULR-92	MANHOLE	STEAM	N100+00 E25+00
TA-0-93	ULR-93	MANHOLE	STEAM	N102+50 E27+50
TA-0-94	ULR-94	MANHOLE	STEAM	N102+50 E30+00
TA-0-95	ULR-95	MANHOLE	STEAM	N102+50 E30+00

50' 25' 0 50' 100' 150' 200'

SCALE

NO.	DATE	REVISIONS	BY	CHKD	GRP. LDR.	ENG. D. O.
R	8-15-61	REDRAWN TO STATUS OF 8-1-61 (WAS ENG-R188)	J.E.J.			

AUTHORIZED FOR: HEALTH / SAFETY / FIRE PROT. / SEC.

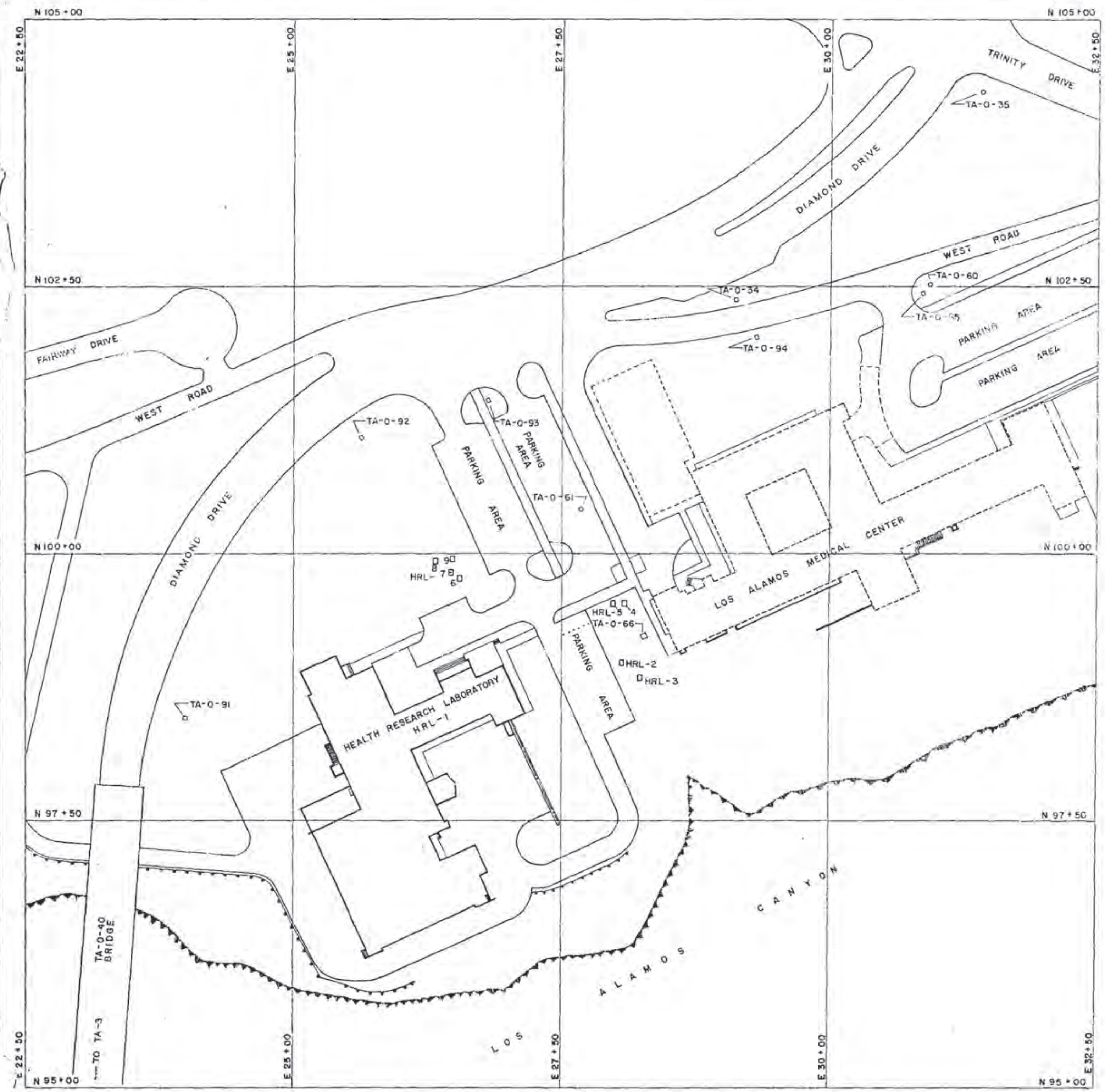
LOS ALAMOS SCIENTIFIC LABORATORY

ENGINEERING DEPARTMENT

UNIVERSITY OF CALIFORNIA — LOS ALAMOS, NEW MEXICO

STRUCTURE LOCATION PLAN TA-43 HEALTH RESEARCH LABORATORY

CHECKED PROJ. ENG.	RECOMMENDED GROUP LEADER	APPROVED ENG. DEPT. OFFICE
DESIGNER	DATE 8-15-61	DRAWING NO.
DRAWN JOHNSON	SHEET 1 OF 1	ENG-R 2477
SCALE AS NOTED		



STRUCTURE NUMBER	STRUCTURE DESIGNATION	STRUCTURE NOMENCLATURE	REMARKS	APPROXIMATE GRID LOCATION
TA-43-1	HRL-1	HEALTH RESEARCH LAB.		N 97+50 E25+00
TA-43-2	HRL-2	MANHOLE	WATER P.I.V.	N100+00 E27+50
TA-43-3	HRL-3	MANHOLE	WATER	N100+00 E27+50
TA-43-4	HRL-4	MANHOLE	WATER	N100+00 E27+50
TA-43-5	HRL-5	MANHOLE	WATER	N100+00 E27+50
TA-43-6	HRL-6	MANHOLE	WATER	N100+00 E27+50
TA-43-7	HRL-7	MANHOLE	WATER	N100+00 E27+50
TA-43-8	HRL-8	MANHOLE	WATER	N100+00 E27+50
TA-43-9	HRL-9	MANHOLE	WATER	N100+00 E27+50

STRUCTURE NUMBER	STRUCTURE DESIGNATION	STRUCTURE NOMENCLATURE	REMARKS	APPROXIMATE GRID LOCATION
TA-0-34	ULR-34	MANHOLE	ACID	N102+50 E30+00
TA-0-35	ULR-35	MANHOLE	ACID	N105+00 E32+50
TA-0-40	ULR-40	BRIDGE		N 97+50 E22+50
TA-0-60	ULR-60	MANHOLE	ACID	N102+50 E30+00
TA-0-61	ULR-61	MANHOLE	ACID	N100+00 E27+50
TA-0-66	ULR-66	MANHOLE	ELECTRICAL	N100+00 E27+50
TA-0-91	ULR-91	MANHOLE	STEAM	N 97+50 E25+00
TA-0-92	ULR-92	MANHOLE	STEAM	N100+00 E25+00
TA-0-93	ULR-93	MANHOLE	STEAM	N102+50 E27+50
TA-0-94	ULR-94	MANHOLE	STEAM	N102+50 E30+00
TA-0-95	ULR-95	MANHOLE	STEAM	N102+50 E30+00

SCALE

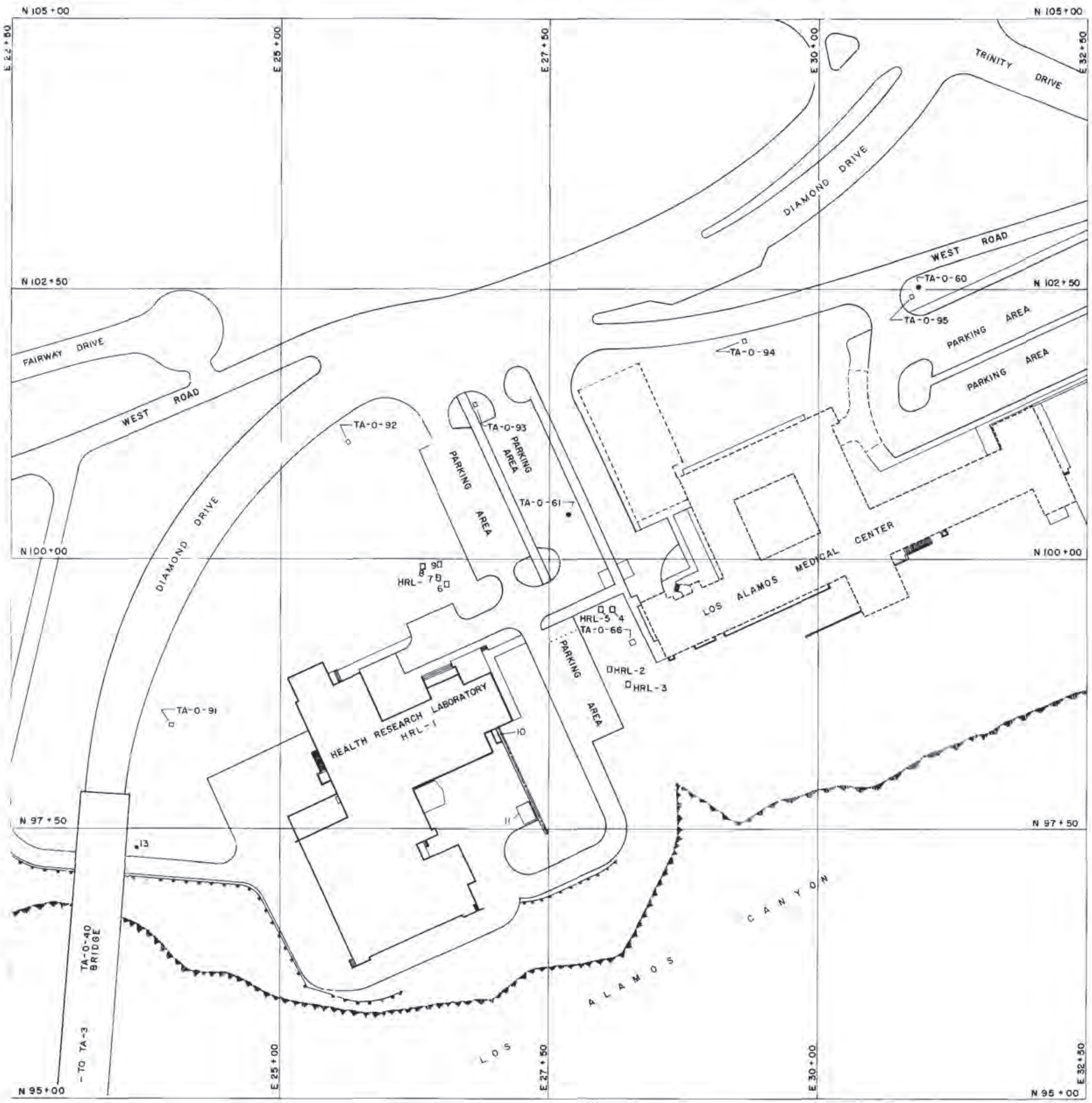
NO.	DATE	REVISIONS	BY	CHKD	GRP. LDR.	ENG. D.O.
9	12-2-69	REVISED TO STATUS OF 12-2-69	DAD			
8	12-2-65	REVISED TO STATUS OF 11-24-65	ERW			
7	3-15-65	REDRAWN TO REPLACE LOST ORIGINAL	CDF			
6	8-15-61	REDRAWN TO STATUS OF 8-1-61 (WAS ENG-R166)	JEJ			

AUTHORIZED FOR: HEALTH / SAFETY / FIRE PROT. / SEC.

LOS ALAMOS SCIENTIFIC LABORATORY
ENGINEERING DEPARTMENT
UNIVERSITY OF CALIFORNIA — LOS ALAMOS, NEW MEXICO

STRUCTURE LOCATION PLAN
TA-43
HEALTH RESEARCH LABORATORY

CHECKED: J.A. Syer, PROJ. ENGR.	RECOMMENDED: GROUP LEADER	APPROVED: ENG. DEPT. OFFICE
DESIGNER	DATE: 8-15-61	DRAWING NO.
DRAWN: JOHNSON	SHEET: 1 OF 1	ENG-R 2477
SCALE: AS NOTED		



STRUCTURE NUMBER	STRUCTURE DESIGNATION	STRUCTURE NOMENCLATURE	REMARKS	APPROXIMATE GRID LOCATION
TA-43-1	HRL-1	HEALTH RESEARCH LAB		N 97+50 E25+00
TA-43-2	HRL-2	MANHOLE	WATER P I V	N100+00 E27+50
TA-43-3	HRL-3	MANHOLE	WATER	N100+00 E27+50
TA-43-4	HRL-4	MANHOLE	WATER	N100+00 E27+50
TA-43-5	HRL-5	MANHOLE	WATER	N100+00 E27+50
TA-43-6	HRL-6	MANHOLE	WATER	N100+00 E27+50
TA-43-7	HRL-7	MANHOLE	WATER	N100+00 E27+50
TA-43-8	HRL-8	MANHOLE	WATER	N100+00 E27+50
TA-43-9	HRL-9	MANHOLE	WATER	N100+00 E27+50
TA-43-10	HRL-10	SEWAGE LIFT STATION	TRANSFERRED TO ZIA AUG '70	N 97+50 E27+50
TA-43-11	HRL-11	METAL LAWN BUILDING		N 97+50 E27+50
TA-43-12	HRL-12			
TA-43-13	HRL-13	MANHOLE, TELEPHONE		N97+50 E25+00

STRUCTURE NUMBER	STRUCTURE DESIGNATION	STRUCTURE NOMENCLATURE	REMARKS	APPROXIMATE GRID LOCATION
TA-0-34	ULR-34		REMOVED 1967	
TA-0-35	ULR-35		REMOVED 1967	
TA-0-40	ULR-40	BRIDGE	TRANSFERRED TO ZIA 1956	N 97+50 E22+50
TA-0-60	ULR-60	MANHOLE, ACID	ABANDONED 1965	N102+50 E30+00
TA-0-61	ULR-61	MANHOLE, ACID	ABANDONED 1965	N100+00 E27+50
TA-0-66	ULR-66	MANHOLE, ELECTRICAL	ABANDONED 1965	N100+00 E27+50
TA-0-91	ULR-91	MANHOLE	STEAM	N 97+50 E25+00
TA-0-92	ULR-92	MANHOLE	STEAM	N100+00 E25+00
TA-0-93	ULR-93	MANHOLE	STEAM	N102+50 E27+50
TA-0-94	ULR-94	MANHOLE	STEAM	N102+50 E30+00
TA-0-95	ULR-95	MANHOLE	STEAM	N102+50 E30+00

REVIEWED M. G. ... DATE 7/28/77

1" = 50'   50' 25' 0 50' 100' 150' 200'

GRAPHIC SCALE

NO.	DATE	REVISIONS	BY	CHKD	GRP. LDR.	ENG D. O.
13	4-20-77	REVISED DWG NO (FORMERLY R2477)	M.M.			
12	6-19-75	REVISED PER ENG DWG LA-MM-C1	B.H.			
11	10-24-74	REVISED PER LASL W/O 6-8504-75	B.H.			
10	5-5-72	REVISED TO STATUS OF 5-5-72	JRN			
9	12-2-69	REVISED TO STATUS OF 12-2-69	DAD			
8	12-2-65	REVISED TO STATUS OF 11-24-65	ERW			
7	3-15-65	REDRAWN TO REPLACE LOST ORIGINAL	CDF			
6	8-15-61	REDRAWN TO STATUS OF 8-1-61 (WAS ENG-R166)	JEJ			

AUTHORIZED FOR: HEALTH / SAFETY / FIRE PROT. / SEC.

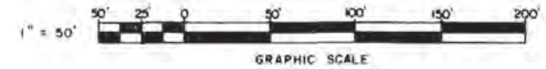
LOS ALAMOS SCIENTIFIC LABORATORY
ENGINEERING DEPARTMENT
UNIVERSITY OF CALIFORNIA — LOS ALAMOS, NEW MEXICO

STRUCTURE LOCATION PLAN
TA-43
HEALTH RESEARCH LABORATORY

CHECKED: PROJ. ENG.
RECOMMENDED: GROUP LEADER
APPROVED: ENG. DEPT. OFFICE
DESIGNER
DATE 8-15-61
DRAWING NO. ENG- R5123
DRAWN JOHNSON
SHEET NO. 1
SCALE AS NOTED

STRUCTURE NUMBER	STRUCTURE DESIGNATION	STRUCTURE NOMENCLATURE	REMARKS	APPROXIMATE GRID LOCATION
TA-43-1	HRL-1	HEALTH RESEARCH LAB		N 97+50 E25+00
TA-43-2	HRL-2	MANHOLE	WATER P.I.V.	N100+00 E27+50
TA-43-3	HRL-3	MANHOLE	WATER	N100+00 E27+50
TA-43-4	HRL-4	MANHOLE	WATER	N100+00 E27+50
TA-43-5	HRL-5	MANHOLE	WATER	N100+00 E27+50
TA-43-6	HRL-6	MANHOLE	WATER	N100+00 E27+50
TA-43-7	HRL-7	MANHOLE	WATER	N100+00 E27+50
TA-43-8	HRL-8	MANHOLE	WATER	N100+00 E27+50
TA-43-9	HRL-9	MANHOLE	WATER	N100+00 E27+50
TA-43-10	HRL-10	SEWAGE LIFT STATION	TRANSFERRED TO ZIA AUG '70	N 97+50 E27+50
TA-43-11	HRL-11	METAL LAWN BUILDING		N 97+50 E27+50
TA-43-12	HRL-12	WAREHOUSE		N97+50 E27+50
TA-43-13	HRL-13	MANHOLE, TELEPHONE		N97+50 E25+00

STRUCTURE NUMBER	STRUCTURE DESIGNATION	STRUCTURE NOMENCLATURE	REMARKS	APPROXIMATE GRID LOCATION
TA-0-34	ULR-34	MANHOLE, ACID	REMOVED 1967	
TA-0-35	ULR-35	MANHOLE, ACID	REMOVED 1967	
TA-0-40	ULR-40	BRIDGE	TRANSFERRED TO ZIA 1966	N 97+50 E22+50
TA-0-60	ULR-60	MANHOLE, ACID	ABANDONED 1965	N102+50 E30+00
TA-0-61	ULR-61	MANHOLE, ACID	ABANDONED 1965	N100+00 E27+50
TA-0-66	ULR-66	MANHOLE, ELECTRICAL	ABANDONED 1965	N100+00 E27+50
TA-0-91	ULR-91	MANHOLE, STEAM		N 97+50 E25+00
TA-0-92	ULR-92	MANHOLE, STEAM		N100+00 E25+00
TA-0-93	ULR-93	MANHOLE, STEAM		N102+50 E27+50
TA-0-94	ULR-94	MANHOLE, STEAM		N102+50 E30+00
TA-0-95	ULR-95	MANHOLE, STEAM		N102+50 E30+00



REV.	DATE	REVISION	BY	CKD	APP
14	7-8-83	REVISED TITLE BLOCK & DWG. TO STATUS OF 6-29-83	H.S.		

UNIVERSITY OF CALIFORNIA
Los Alamos
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

FACILITIES ENGINEERING DIVISION

STRUCTURE LOCATION PLAN
TA-43
HEALTH RESEARCH LABORATORY

SEC. CLASSIFICATION
CLASS: U
REVIEWER
DATE

SUBMITTED
RECOMMENDED
APPROVED
DRAWN: HERB SALGADO
CHECKED
DATE: 7-8-83
SHEET NO: 1 OF 1
DRAWING NO.: ENG-R5123

STRUCTURE NUMBER	STRUCTURE DESIGNATION	STRUCTURE NOMENCLATURE	REMARKS	APPROXIMATE GRID LOCATION
TA-43-1	HRL-1	HEALTH RESEARCH LAB		N 97+50 E25+00
TA-43-2	HRL-2	MANHOLE	WATER P.I.V.	N100+00 E27+50
TA-43-3	HRL-3	MANHOLE	WATER	N100+00 E27+50
TA-43-4	HRL-4	MANHOLE	WATER	N100+00 E27+50
TA-43-5	HRL-5	MANHOLE	WATER	N100+00 E27+50
TA-43-6	HRL-6	MANHOLE	WATER	N100+00 E27+50
TA-43-7	HRL-7	MANHOLE	WATER	N100+00 E27+50
TA-43-8	HRL-8	MANHOLE	WATER	N100+00 E27+50
TA-43-9	HRL-9	MANHOLE	WATER	N100+00 E27+50
TA-43-10	HRL-10	SEWAGE LIFT STATION	TRANSFERRED TO ZIA AUG.'70	N 97+50 E27+50
TA-43-11	HRL-11	METAL LAWN BUILDING	REMOVED 1965	
TA-43-12	HRL-12	WAREHOUSE		N97+50 E27+50
TA-43-13	HRL-13	MANHOLE, TELEPHONE		N97+50 E25+00
TA-43-14	HRL-14			
TA-43-15	HRL-15			
TA-43-16	HRL-16			
TA-43-17	HRL-17		CANCELLED	
TA-43-18	HRL-18			
TA-43-19	HRL-19			
TA-43-20	HRL-20	TRANSPORTABLE, OFFICE		N97+50 E27+50
TA-43-21	HRL-21		CANCELLED	
TA-43-22	HRL-22	EMERGENCY ACCESS TO 43-1		N97+50 E27+50
TA-43-23	HRL-22		CANCELLED	
TA-43-24	HRL-24	TRAILER, OFFICE		N95+00 E27+50
TA-43-25	HRL-25	TRANSFORMER PAD		N95+00 E27+50
TA-43-26	HRL-26		CANCELLED	
TA-43-27	HRL-27		CANCELLED	
TA-43-28	HRL-28			
TA-43-29	HRL-29			
TA-43-30	HRL-30	STORAGE SHED		
TA-43-31	HRL-31		CANCELLED	
TA-43-32	HRL-32	RETAINING WALL		N97+50 E27+50
TA-43-33	HRL-33			
TA-43-34	HRL-34			
TA-43-35	HRL-35			
TA-43-36	HRL-36			
TA-43-37	HRL-37			
TA-43-38	HRL-38			
TA-43-39	HRL-39			
TA-43-40	HRL-40			
TA-43-41	HRL-41			
TA-43-42	HRL-42			
TA-43-43	HRL-43			
TA-43-44	HRL-44			

STRUCTURE NUMBER	STRUCTURE DESIGNATION	STRUCTURE NOMENCLATURE	REMARKS	APPROXIMATE GRID LOCATION
TA-0-40	ULR-40	BRIDGE	TRANSFERRED TO ZIA 1956	N 97+50 E22+50
TA-0-60	ULR-60	MANHOLE, ACID	ABANDONED 1965	N102+50 E30+00
TA-0-61	ULR-61	MANHOLE, ACID	ABANDONED 1965	N100+00 E27+50
TA-0-66	ULR-66	MANHOLE, ELECTRICAL	ABANDONED 1965	N100+00 E27+50
TA-0-91	ULR-91	MANHOLE, STEAM		N 97+50 E25+00
TA-0-92	ULR-92	MANHOLE, STEAM		N100+00 E25+00
TA-0-93	ULR-93	MANHOLE, STEAM		N102+50 E27+50
TA-0-94	ULR-94	MANHOLE, STEAM		N102+50 E30+00
TA-0-95	ULR-95	MANHOLE, STEAM		N102+50 E30+00
TA-0-168	ULR-168	MANHOLE, ELECTRICAL		N 97+50 E27+50
TA-0-169	ULR-169	MANHOLE, ELECTRICAL		N 97+50 E27+50
TA-0-170	ULR-170	MANHOLE, ELECTRICAL		N 97+50 E30+00

50' 25' 0 50' 100'

1"=50' GRAPHIC SCALE

REV	DATE	REVISION	BY	CKD	APP
15	3-28-86	REVISED TO STATUS OF 3-11-86	ALC		
14	7-8-83	REVISED TITLE BLOCK & DWG. TO STATUS OF 6-29-83	H.S.		

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Los Alamos National Laboratory
Los Alamos, New Mexico 87545

FACILITIES ENGINEERING DIVISION

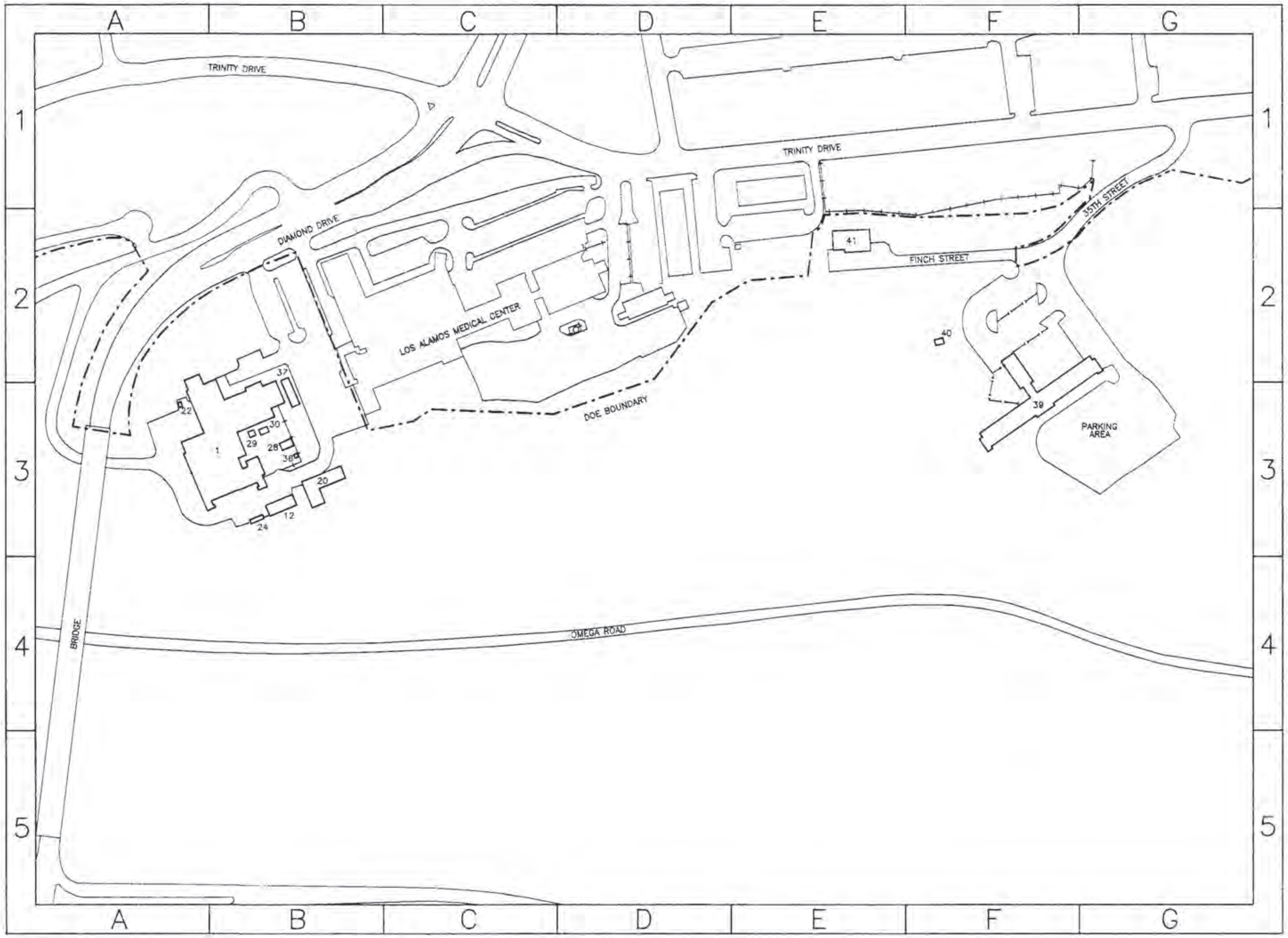
STRUCTURE LOCATION PLAN
TA-43
HEALTH RESEARCH LABORATORY

SEC CLASSIFICATION
CLASS. U
REVIEWER
DATE

SUBMITTED | RECOMMENDED | APPROVED

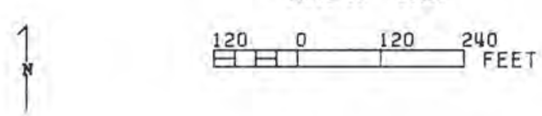
DRAWN: HERB SALGADO
CHECKED
DATE: 7-8-83
SHEET NO. 1 OF 1
DRAWING NO. ENG-R5123

TA-43



AUTOGIS

SCALE 1: 1440.



STRUCTURE NUMBER INDEX

STRUCTURE TA-NUMBER	STRUCTURE DESIGNATION	STRUCTURE NOMENCLATURE	STRUCTURE LOCATOR SHEET NO.	MAP KEY
43- 1	HRL- 1	HEALTH RESEARCH LABORATORY	1	B-3
43- 12	HRL- 12	WAREHOUSE	1	B-3
43- 20	HRL- 20	TRANSPORTABLE OFFICE BLDG.	1	B-3
43- 22	HRL- 22	EMERGENCY ACCESS	1	A-3
43- 24	HRL- 24	TRAILER, OFFICE	1	B-3
43- 28	HRL- 28	STORAGE SHED	1	B-3
43- 29	43- 29	STORAGE SHED	1	B-3
43- 30	43- 30	STORAGE SHED	1	B-3
43- 36	43- 36	STORAGE SHED	1	B-3
43- 37	43- 37	OFFICE TRAILER	1	B-3
43- 39	43- 39	DOE HEADQUARTERS	1	F-3
43- 40	43- 40	PUMP HOUSE	1	F-2
43- 41	43- 41	STEAM PLANT	1	E-2

REV	DATE	REVISION
15	04-12-89	REDRAWN & REVISED TO STATUS OF 04-03-89

UNIVERSITY OF CALIFORNIA

Los Alamos — Los Alamos National Laboratory, Los Alamos, New Mexico 87545

FACILITIES ENGINEERING DIVISION

STRUCTURE LOCATION MAP

TA-43

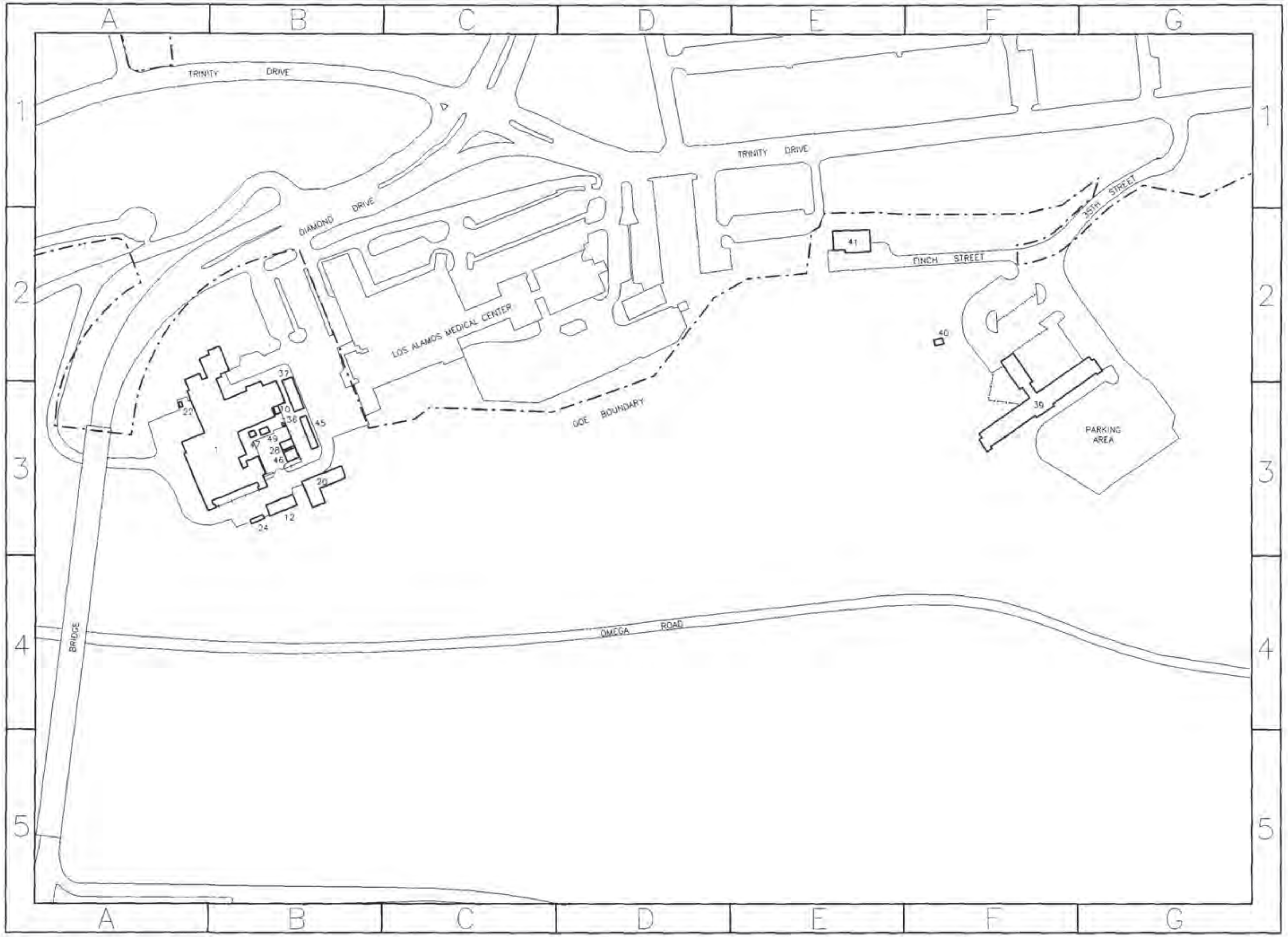
HEALTH RESEARCH LABORATORY

SEC CLASSIFICATION
CLASS U
REVIEWER
DATE

SUBMITTED — RECOMMENDED — APPROVED

DRAWN C.SANDOVAL
CHECKED N.BYERS
DATE 04-12-89
SHEET NO 1 OF 1
DRAWING NO ENG-R 5123

TA-43



SCALE 1: 1440

120 0 120 240 FEET

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STRUCTURE NUMBER INDEX

STRUCTURE TA-NUMBER	STRUCTURE DESIGNATION	STRUCTURE NOMENCLATURE	STRUCTURE LOCATOR SHEET NO.	STRUCTURE LOCATOR MAP KEY
43- 1	HRL- 1	HEALTH RESEARCH LABORATORY	1	B-3
43- 10	43- 10	SEWAGE LIFT STATION	1	B-3
43- 12	HRL- 12	WAREHOUSE	1	B-3
43- 20	HRL- 20	TRANSPORTABLE OFFICE BLDG.	1	B-3
43- 22	HRL- 22	EMERGENCY ACCESS	1	A-3
43- 24	HRL- 24	TRAILER, OFFICE	1	B-3
43- 28	HRL- 28	STORAGE SHED	1	B-3
43- 36	43- 36	STORAGE SHED	1	B-3
43- 37	43- 37	OFFICE TRAILER	1	B-3
43- 39	43- 39	DOE HEADQUARTERS	1	F-3
43- 40	43- 40	PUMP HOUSE	1	F-2
43- 41	43- 41.	STEAM PLANT	1	E-2
43- 45	43- 45	LUNCH CONFERENCE ROOM	1	B-3
43- 46	43- 46	STORAGE SHED	1	B-3
43- 47	43- 47	CHEMICAL SHED	1	B-3
43- 49	43- 49	CHEMICAL SHED	1	B-3

NO.	DATE	CLASS REV.	REVISIONS	DWN	DES	CKD	REL	SUB	REC	APP

FACILITIES ENGINEERING DIVISION

STRUCTURE LOCATION MAP
TA-43
HEALTH RESEARCH LABORATORY

DRAWN	C.SANDOVAL
DESIGN	
CHECKED	B. COMER
RELEASED	B. COMER
DATE	03-06-91

BLDG.

SUBMITTED [signature] RECOMMENDED Bryan Comer APPROVED [signature]

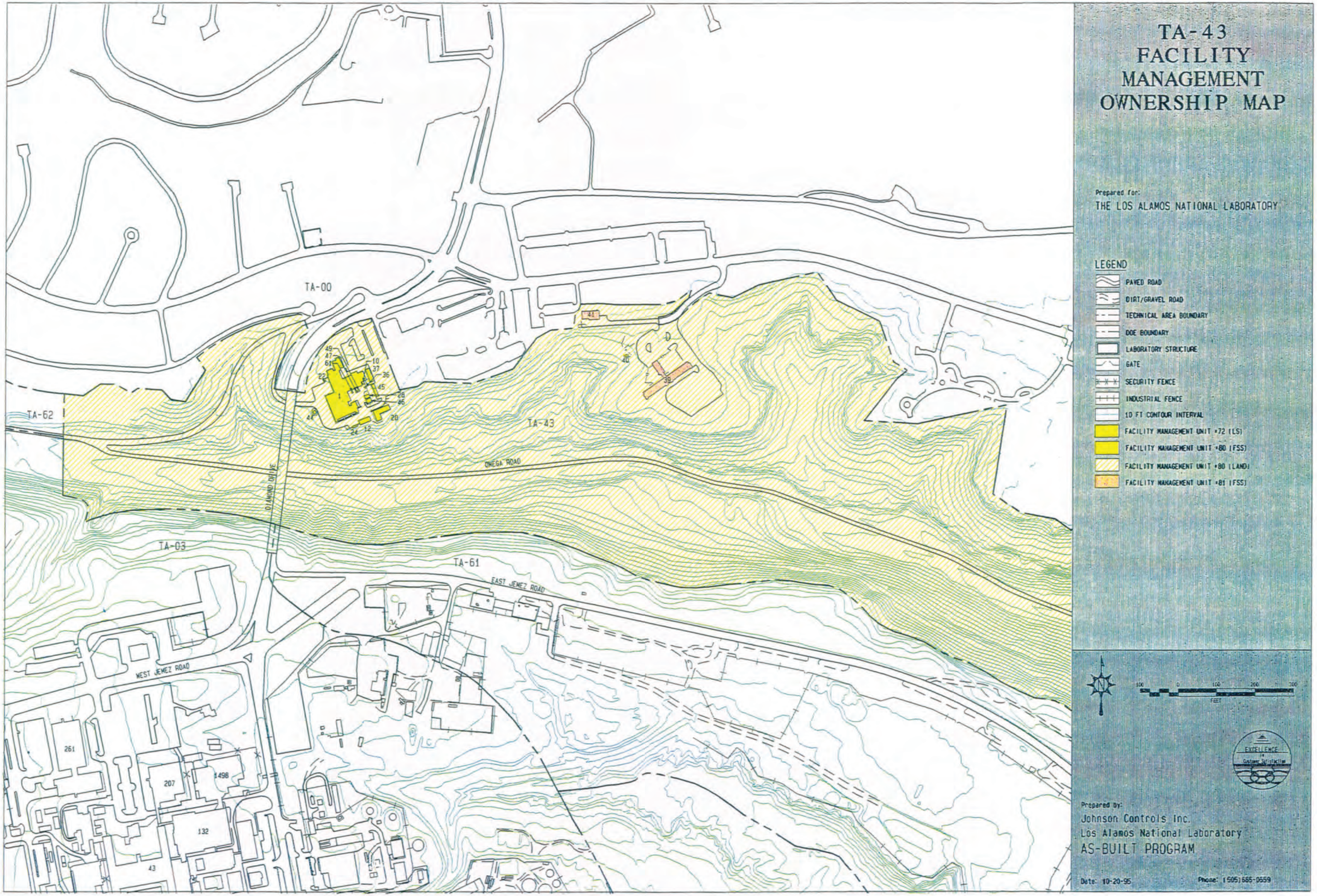
LOS ALAMOS — LOS ALAMOS NATIONAL LABORATORY, LOS ALAMOS, NEW MEXICO 87545

SHEET 1 OF 1

CLASSIFICATION U REVIEWER [signature] DATE 4-15-91

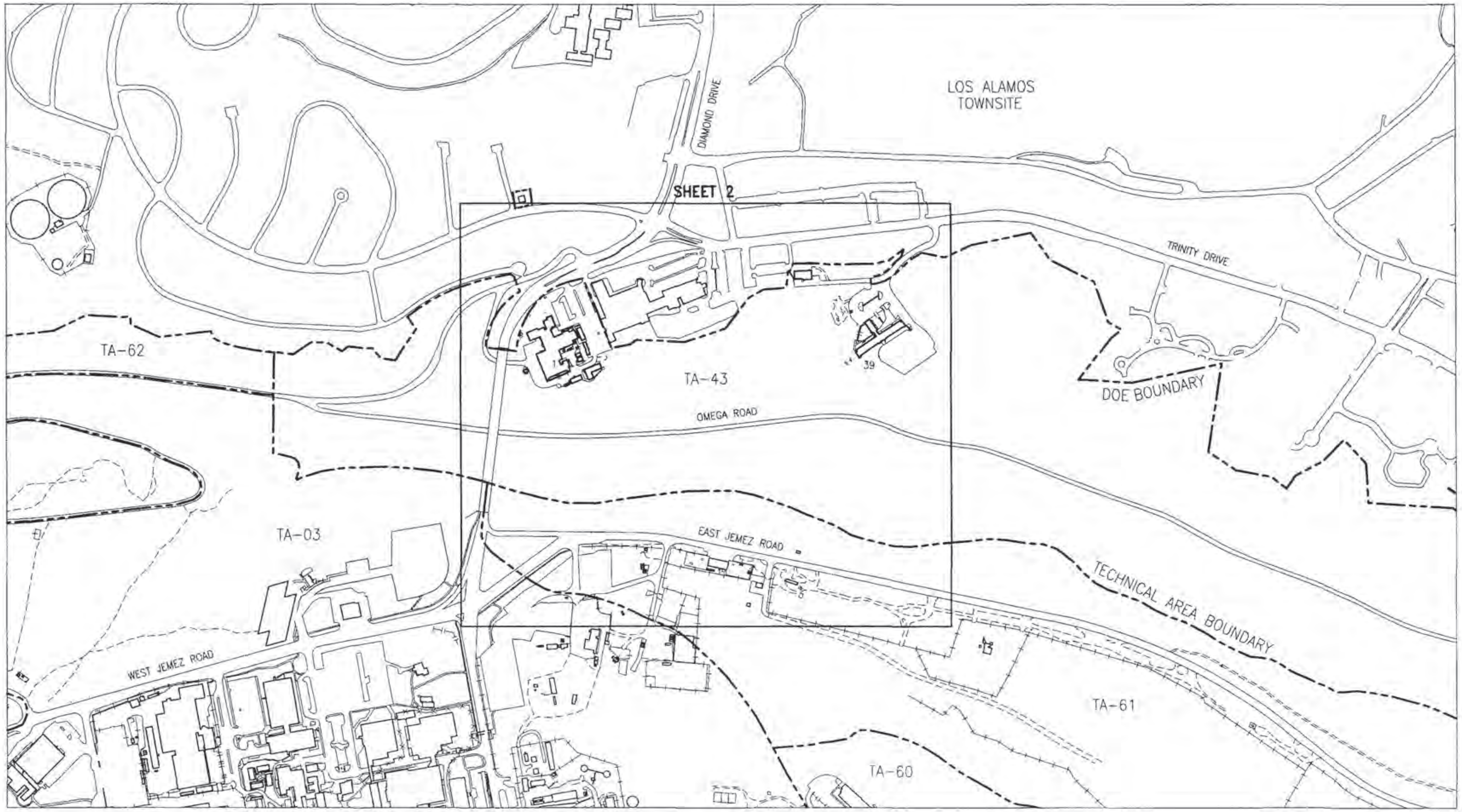
LAB JOB NO. DRAWING NO. ENG-R 5123 REV. 17

AUTOGIS



TA-43
FACILITY
MANAGEMENT
OWNERSHIP MAP
Prepared for:
THE LOS ALAMOS NATIONAL LABORATORY
LEGEND
PAVED ROAD
DIRT/GRAVEL ROAD
TECHNICAL AREA BOUNDARY
DOE BOUNDARY
LABORATORY STRUCTURE
GATE
SECURITY FENCE
INDUSTRIAL FENCE
10 FT CONTOUR INTERVAL
FACILITY MANAGEMENT UNIT •72 (LS)
FACILITY MANAGEMENT UNIT •80 (FSS)
FACILITY MANAGEMENT UNIT •80 (LAND)
FACILITY MANAGEMENT UNIT •81 (FSS)
TA-00
TA-62
TA-43
TA-03
TA-61
ONEGA ROAD
DIAMOND DRIVE
EAST JEMEZ ROAD
WEST JEMEZ ROAD
FEET
EXCELLENCE
Prepared by:
Johnson Controls Inc.
Los Alamos National Laboratory
AS-BUILT PROGRAM
Date: 10-20-95
Phone: (505)665-0559

STRUCTURE LOCATION MAPS



TA-43 KEY MAP

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FEET
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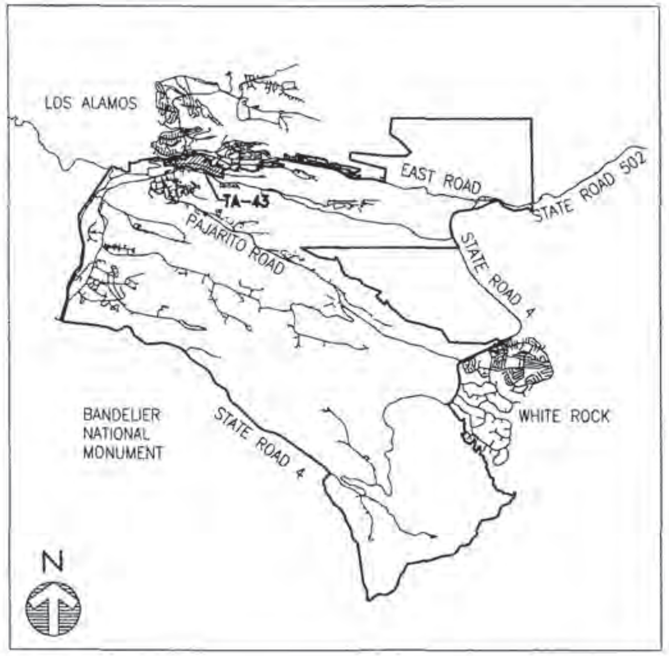


LOCATION MAP

SCALE: NONE

NO	DATE	CLASS REV	DESCRIPTION	DWN	VER	CHKD	SUB	APP
2	03-26-01		REVISED TO STATUS OF 03-26-01	HPR	SAD	CES	HMS	LAB
1	12-20-99		REVISED TO STATUS OF 12-20-99	MMM	SAD	CES	HMS	LAB

Johnson Controls
Northern New Mexico

AS-BUILT STRUCTURE LOCATION MAPS
TA-43
HEALTH RESEARCH LAB & DOE HDQRS

DRAWN: J. CATA
VERIFIED: J. CATA
CHECKED: H. SALAZAR
DATE: 02-22-95

SUBMITTED: HAROLD SALAZAR
APPROVED FOR RELEASE: LARRY BAYS

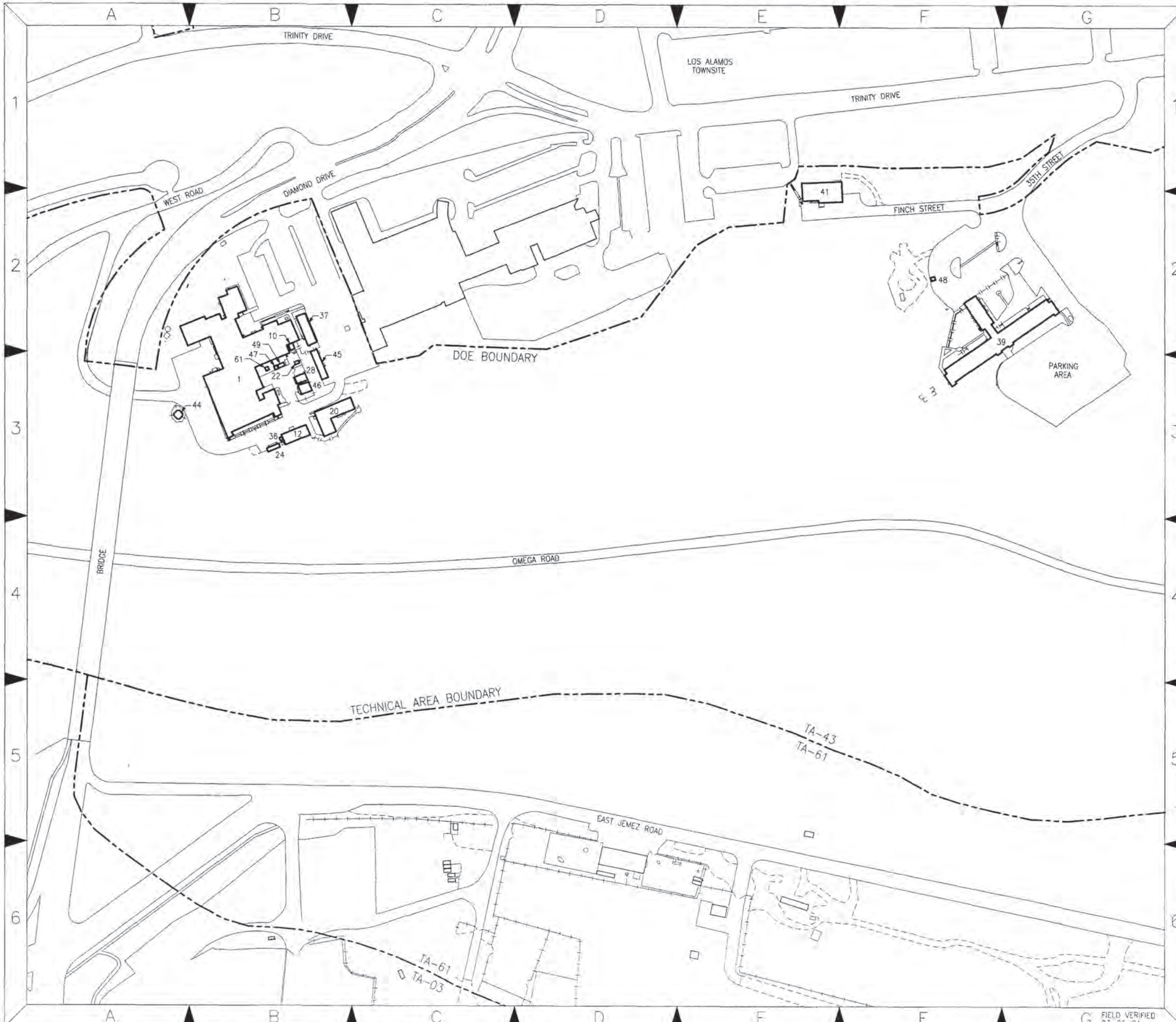
Los Alamos — Los Alamos National Laboratory, Los Alamos, New Mexico 87545

SHEET 1 OF 2

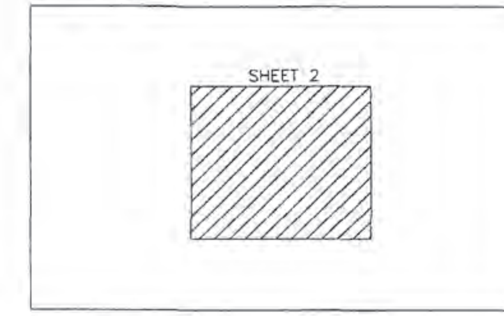
CLASSIFICATION: U | REVIEWER: HAROLD SALAZAR | DATE 5-7-01

PROJECT ID: 11952 | DRAWING NO: AB33 | REV: 2

JCI NO. 91-020



KEY MAP



STRUCTURE LOCATION INDEX

STRUCTURE TA NUMBER	STRUCTURE DESIGNATION	STRUCTURE NOMENCLATURE	LOCATOR SHEET NO.	LOCATOR MAP KEY
43-1	43-1	HEALTH RESEARCH LABORATORY	2	B-3
43-10	43-10	SEWAGE LIFT STATION	2	B-2
43-12	43-12	WAREHOUSE	2	B-3
43-20	43-20	TRANSPORTABLE OFFICE BLDG.	2	B-3
43-22	43-22	METAL SHED	2	B-3
43-24	43-24	TRAILER	2	B-3
43-28	43-28	GARAGE SHED	2	B-3
43-36	43-36	STORAGE SHED	2	B-3
43-37	43-37	TRAILER	2	B-2
43-39	43-39	DOE HEADQUARTERS	2	F-2
43-41	43-41	STORAGE BLDG.	2	E-2
43-44	43-44	COOLING TOWER	2	A-3
43-45	43-45	TRAILER	2	B-3
43-46	43-46	STORAGE BLDG.	2	B-3
43-47	43-47	SAFETY STORAGE SHED	2	B-3
43-48	43-48	SAFETY STORAGE SHED	2	F-2
43-49	43-49	SAFETY STORAGE SHED	2	B-3
43-61	43-61	SAFETY STORAGE SHED	2	B-3

SCALE: 1:1200 IN

100 0 100 200

FEET

N

NO	DATE	CLASS REV	DESCRIPTION	DWN	VER	CHKD	SUB	APP
4	03-26-01		REVISED TO STATUS OF 03-26-01	HPR	SAB	CES	HMS	LAB
3	12-20-99		REVISED TO STATUS OF 12-20-99	MMM	SAD	CES	HMS	LAB
2	05-28-97		REVISED TO STATUS OF 05-28-97	MEG	MEG	HMS	DMV	LAB
1	12-04-96		REVISED TO STATUS OF 12-04-96	CJR	CJR	HMS	DMV	LAB

Johnson Controls
Northern New Mexico

AS-BUILT STRUCTURE LOCATION MAPS

TA-43

HEALTH RESEARCH LAB & DOE HDQRS

DRAWN	M. GALLEGOS
VERIFIED	M. GALLEGOS
CHECKED	H. SALAZAR
DATE	02-22-95

SUBMITTED HAROLD SALAZAR

APPROVED FOR RELEASE LARRY BAYS

Los Alamos Los Alamos National Laboratory Los Alamos, New Mexico 87545

SHEET 2 | 2 OF 2

CLASSIFICATION U REVIEWER HAROLD SALAZAR DATE 5-7-01

PROJECT ID 11952

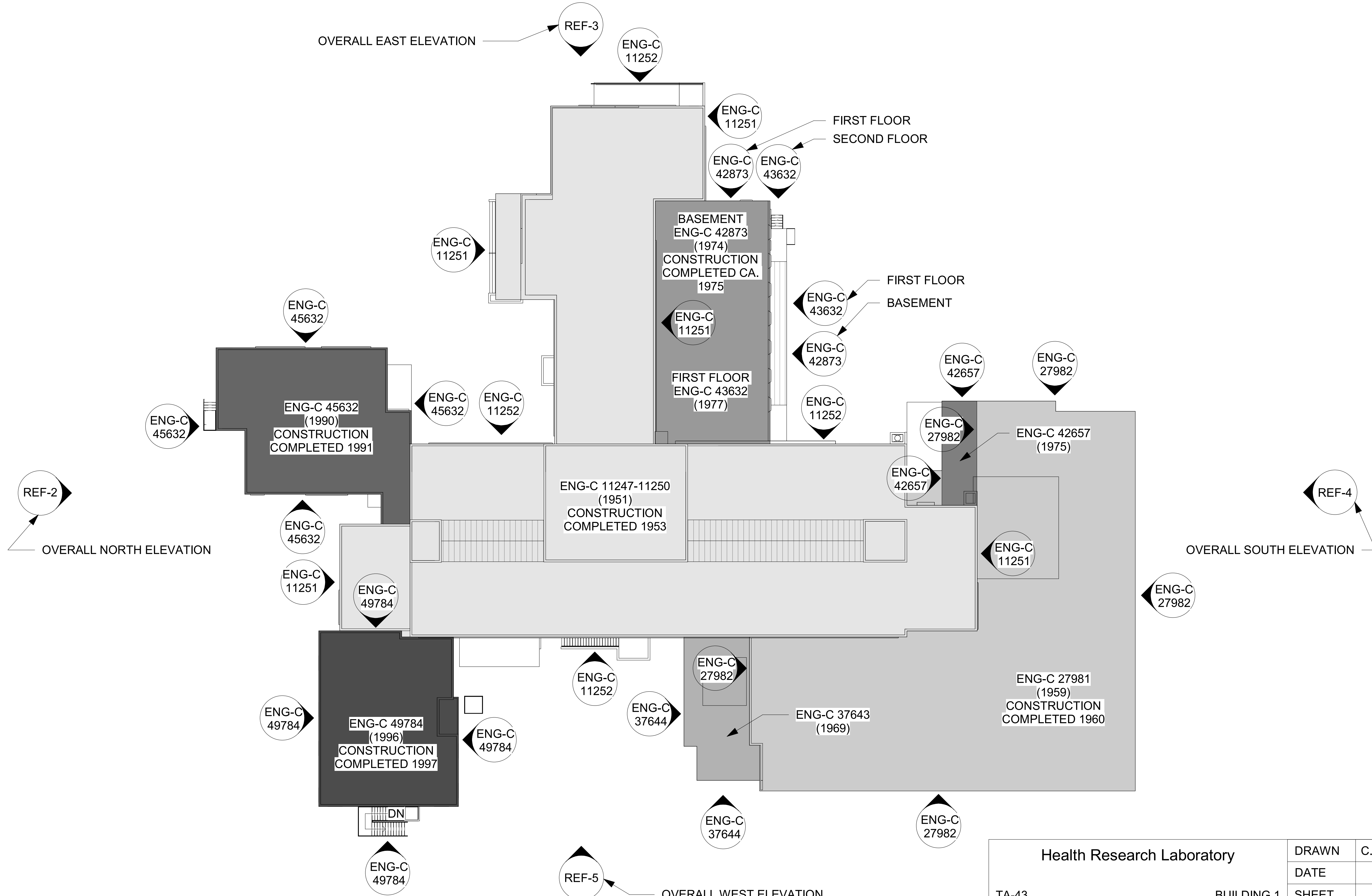
JCI NO 91-020

DRAWING NO AB33

REV 4

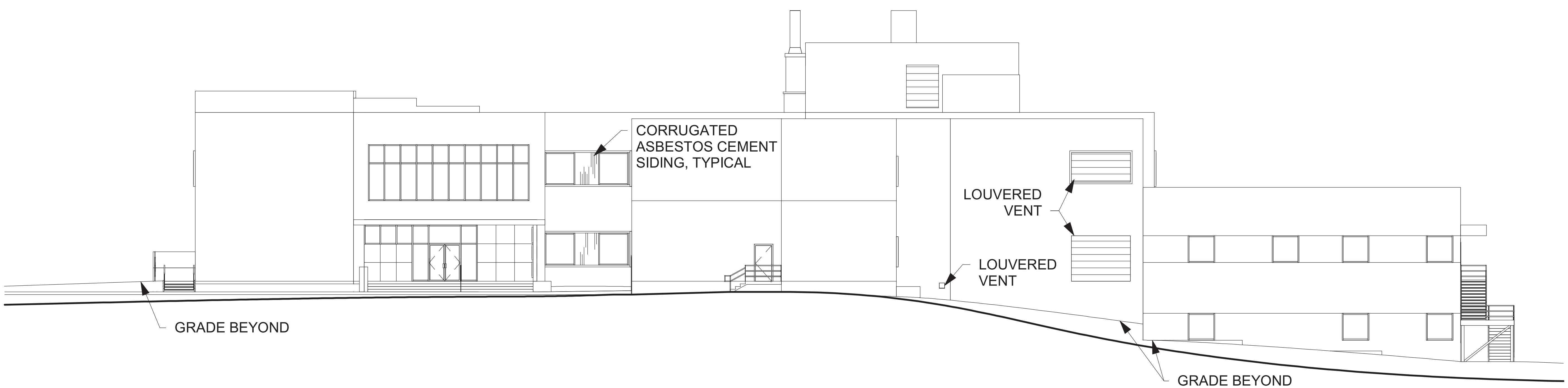
Appendix F: TA-43-0001 Drawings Key and Selected Drawings

Appendix F: TA-43-0001 Elevation Drawings Reference Key with Referenced Drawings



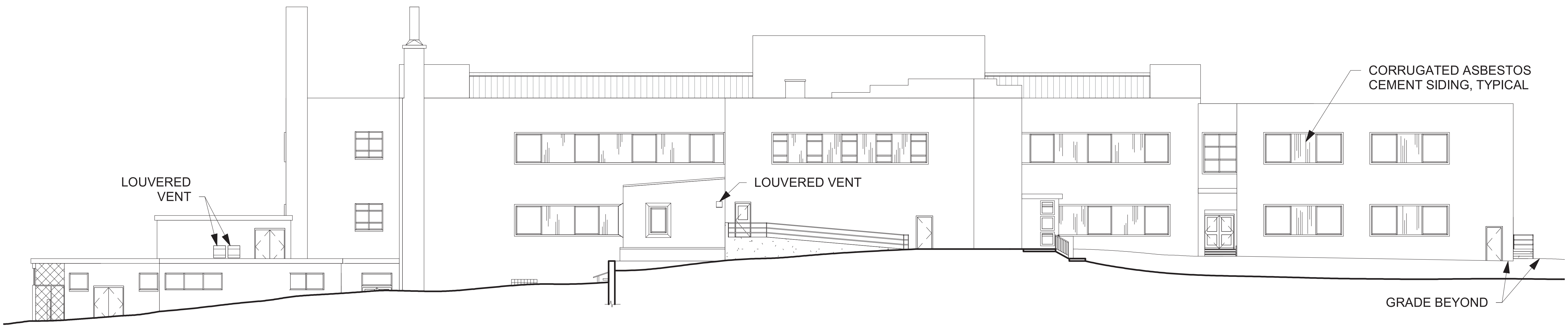
1 FLOOR PLAN AND ELEVATION DRAWINGS KEY
1" = 30'-0"

Health Research Laboratory		DRAWN	C. TOWNSEND
		DATE	03.30.22
TA-43	BUILDING 1	SHEET	REF-1
Los Alamos NATIONAL LABORATORY	PO BOX 1663 LOS ALAMOS, NM 87545	1 OF 5	
		LA-UR	-



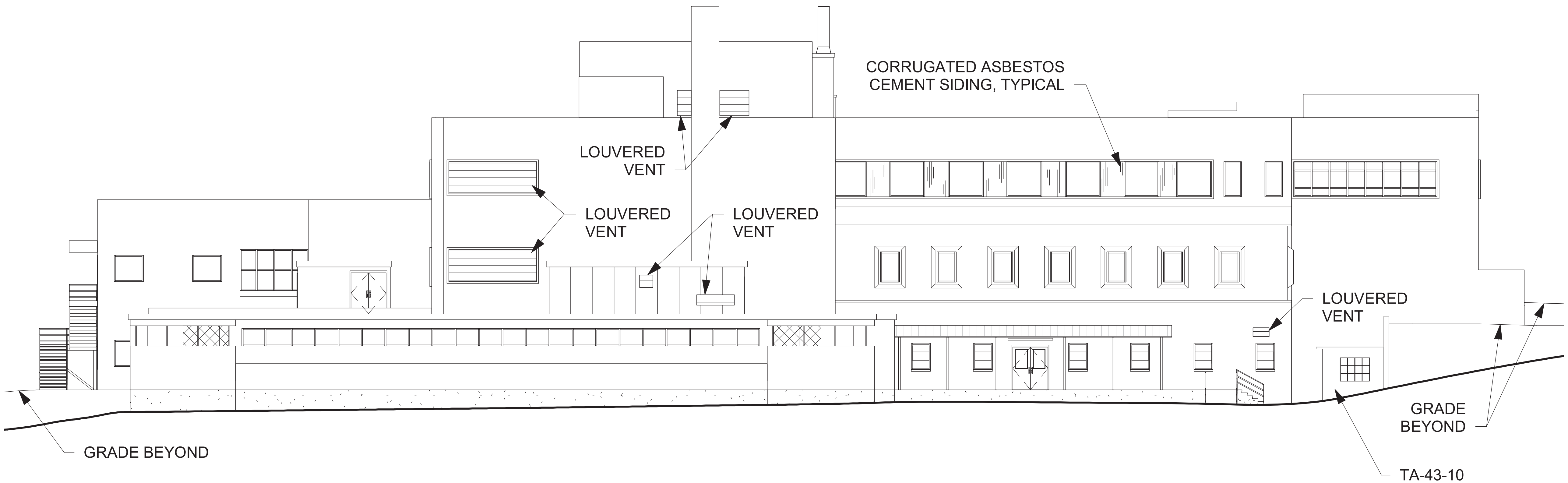
1 OVERALL NORTH ELEVATION
1" = 20'-0"

Health Research Laboratory		DRAWN	C. TOWNSEND
		DATE	03.30.22
TA-43	BUILDING 1	SHEET	REF-2
Los Alamos NATIONAL LABORATORY	PO BOX 1663 LOS ALAMOS, NM 87545	2 OF 5	
		LA-UR	-



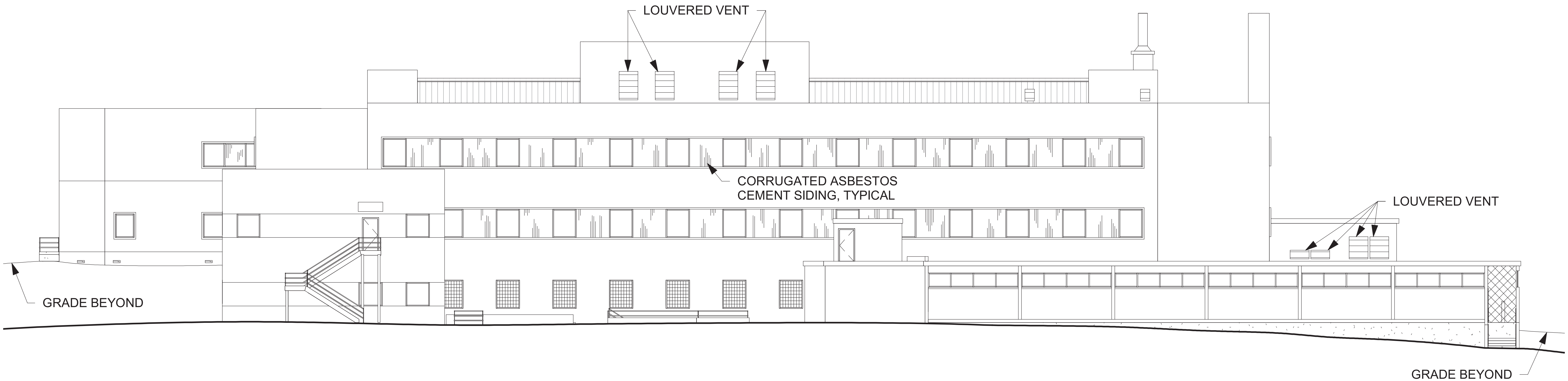
1 OVERALL EAST ELEVATION
1" = 20'-0"

Health Research Laboratory		DRAWN	C. TOWNSEND
		DATE	03.30.22
TA-43	BUILDING 1	SHEET	REF-3
Los Alamos NATIONAL LABORATORY	PO BOX 1663 LOS ALAMOS, NM 87545	3 OF 5	
		LA-UR	-



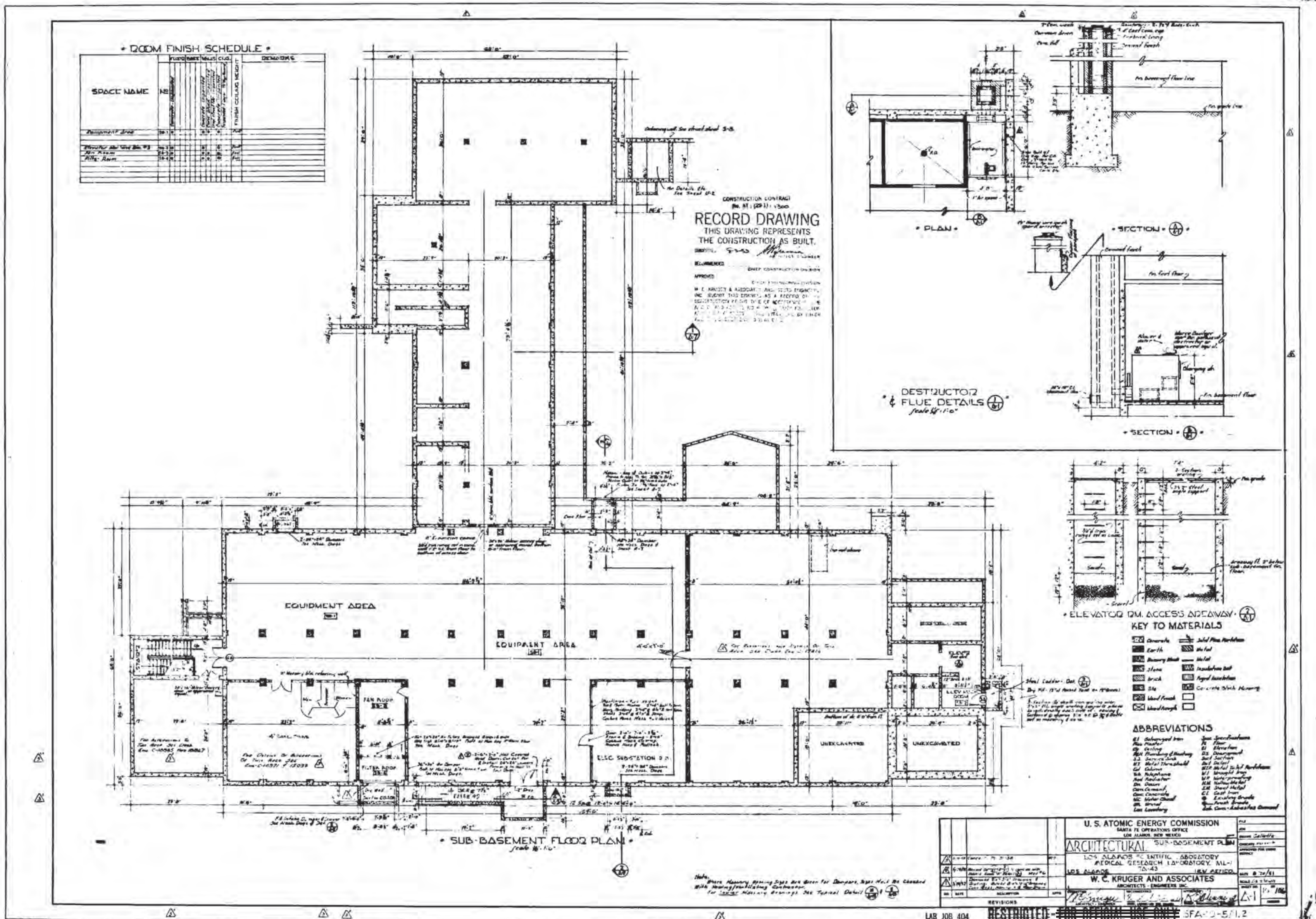
1 OVERALL SOUTH ELEVATION
1" = 20'-0"

Health Research Laboratory		DRAWN	C. TOWNSEND
		DATE	03.30.22
TA-43	BUILDING 1	SHEET	REF-4
Los Alamos NATIONAL LABORATORY	PO BOX 1663 LOS ALAMOS, NM 87545	4 OF 5	
		LA-UR	-



1 OVERALL WEST ELEVATION
1" = 20'-0"

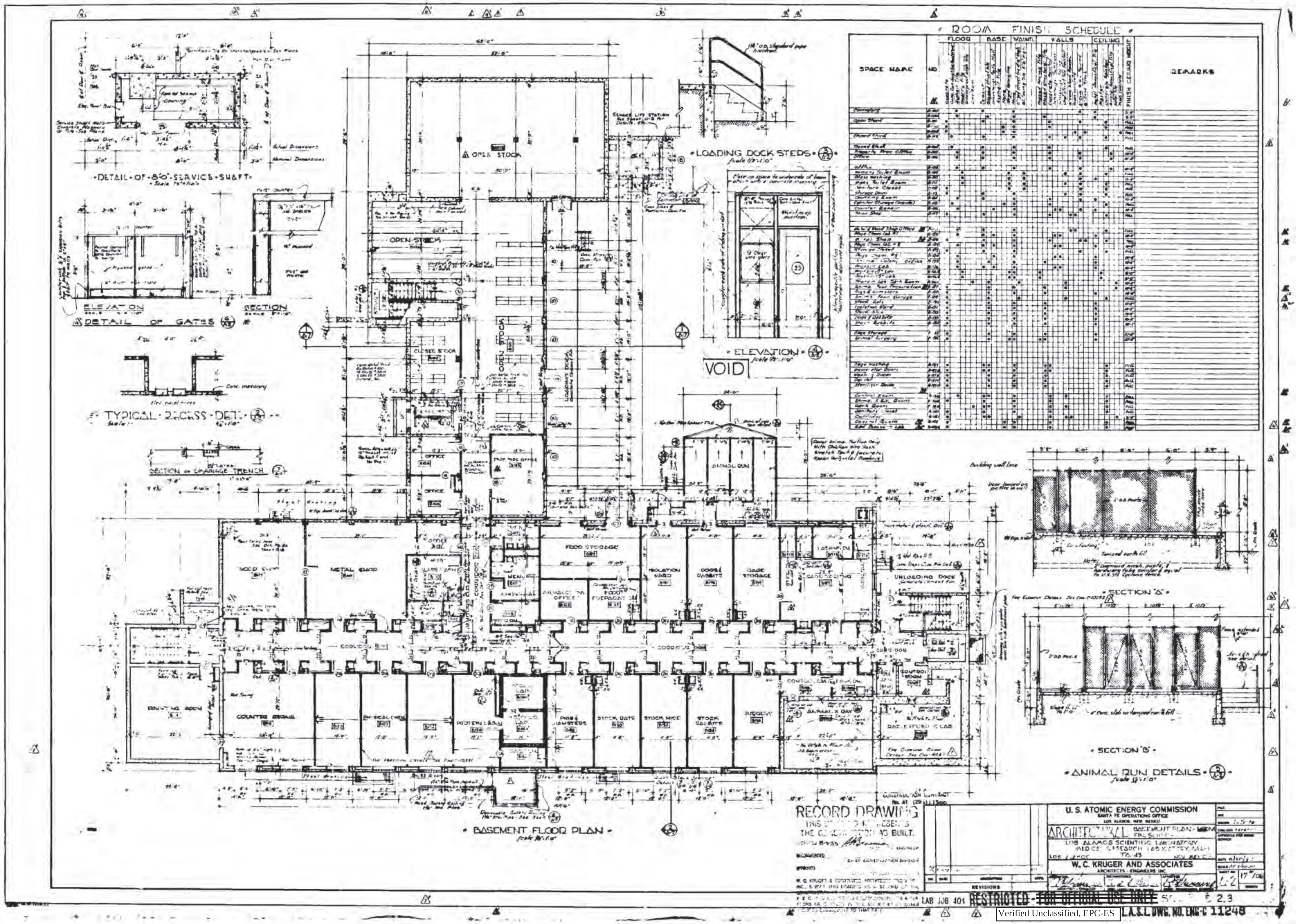
Health Research Laboratory		DRAWN	C. TOWNSEND
		DATE	03.30.22
TA-43	BUILDING 1	SHEET	REF-5
Los Alamos NATIONAL LABORATORY	PO BOX 1663 LOS ALAMOS, NM 87545	5 OF 5	
		LA-UR	-



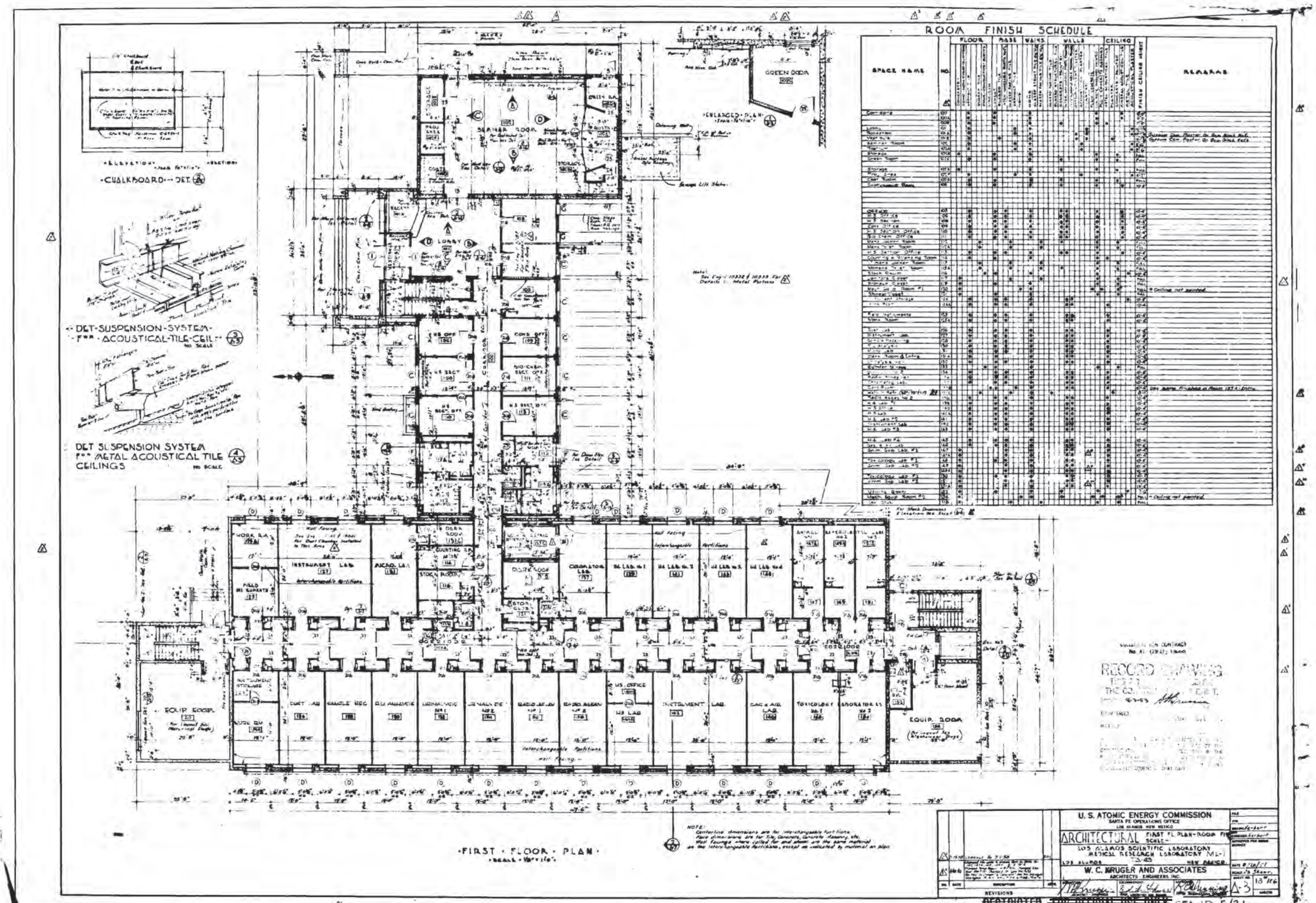
LAB JOB 404 RESTRICTED - ~~FOR OFFICIAL USE ONLY~~ SFA-3-5/1.2

Verified Unclassified, EPC-ES

L.A.S.L. DWG. NO. ENG-C 11247



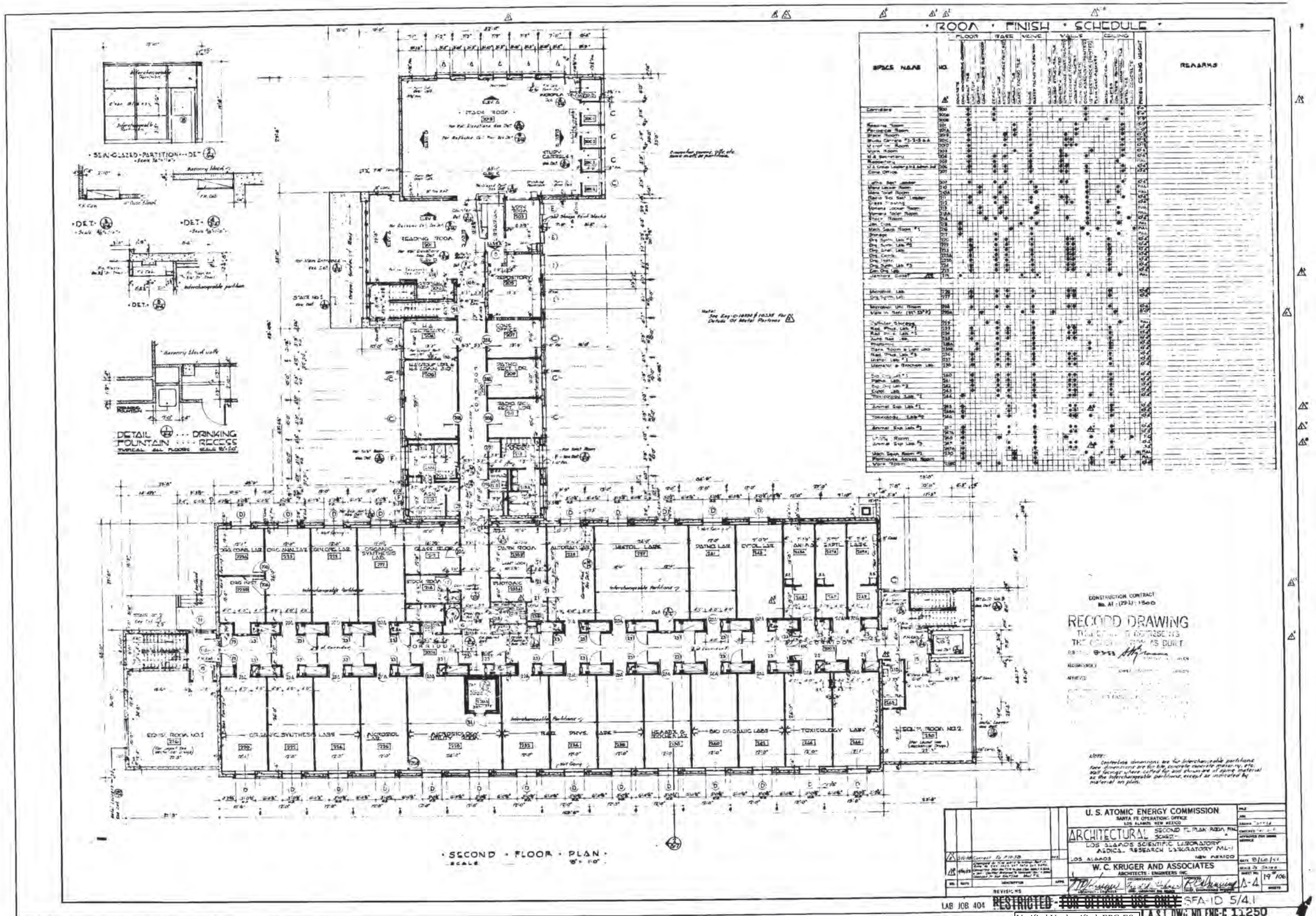
Verified Unclassified, EPC-ES



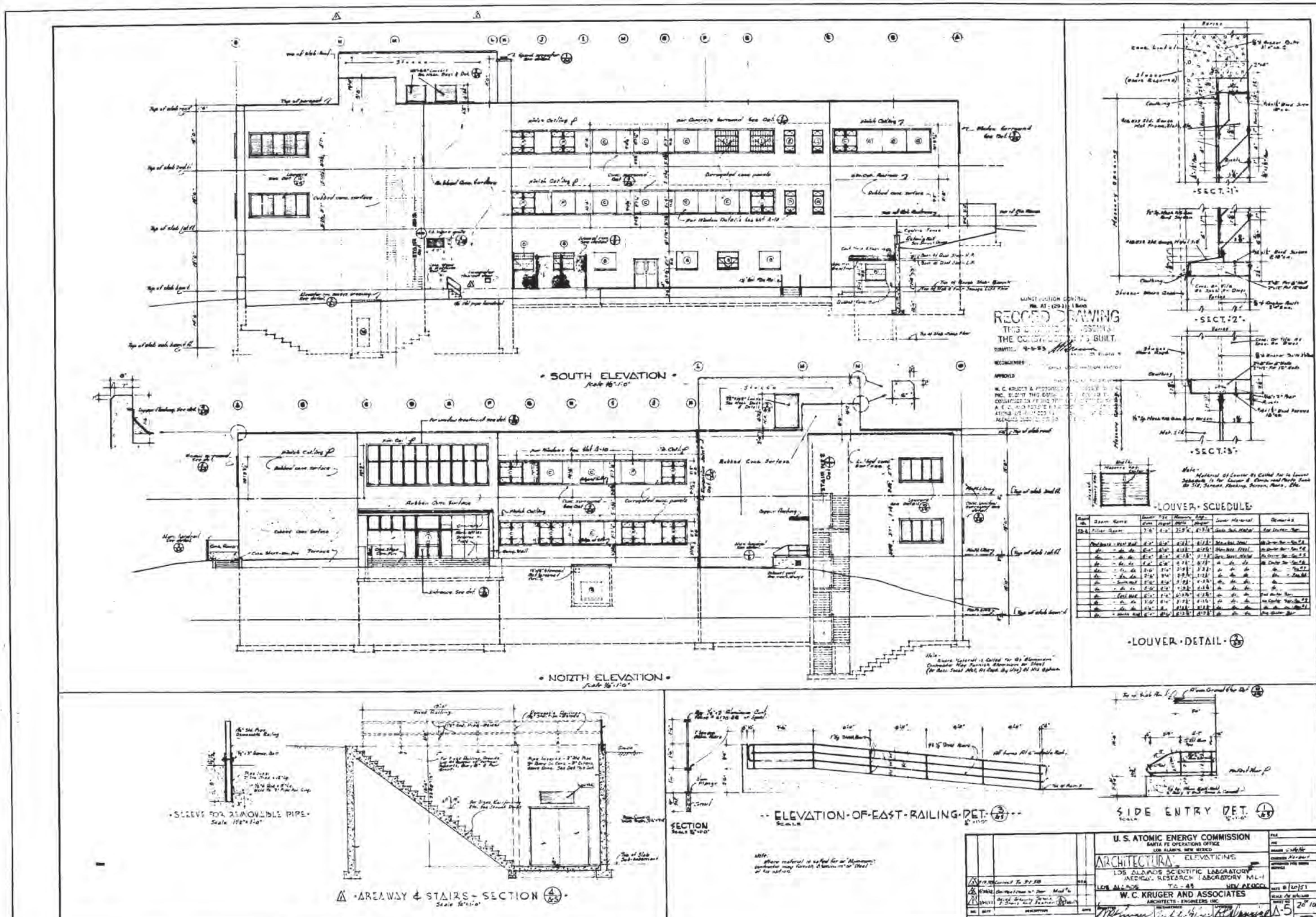
LAB JOB 404 RESTRICTED ~~FOR OFFICIAL USE ONLY~~ SFA-ID-5/3.1

Verified Unclassified, EPC-ES

L.A.S.L. DWG. NO. ENG-C 11249



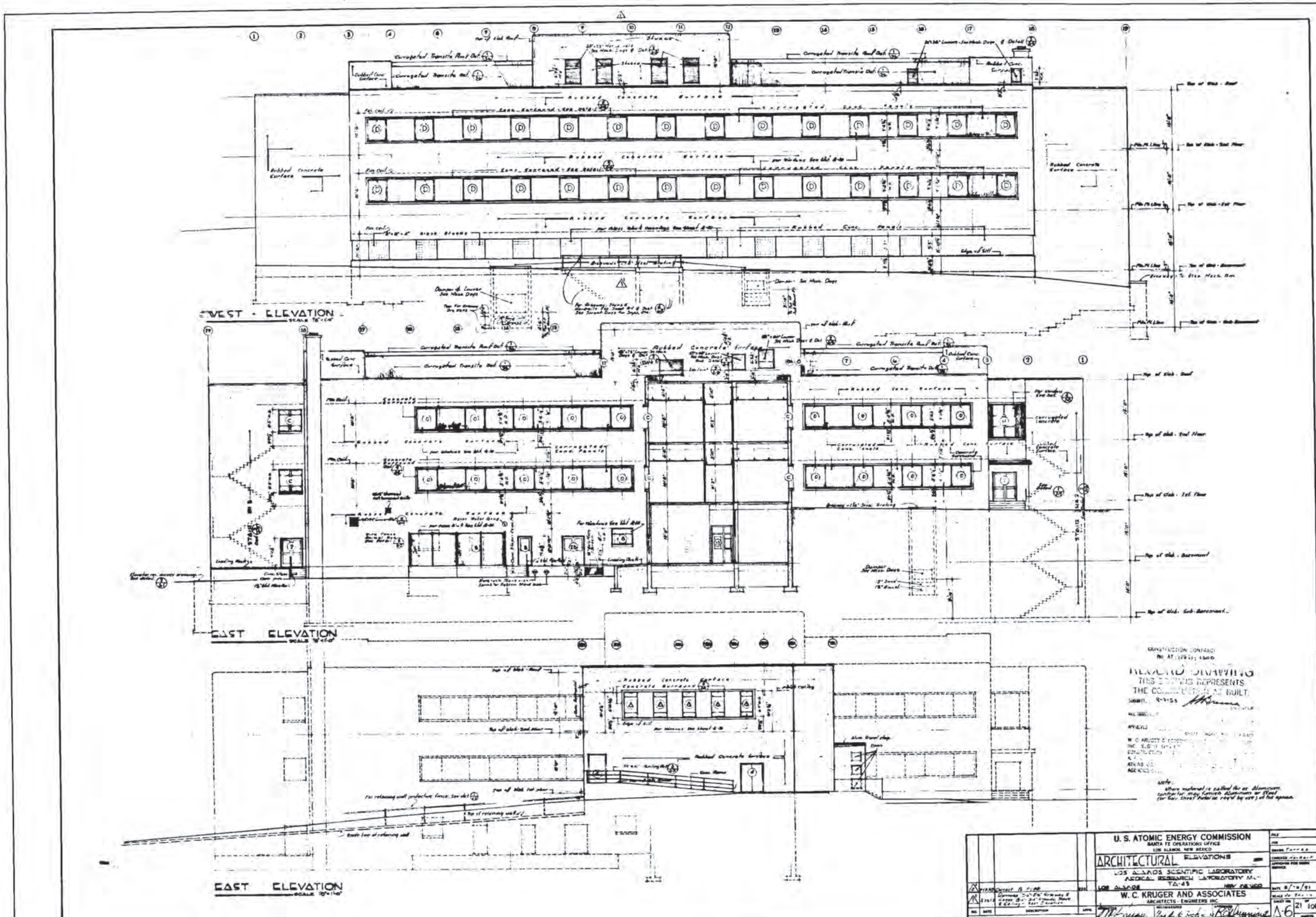
Verified Unclassified, EPC-ES



LAB JOB 404 RESTRICTED - ~~FOR OFFICIAL USE ONLY~~ SFA-ID-5/5.2

Verified Unclassified, EPC-ES

L.A.S.L. DWG. NO. ENG-C 11251



LAB JOB 404 RESTRICTED - ~~FOR OFFICIAL USE ONLY~~ SFA-ID-5,61

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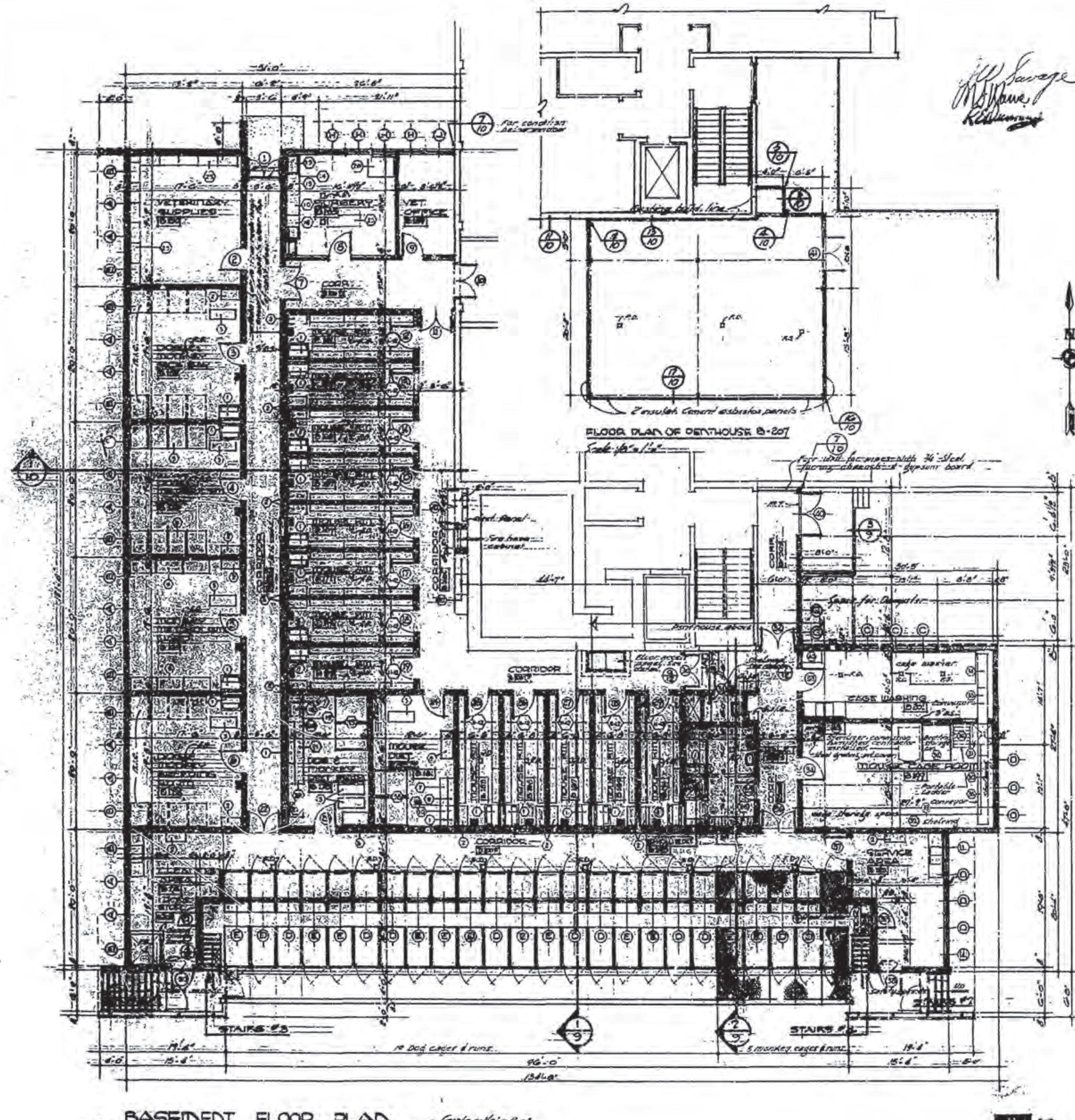
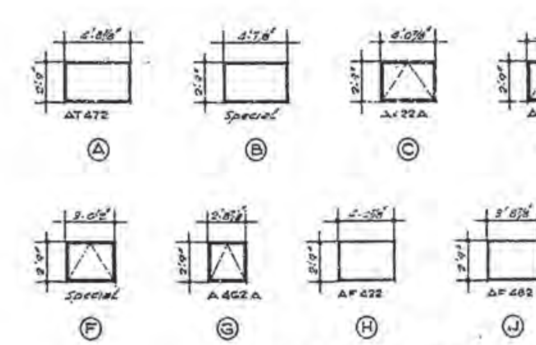


• ROOM • FINISH • SCHEDULE •

NAME OF SPACE	NO.	FLOOR: Concrete (hardened)	FLOOR: Ceramic tile - conductive	FLOOR: Vinyl asbestos tile	FLOOR: Ceramic tile	BASE: Glazed struct. units	BASE: Vinyl (topset) cove	BASE: Concrete	WAINS: Glazed struct. units	WAINS:	WAINS:	WALLS: Masonry units - painted	WALLS: Concrete - painted	WALLS: Glazed struct. units	WALLS: Cemesto panels	CEILING: Acoustical tile	CEILING: Metal deck	CEILING: Gypsum board	CEILING: Cement asbestos board	ROOM HEIGHT	REMARKS
CORRIDOR	B100B	●				●						●						●		[illegible]	
CORRIDOR	B100C	●				●						●								[illegible]	
CORRIDOR	B100D	●				●						●								[illegible]	
CORRIDOR	B100E	●				●						●						●		[illegible]	
CORRIDOR	B100F	●				●			●			●				●				[illegible]	8' high glazed struct. unit Pen-Dividers
CORRIDOR	B1004	●				●						●						●		[illegible]	
VETERINARY SUPPLIES	B150	●				●						●					●			[illegible]	
SURGERY	B155		●			●								●		●				[illegible]	
DOG & MONKEY SICK BAY	B158	●				●						●					●			[illegible]	
VETERINARY OFFICE	B159			●			●					●				●				[illegible]	
MOUSE ROOM	B161	●				●						●					●			[illegible]	
DOG METABOLISM WARD	B162	●				●						●					●			[illegible]	
MOUSE ROOM	B163	●				●						●					●			[illegible]	
MOUSE ROOM	B165	●				●						●					●			[illegible]	
MONKEY METABOLISM WARD	B166	●				●						●					●			[illegible]	
MOUSE ROOM	B167	●				●						●					●			[illegible]	
MOUSE ROOM	B169	●				●						●					●			[illegible]	
D & M BREEDING ROOM	B170	●				●						●					●			[illegible]	
MOUSE ROOM	B171	●				●						●					●			[illegible]	
MOUSE ROOM	B173	●				●						●					●			[illegible]	
CLEANING AREA	B174	●				●						●					●			[illegible]	
MOUSE ROOM	B175	●				●						●					●			[illegible]	
D & M DIET PREPARATION	B176	●				●						●					●			[illegible]	
SERVICE AREA	B180	●				●						●					●			[illegible]	
MICE DIET PREPARATION	B181	●				●						●					●			[illegible]	
MOUSE ROOM	B183	●				●						●					●			[illegible]	
MOUSE ROOM	B185	●				●						●					●			[illegible]	
MOUSE ROOM	B187	●				●						●					●			[illegible]	
MOUSE ROOM	B189	●				●						●					●			[illegible]	
MOUSE ROOM	B191	●				●						●					●			[illegible]	
TOILET	B193				●	●			●			●						●		[illegible]	[illegible] high glazed struct unit wainscot
SHOWER	B195				●	●								●					●	[illegible]	
JANITOR CLOSET	B197	●				●						●						●		[illegible]	
MOUSE CAGE ROOM	B199	●				●						●					●			[illegible]	
CAGE WASHING ROOM	B201	●				●						●					●			[illegible]	
STORAGE	B203	●				●						●									
STORAGE	B205	●				●						●									
PENTHOUSE	B207	●						●							●		●			[illegible]	
CORRIDOR	B-1003	●				●						●						●		9'-6"	



• WINDOW SCHEDULE •

CROSS REFERENCE SYMBOL

DETAIL NUMBER

SHEET NUMBER

KEY TO MATERIALS

Earth	Glazed Structural Facing Units	Masonry Units
Concrete	Gypsum Board or Plaster	Wood Rough
Acoustical Tile	Brick	Wood Finish
Metal	Terrazzo	Insulation

Verified Unclassified, EPC-ES

NOTE:
Aluminum projected windows glazed with clear glass or as specified.

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NO.	DATE	REVISIONS	BY	CK.
1		WAS SHT. 7 OF 25 NOW SHT. 8 OF 26		

U. S. ATOMIC ENERGY COMMISSION
LOS ALAMOS AREA OFFICE
LOS ALAMOS, NEW MEXICO

ARCHITECTURAL – BASEMENT FLOOR PLAN – SCHEDULES

ADDITIONAL ANIMAL QUARTERS, TA-43

LOS ALAMOS NEW MEXICO

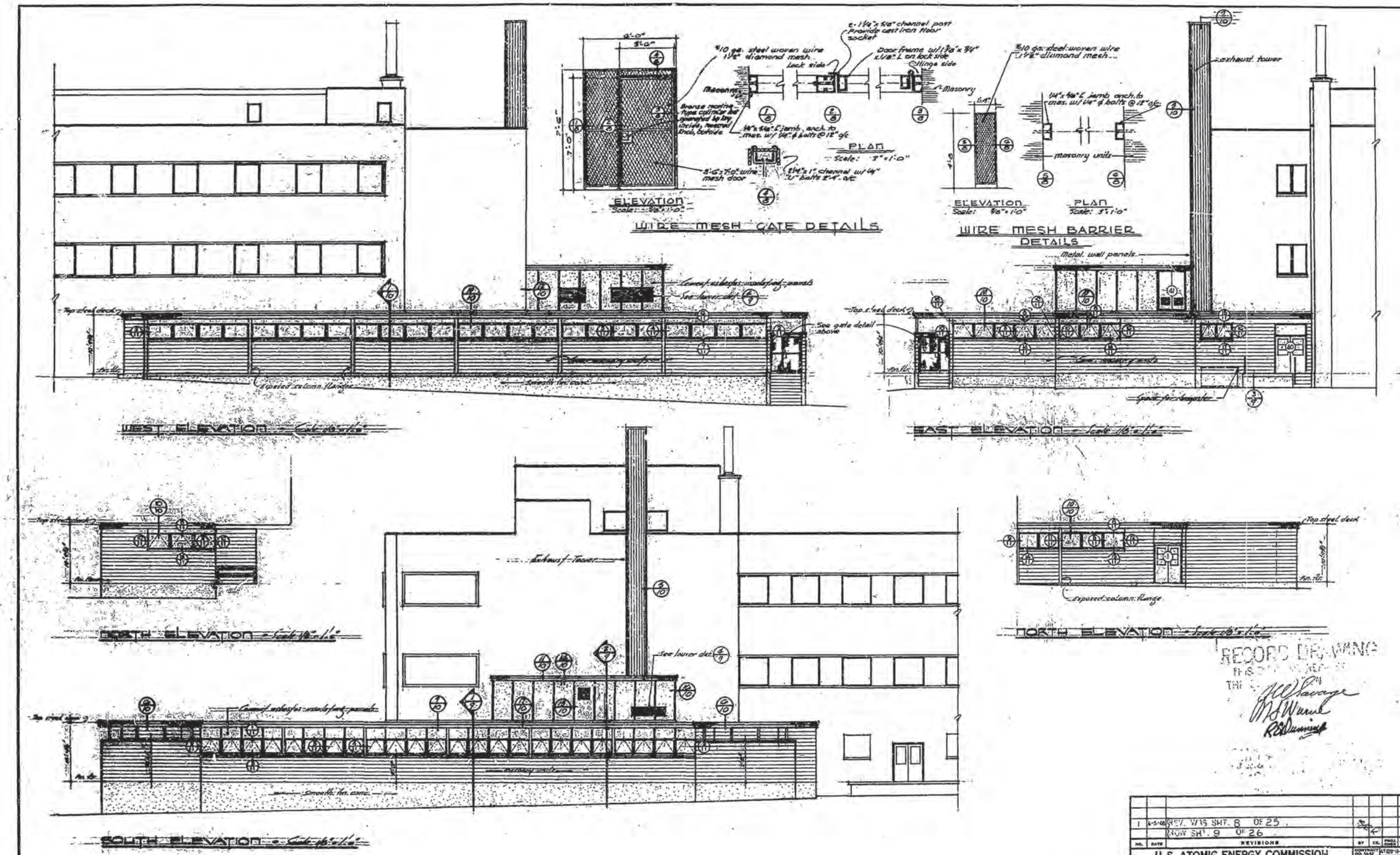
W. C. KRUGER AND ASSOCIATES
ARCHITECTS – ENGINEERS INC.
SANTA FE, NEW MEXICO

DRAWING NO. LA-DK-1/7 SHEET 8 OF 26

SCALE AS SHOWN

LAB. JOB NO. 2001

L.A.S.L. DWG. NO. ENG-C27981



No.	Date	Revisions	By	Ck.
1	6-5-46	REV. WAS SHT. 8 OF 25. NOW SHT. 9 OF 26.		

U. S. ATOMIC ENERGY COMMISSION
LOS ALAMOS AREA OFFICE
LOS ALAMOS, NEW MEXICO

ARCHITECTURAL - ELEVATIONS

ADDITIONAL ANIMAL QUARTERS TA-43
LOS ALAMOS NEW MEXICO

Contract No. W-D: AT(29-1)-1575
A.E.C. Acct. No.: 0-300-59-14
Drawn: H.L.
Checked: L.F.
A-E Approved
Scale: AS SHOWN
Date: MARCH 20, 1950

Submitted / Recommended / Approved

W. C. KRUGER AND ASSOCIATES
ARCHITECTS - ENGINEERS INC.
SANTA FE, NEW MEXICO

Drawing No.: LA-DK-1/8
Sheet 9 of 26

Verified Unclassified, EPC-ES

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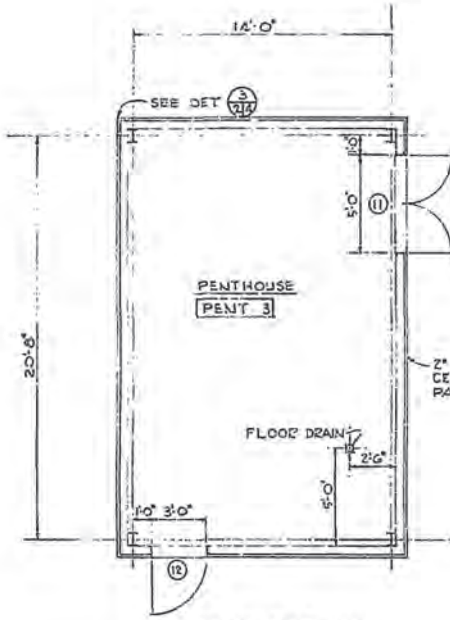
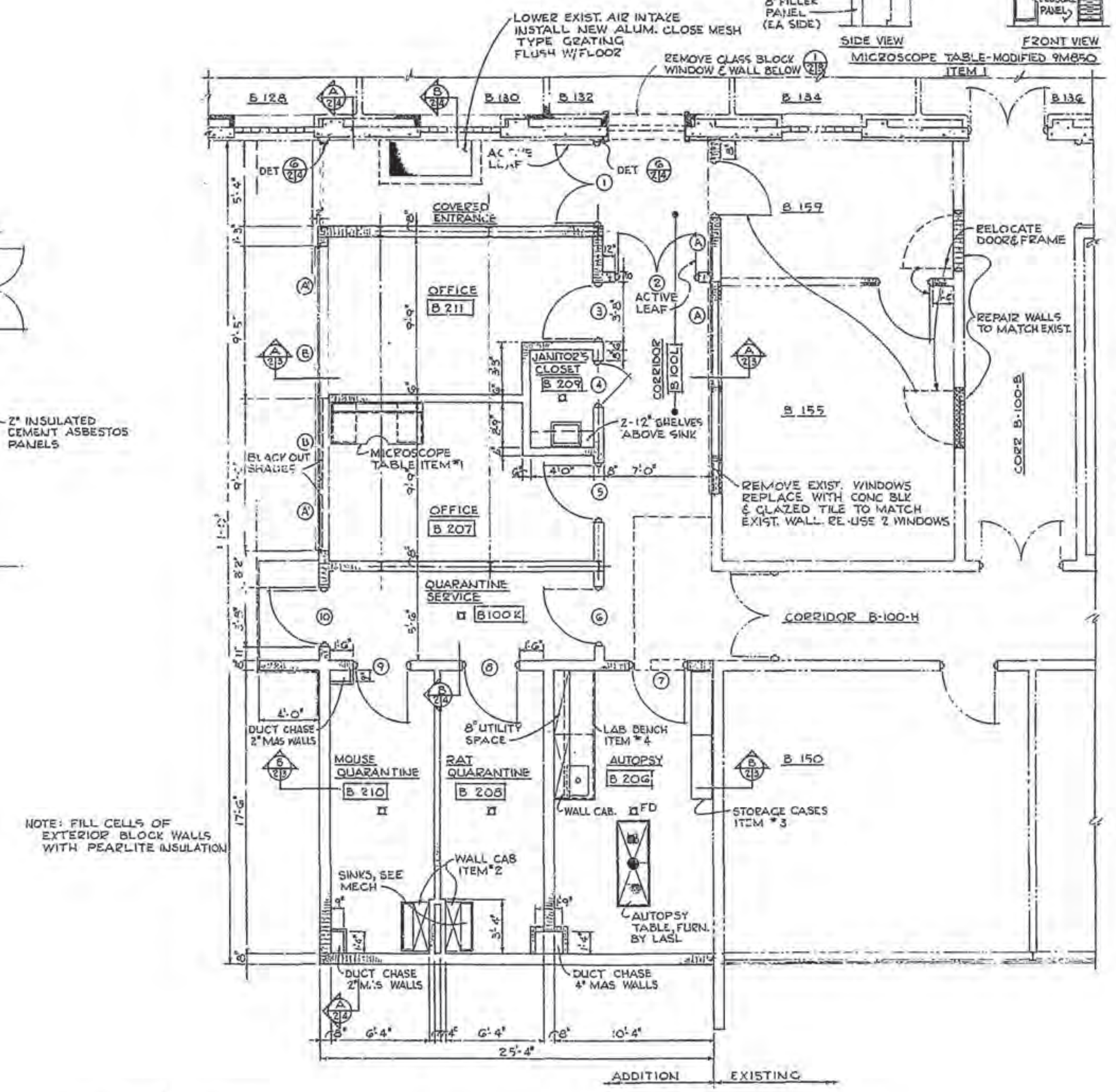
LAB. JOB NO. 2001

L.A.S.L. DWG. NO. ENG-C 27982



PENTHOUSE PLAN
Scale: 1/4"=1'-0"



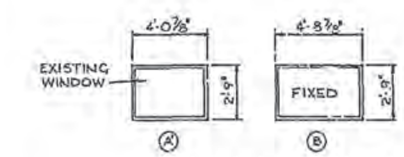
PARTIAL BASEMENT FLOOR PLAN HRL BUILDING
Scale: 1/4"=1'-0"

NUMBERS ARE FROM 'KEN METAL' METAL LABORATORY EQUIPMENT CATALOG NO. 67 M BY KEWAUNEE MANUFACTURING CO.

EQUIPMENT ELEVATIONS
Scale: 1/4"=1'-0"

ROOM FINISH SCHEDULE

NAME OF SPACE	NUMBER	FLOOR: CONC W/HARDENER	FLOOR: ASPHALT TILE	WALLS: MASONRY UNITS PAINTED	WALLS: INSULATED CEMENT ASBESTOS PANELS	CEILING: METAL DECK	CEILING: ACOUSTICAL TILE	ROOM HEIGHT	REMARKS
AUTOPSY	B 206		●	●			●	9'-3½"	
OFFICE	B 207		●	●			●	9'-3½"	
RAT QUARANTINE	B 208	●		●		●		10'-3¾"	
JANITOR'S CLOSET	B 209	●		●			●	8'-0"	
MOUSE QUARANTINE	B 210	●		●		●		10'-3¾"	
OFFICE	B 211		●	●			●	9'-3½"	
QUARANTINE SERVICE	B 100K		●	●			●	8'-0"	
CORRIDOR	B 100L		●	●			●	8'-0"	
COVERED ENTRANCE	—	●		●		●		10'-3¾"	
PENTHOUSE	PENT 3	●			●	●		9'-5"	



NOTE: WINDOWS TO BE ALUM. PROJECTED TYPE GLAZED W/ 3/16 DSB GLASS

WINDOW SCHEDULE

NO.	DATE	REVISIONS	BY	CHKD	GRP	D.O.	GRP. LDR.	ENGR. D.O.
A	9-3-69	NO CHANGE THIS SHEET	RwR	RwR	WE			

THIS JOB MUST BE INSPECTED AND ANY CHANGES APPROVED BY WILDE ENG-4 PHONE 7-4265

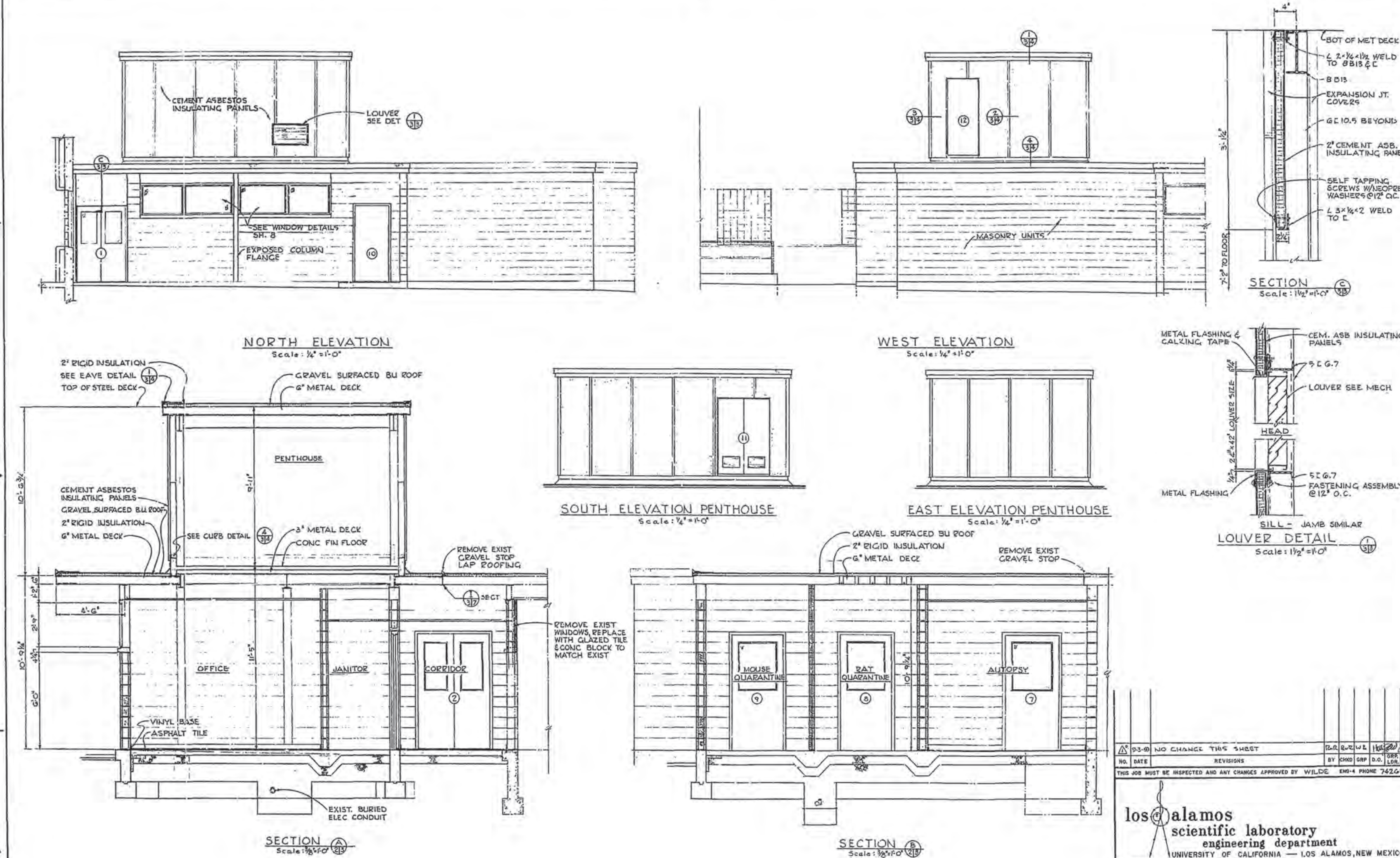
los alamos scientific laboratory
engineering department
UNIVERSITY OF CALIFORNIA — LOS ALAMOS, NEW MEXICO

AUTHORIZED FOR
SECURITY N A
SAFETY H-3
HEALTH H-1
FIRE PROT.
DIVISION H-DO
GROUP H-4
H-5
ENG.-6
SCALE AS NOTED

FACILITY IMPROVEMENTS
FLOOR PLANS & DETAILS
BUILDING HRL-1 TA-43

SUBMITTED JFZ PROJ. ENGR.
APPROVED ENGR GROUP LEADER
APPROVED ENGR. DEPT. OFFICE
CHECKED JFZ
DESIGNED LUPARDUS
DRAWN LUPARDUS
CA
BA
DATE 7-28-69
A-2
SHEET 2 OF 19
LAB JOB NUMBER 4054-43
DRAWING NO. ENG-C 37643

PHASE 'C'



NO.	DATE	REVISIONS	BY	CHKD	GRP	D.O.	GRP. LDR.	ENGR. D.O.
△	9-3-69	NO CHANGE THIS SHEET	R.R.	R.R.	W.L.			

THIS JOB MUST BE INSPECTED AND ANY CHANGES APPROVED BY WILDE ENG-4 PHONE 74265

los alamos scientific laboratory
engineering department
UNIVERSITY OF CALIFORNIA — LOS ALAMOS, NEW MEXICO

AUTHORIZED FOR
SECURITY N A
SAFETY H-3 a Hack
HEALTH H-1 EaA
FIRE PROT. a Hack
DIVISION H-DO WL
GROUP H-4
H-9 R.nnn
ENG.-5 L.Sce
SCALE AS NOTED

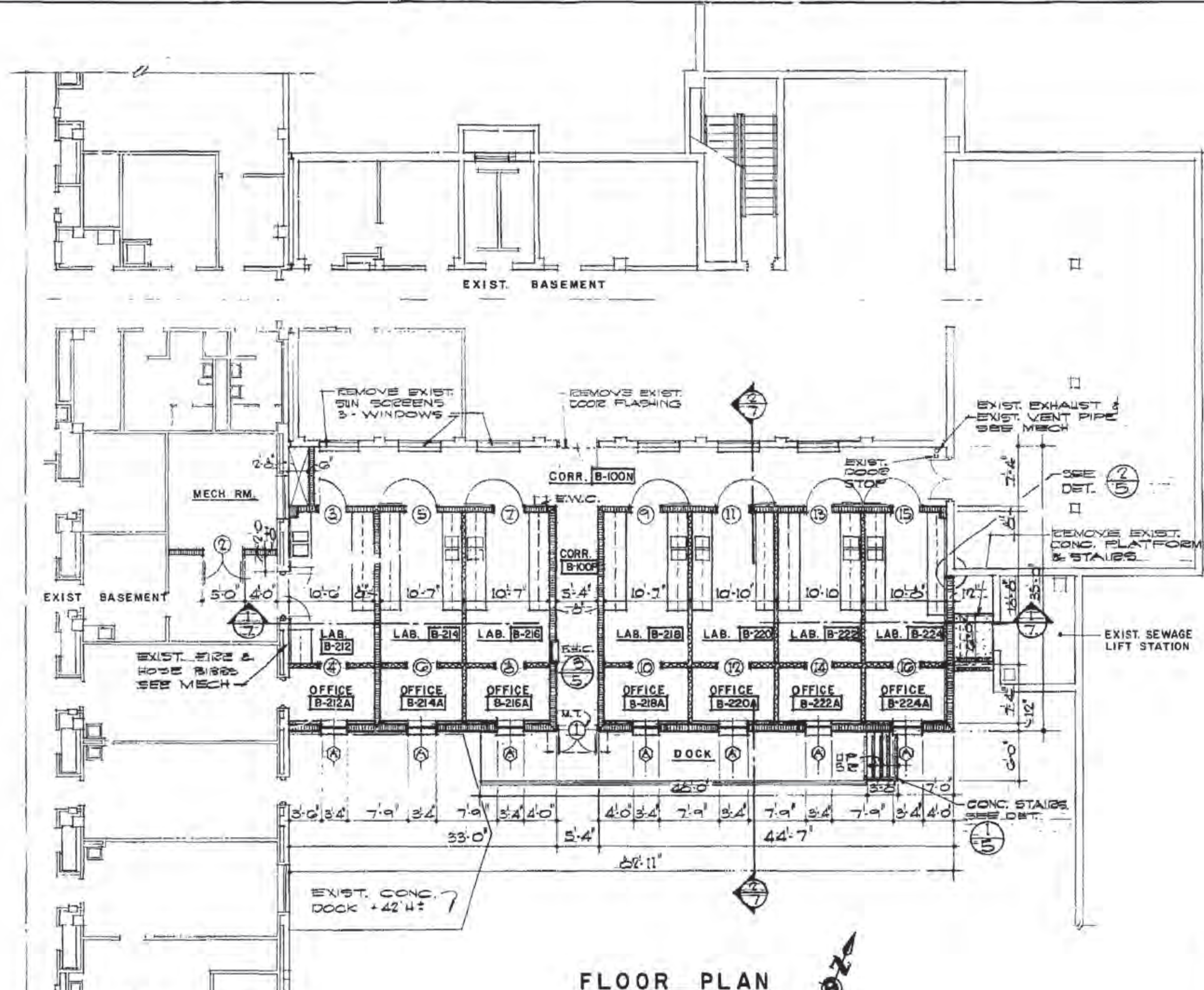
FACILITY IMPROVEMENTS

ELEVATIONS & SECTIONS

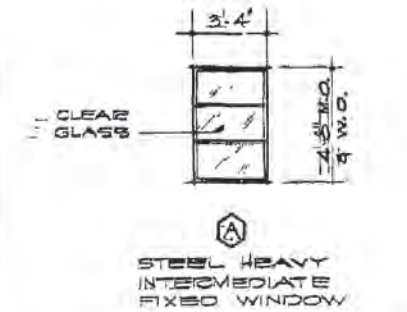
BUILDING HRL-1 TA-43

SUBMITTED JFZ PROJ. ENGR.
APPROVED ENGR. GROUP LEADER
APPROVED ENGR. DEPT. OFFICE
CHECKED JFZ
DESIGNED LUPARDUS
DRAWN LUPARDUS
CA BA
DATE 7-28-69 SHEET A-3 3 OF 19
LAB JOB NUMBER 4054-43
DRAWING NO. ENG-C 37644

PHASE 'C'



FLOOR PLAN
SCALE 1/8" = 1'-0"



WINDOW SCHEDULE
SCALE 1/4" = 1'-0"

LEGEND

EXISTING WALLS

NEW WALLS - CONC. MAS. UNITS

NEW WALLS - MET. STUDS @ 16" O.C. NON BEARING

ROOM FINISH SCHEDULE

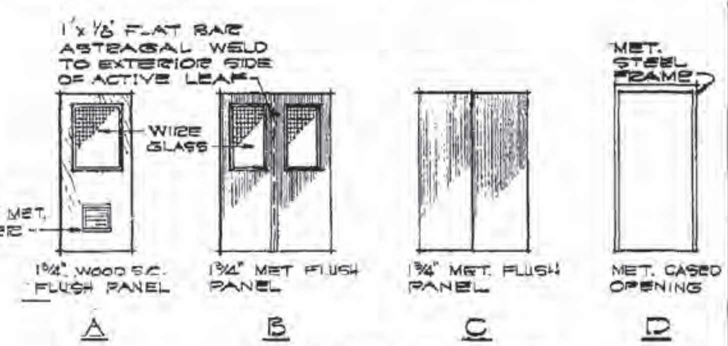
ROOM NUMBERS	SPACES	FLR. VINYL ASB. TILE	FLR. EXIST. CONC.	BASE VINYL	BASE G.W.B.	WALLS CONC. MAS. UNITS	WALLS	WALLS	WAINSCOT HIPAC	WAINSCOT	WAINSCOT HT.	CEILING ACOUST. TILE	CEILING EXIST.	CEILING	HT.	REMARKS
B-100N	CORR.	O		O		O			O		4'-6"	O			9'-0"	
B-212	LAB.	O		O		O	O					O				
B-212A	OFFICE	O		O		O	O					O				
B-214	LAB.	O		O		O	O					O				
B-214A	OFFICE	O		O		O	O					O				
B-216	LAB.	O		O		O	O					O				
B-216A	OFFICE	O		O		O	O					O				
B-100P	CORR.	O		O		O			O		4'-6"	O				
B-218	LAB.	O		O		O	O					O				
B-218A	OFFICE	O		O		O	O					O				
B-220	LAB.	O		O		O	O					O				
B-220A	OFFICE	O		O		O	O					O				
B-222	LAB.	O		O		O	O					O				
B-222A	OFFICE	O		O		O	O					O				
B-224	LAB.	O		O		O	O					O				
B-224A	OFFICE	O		O		O	O					O			9'-0"	
—	MECH.		O			O							O			

DOOR SCHEDULE

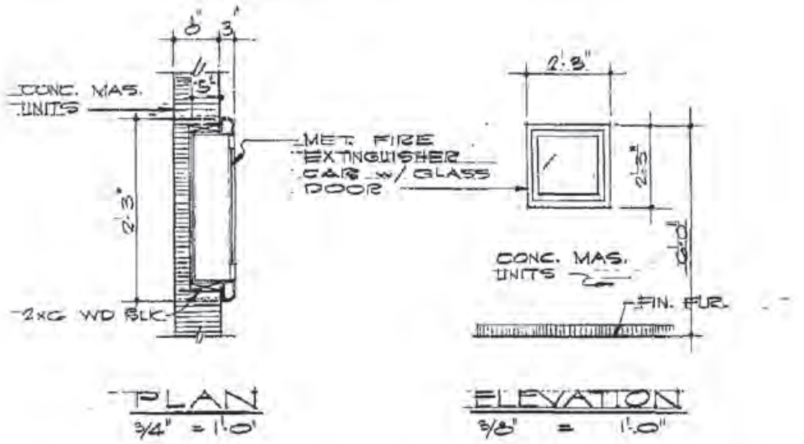
NO	TYPE	THRESHOLD	H.W SET	SIZE	DETS	SIGN	REMARKS
1	B	METAL	HW-1	2-2'-0"x7'-0"x1¾	A-A		
2	C	—	HW-2	2-2'-0"x7'-0"x1¾	B-B		FIRE DOOR 1-HR
3	A	—	HW-3	3'-4"x7'-0"x1¾	B-B		
4	D		—	3'-4"x7'-0"	C-C		
5	A	—	HW-3	3'-4"x7'-0"x1¾	B-B		
6	D		—	3'-4"x7'-0"	C-C		
7	A	—	HW-3	3'-4"x7'-0"x1¾	B-B		
8	D		—	3'-4"x7'-0"	C-C		
9	A	—	HW-3	3'-4"x7'-0"x1¾	B-B		
10	D		—	3'-4"x7'-0"	C-C		
11	A	—	HW-3	3'-4"x7'-0"x1¾	B-B		
12	D		—	3'-4"x7'-0"	C-C		
13	A	—	HW-3	3'-4"x7'-0"x1¾	B-B		
14	D		—	3'-4"x7'-0"	C-C		
15	A	—	HW-3	3'-4"x7'-0"x1¾	B-B		
16	D		—	3'-4"x7'-0"	C-C		

AS BUILT
DRAWING
REGISTER AIA
By RWL Date 5/14/75

AS CONSTRUCTED DRAWING
CONSTRUCTION CONTRACT NO AT(29-1) 2260
SUBMITTED
RECOMMENDED L. A. Finley ARCHITECT-ENGINEER
APPROVED Bryan K. Hollager



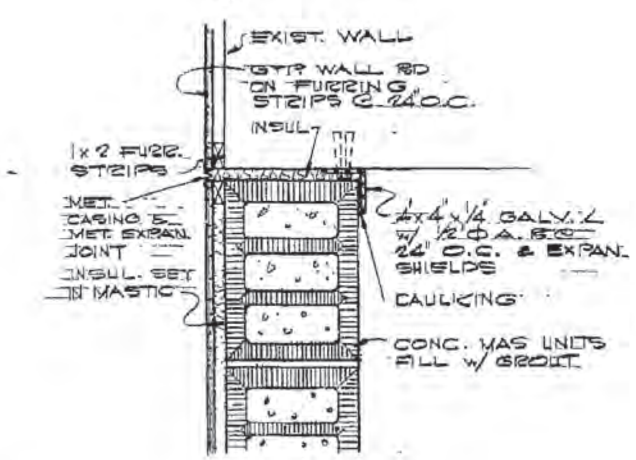
DOOR TYPES



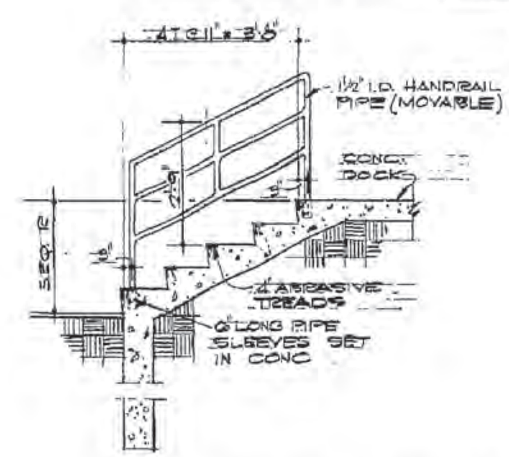
PLAN
3/4" = 1'-0"

ELEVATION
3/8" = 1'-0"

FIRE EXTINGUISHER CABINET DETAIL 3/5



DETAIL 2/5
1½" = 1'-0"



HANDRAIL DETAIL 1/5
SCALE 1/2" = 1'-0"

NO	DATE	REVISIONS	BY	CK	PROJ ENGR	A E C APP

U. S. ATOMIC ENERGY COMMISSION
LOS ALAMOS AREA OFFICE
LOS ALAMOS NEW MEXICO

ARCHITECTURAL - FLOOR PLAN

LAB - OFFICE ADDITION HRL-1 TA-43
U S ATOMIC ENERGY COMMISSION
LOS ALAMOS, NEW MEXICO

CONTRACT NO (A.E.)
A E C ACCT NO
DRAWN J.G.
CHECKED P.R.
A.-E. APPROVED
DESIGN
PROJ ENGR
CHIEF ENGR
SCALE
DATE

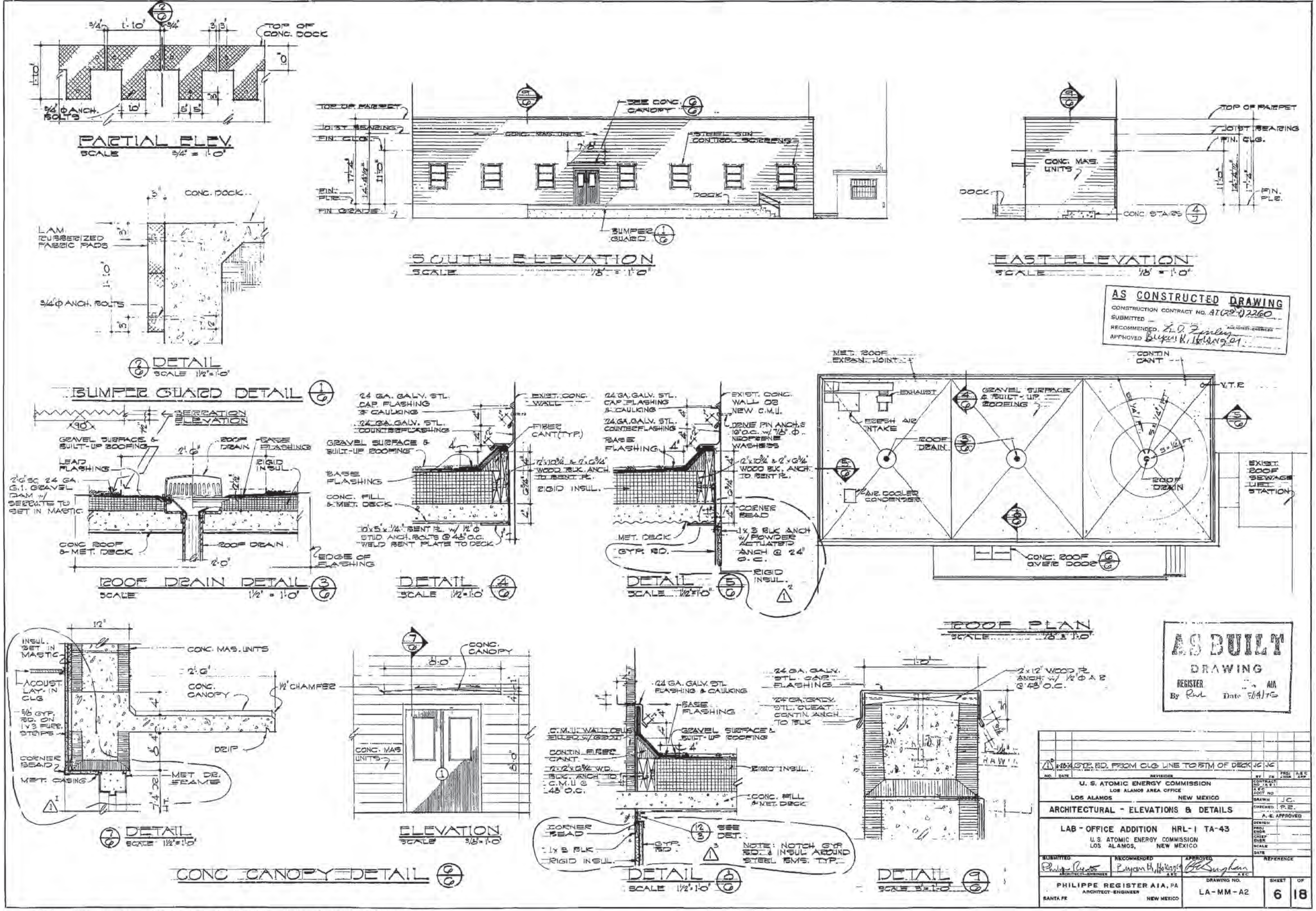
SUBMITTED Philippe Register ARCHITECT-ENGINEER
RECOMMENDED Bryan K. Hollager A.E.C.
APPROVED C. E. Branigan A.E.C.
REFERENCE

PHILIPPE REGISTER AIA, PA
ARCHITECT-ENGINEER
SANTA FE NEW MEXICO

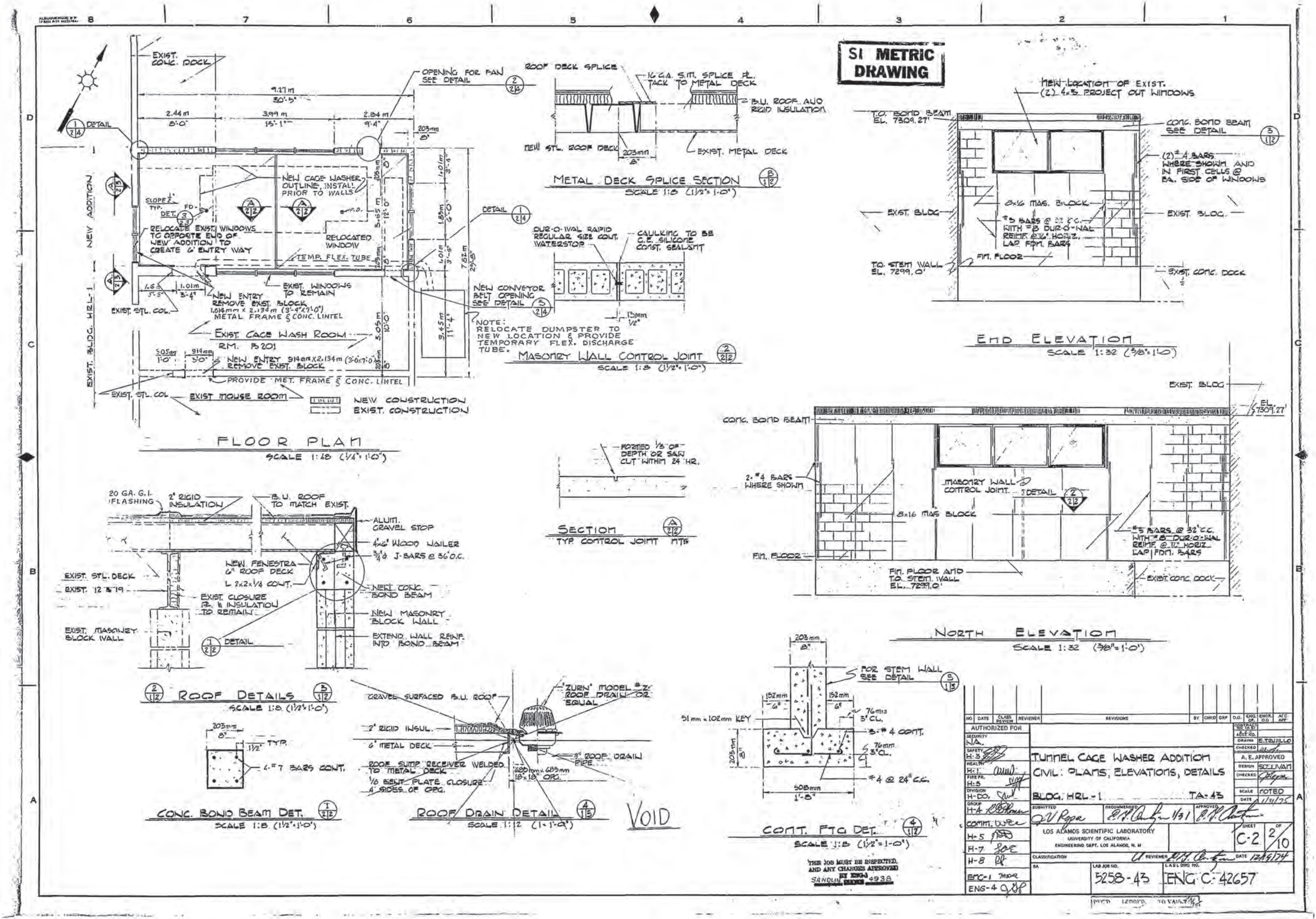
DRAWING NO. LA-MM-A1

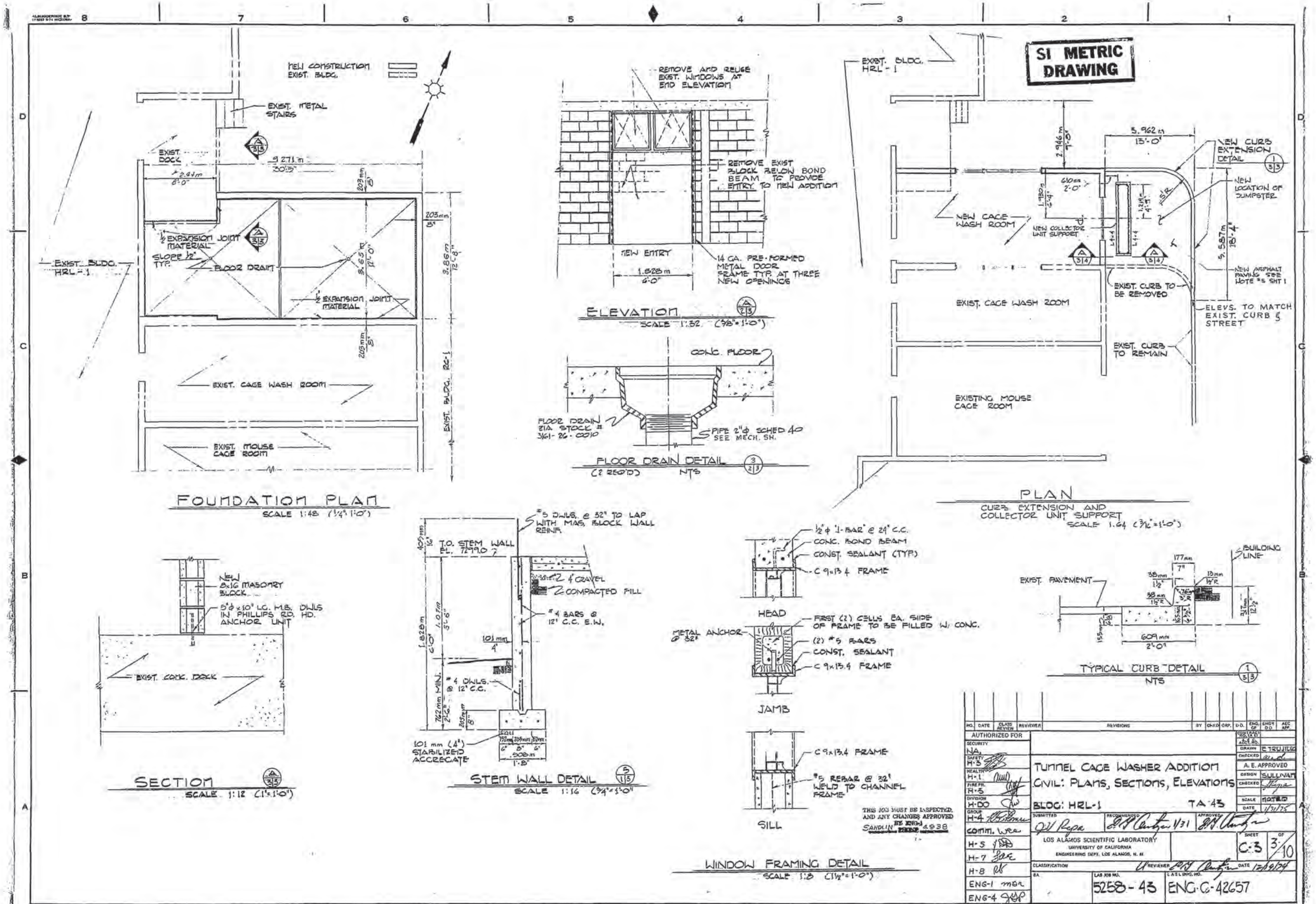
SHEET 5 OF 18

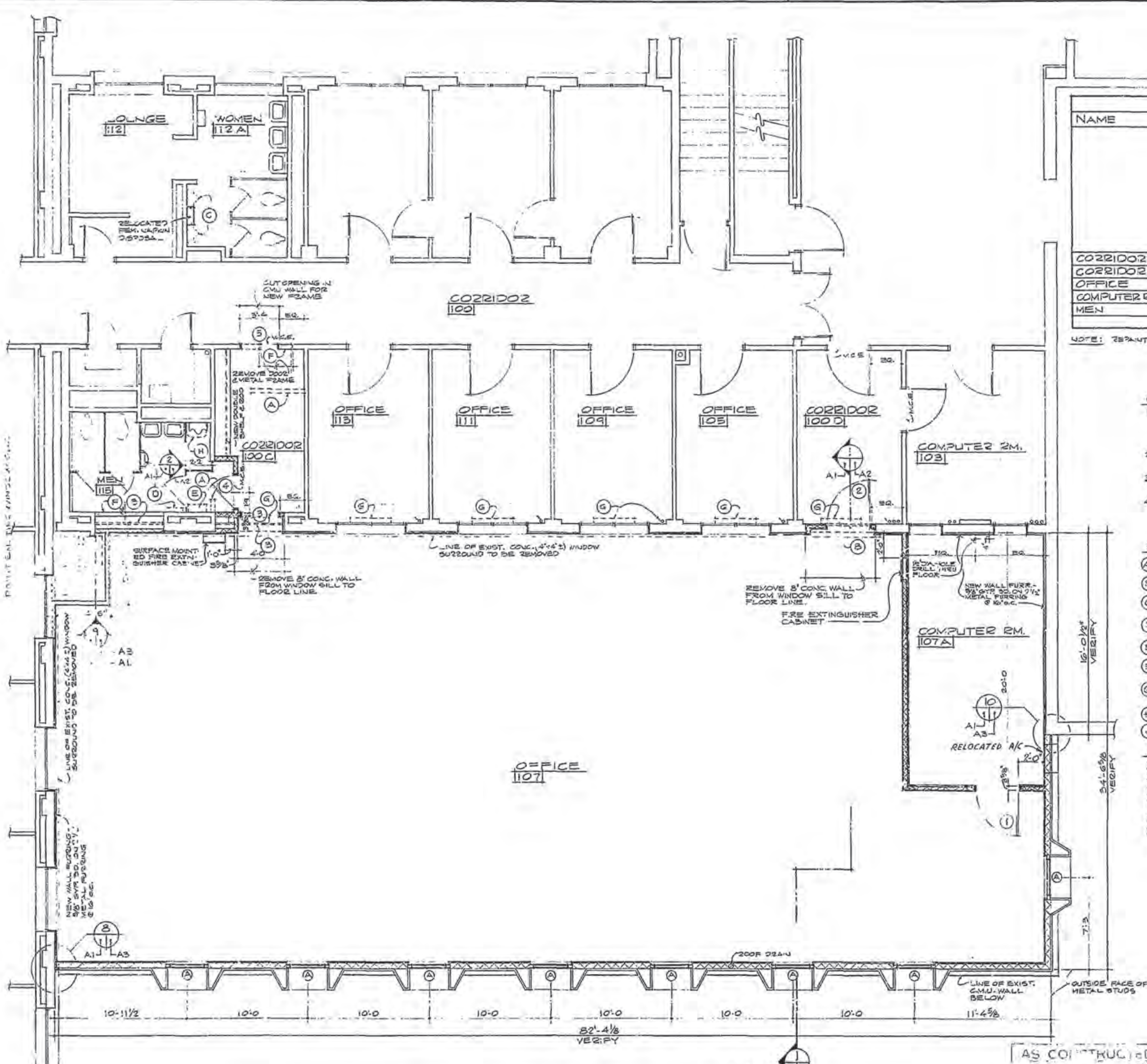
Prefix	Drawing number	Sheet number	Sheet suffix	Number of sheets	Revision number
C	42873	5		18	0



Prefix	Drawing number	Sheet number	Sheet suffix	Number of sheets	Revision number
C	42873	6		18	1


SI METRIC DRAWING
FLOOR PLAN
SCALE 1:48 (1/4"=1'-0")
EXIST. CONC. DOCK
9.27 m 30'-5"
2.44 m 8'-0"
3.99 m 13'-1"
2.84 m 9'-4"
203 mm 8"
OPENING FOR FAN SEE DETAIL
NEW CAGE WASHER OUTLINE, INSTALL PRIOR TO WALLS
RELOCATE EXIST. WINDOWS TO OPPOSITE END OF NEW ADDITION TO CREATE 6' ENTRY WAY
RELOCATED WINDOW
TEMP. FLEX. TUBE
EXIST. WINDOWS TO REMAIN
NEW ENTRY REMOVE EXIST. BLOCK 1.014mm x 2.134m (3'-4"x7'-0") METAL FRAME & CONC. LINTEL
NEW CONVEYOR BELT OPENING SEE DETAIL
EXIST. CAGE WASH ROOM RM. B201
NEW ENTRY 914mm x 2.134m (3'-0"x7'-0") REMOVE EXIST. BLOCK
PROVIDE MET. FRAME & CONC. LINTEL
EXIST. STL. COL.
EXIST. MOUSE ROOM
NEW CONSTRUCTION
EXIST. CONSTRUCTION
NEW ADDITION
EXIST. BLDG. HRL-1
NOTE: RELOCATE DUMPSTER TO NEW LOCATION & PROVIDE TEMPORARY FLEX. DISCHARGE TUBE.
METAL DECK SPLICE SECTION
SCALE 1:8 (1 1/2"=1'-0")
ROOF DECK SPLICE
16 GA. S.M. SPLICE PL. TACK TO METAL DECK
B.U. ROOF AND RGID INSULATION
NEW STL. ROOF DECK
EXIST. METAL DECK
MASONRY WALL CONTROL JOINT
SCALE 1:8 (1 1/2"=1'-0")
DUR-O-WAL RAPID REGULAR SIZE CONT. WATERSTOP
CAULKING TO BE G.E. SILICONE CONST. SEALANT
SECTION
TYP. CONTROL JOINT NTS
FORMED 1/3 OF DEPTH OR SAW CUT WITHIN 24 HR.
END ELEVATION
SCALE 1:32 (3/8"=1'-0")
NEW LOCATION OF EXIST. (2) 4x5 PROJECT OUT WINDOWS
T.O. BOND BEAM EL. 7309.27'
CONC. BOND BEAM SEE DETAIL
(2) #4 BARS WHERE SHOWN AND IN FIRST CELLS @ EA. SIDE OF WINDOWS
8x16 MAS. BLOCK
#5 BARS @ 32" C.C. WITH #8 DUR-O-WAL REINF. @ 16" HORIZ. LAP FDN. BARS
EXIST. BLDG.
FIN. FLOOR
T.O. STEM WALL EL. 7299.0'
EXIST. CONC. DOCK
NORTH ELEVATION
SCALE 1:32 (3/8"=1'-0")
CONC. BOND BEAM
2-#4 BARS WHERE SHOWN
MASONRY WALL CONTROL JOINT
8x16 MAS BLOCK
FIN. FLOOR AND T.O. STEM WALL EL. 7299.0'
ROOF DETAILS
SCALE 1:8 (1 1/2"=1'-0")
20 GA. G.I. FLASHING
2" RIGID INSULATION
B.U. ROOF TO MATCH EXIST.
ALUM. GRAVEL STOP
4x6 WOOD NAILER
3/4 J-BARS @ 36" O.C.
NEW FENESTRA 6" ROOF DECK
L 2x2x1/4 CONT.
NEW CONC. BOND BEAM
NEW MASONRY BLOCK WALL
EXTEND WALL REINF. INTO BOND BEAM
EXIST. STL. DECK
EXIST. 12 B 19
EXIST. CLOSURE PL. & INSULATION TO REMAIN
EXIST. MASONRY BLOCK WALL
CONC. BOND BEAM DET.
SCALE 1:8 (1 1/2"=1'-0")
203 mm 8"
4-#7 BARS CONT.
ROOF DRAIN DETAIL
SCALE 1:12 (1"=1'-0")
GRAVEL SURFACED B.U. ROOF
"ZURN" MODEL #Z ROOF DRAIN OR EQUAL
2" RIGID INSUL.
6" METAL DECK
ROOF SUMP RECEIVER WELDED TO METAL DECK
1/8 BENT PLATE CLOSURE 4 SIDES OF OPG.
3" ROOF DRAIN PIPE
VOID
CONT. FTG DET.
SCALE 1:8 (1 1/2"=1'-0")
FOR STEM WALL SEE DETAIL
51 mm x 102 mm KEY
3-#4 CONT.
#4 @ 24" C.C.
508 mm 1'-8"
THIS JOB MUST BE INSPECTED, AND ANY CHANGES APPROVED BY ENG-3 SANDLIN 4938
AUTHORIZED FOR
SECURITY N.A.
SAFETY H-3
HEALTH H-1
FIRE PR. H-5
DIVISION H-DO.
GROUP H-4
COMM. WRC
H-5
H-7
H-8
ENG-1 MDR
ENG-4
TUNNEL CAGE WASHER ADDITION
CIVIL: PLANS, ELEVATIONS, DETAILS
BLDG. HRL-1 TA-43
DRAWN E. TRUJILLO
A. E. APPROVED
DESIGN SULLIVAN
SCALE NOTED
DATE 1/31/75
LOS ALAMOS SCIENTIFIC LABORATORY
UNIVERSITY OF CALIFORNIA
ENGINEERING DEPT. LOS ALAMOS, N. M.
SHEET C-2 2 OF 10
DATE 12/19/74
LAB JOB NO. 5258-43
LASL DWG NO. ENG C-42657


SI METRIC DRAWING
NEW CONSTRUCTION
EXIST. BLDG.
EXIST. METAL STAIRS
EXIST. DOCK
9.271 m 30'-5"
2.44 m 8'-0"
EXIST. BLDG. HRL-1
1/2" EXPANSION JOINT MATERIAL
SLOPE 1/2" TYP.
FLOOR DRAIN
1/2" EXPANSION JOINT MATERIAL
EXIST. CAGE WASH ROOM
EXIST. MOUSE CAGE ROOM
EXIST. BLDG. RC-1
FOUNDATION PLAN
SCALE 1:48 (1/4"=1'-0")
REMOVE AND REUSE EXIST. WINDOWS AT END ELEVATION
REMOVE EXIST BLOCK BELOW BOND BEAM TO PROVIDE ENTRY TO NEW ADDITION
NEW ENTRY
1.828 m 6'-0"
14 GA. PRE-FORMED METAL DOOR FRAME TYP. AT THREE NEW OPENINGS
ELEVATION
SCALE 1:32 (3/8"=1'-0")
CONC. FLOOR
FLOOR DRAIN ZIA STOCK # 3161-26-0010
PIPE 2"ϕ SCHED 40 SEE MECH. SH.
FLOOR DRAIN DETAIL
(2 REQ'D) NTS
EXIST. BLDG. HRL-1
5.962 m 13'-0"
2.946 m 9'-8"
610 mm 2'-0"
NEW CURB EXTENSION DETAIL
NEW LOCATION OF DUMPSTER
NEW CAGE WASH ROOM
NEW COLLECTOR UNIT SUPPORT
5.587 m 18'-4"
NEW ASPHALT PAVING SEE NOTE #5 SHT 1
EXIST. CURB TO BE REMOVED
EXIST. CAGE WASH ROOM
ELEVS. TO MATCH EXIST. CURB & STREET
EXIST. CURB TO REMAIN
EXISTING MOUSE CAGE ROOM
PLAN
CURB EXTENSION AND COLLECTOR UNIT SUPPORT
SCALE 1:64 (3/16"=1'-0")
NEW 8x16 MASONRY BLOCK
5/8"ϕ x 10" LG. M.B. DWLS IN PHILLIPS RD. HD. ANCHOR UNIT
EXIST. CONC. DOCK
SECTION
SCALE 1:12 (1"=1'-0")
#5 DWLS. @ 32" TO LAP WITH MAS. BLOCK WALL REINF.
T.O. STEM WALL EL. 7299.0
4" GRAVEL
COMPACTED FILL
#4 BARS @ 12" C.C. E.W.
1.828 m 6'-0"
1.07 m 3'-6"
101 mm 4"
#4 DWLS. @ 12" C.C.
762 mm MIN. 2'-6"
101 mm (4") STABILIZED AGGREGATE
508 mm 1'-8"
STEM WALL DETAIL
SCALE 1:16 (3/4"=1'-0")
1/2"ϕ 'J'-BAR @ 24" C.C.
CONC. BOND BEAM
CONST. SEALANT (TYP.)
C 9x13.4 FRAME
HEAD
METAL ANCHOR @ 32"
FIRST (2) CELLS EA. SIDE OF FRAME TO BE FILLED W/ CONC.
(2) #5 BARS
CONST. SEALANT
C 9x13.4 FRAME
JAMB
C 9x13.4 FRAME
#5 REBAR @ 32" WELD TO CHANNEL FRAME
SILL
WINDOW FRAMING DETAIL
SCALE 1:8 (1 1/2"=1'-0")
BUILDING LINE
EXIST. PAVEMENT
609 mm 2'-0"
TYPICAL CURB DETAIL
NTS
THIS JOB MUST BE INSPECTED AND ANY CHANGES APPROVED BY ENG-4
TUNNEL CAGE WASHER ADDITION
CIVIL: PLANS, SECTIONS, ELEVATIONS
BLDG: HRL-1
TA-43
LOS ALAMOS SCIENTIFIC LABORATORY
UNIVERSITY OF CALIFORNIA
ENGINEERING DEPT. LOS ALAMOS, N.M.
AUTHORIZED FOR
SECURITY NA
SAFETY H-3
HEALTH H-1
FIRE PR. H-5
DIVISION H-DO
GROUP H-4
COMM. WRA
H-5
H-7
H-8
ENG-1 MGR
ENG-4
DRAWN E. TRUJILLO
A. E. APPROVED
DESIGN SULLIVAN
SCALE NOTED
DATE 1/31/75
SHEET C-3 OF 3/10
LAB JOB NO. 5258-43
ENG-C-42657



FIRST FLOOR PLAN
SCALE: 1/4" — 1'-0"

AS CONSTRUCTED DRAWING
EW-12-C-32-4114
16 FEB 1979

1/4" = 1'-0"   0   2'   4'   8'   12'

ROOM FINISH SCHEDULE

NAME	NO.	FLOOR: CARPET	FLOOR: QUARRY TILE	FLOOR: CONDUCTIVE TILE	BASE: VINYL	BASE: GLAZED FACING TILE	WAIN.: GLAZED FACING TILE	WALLS: CONC. MASONRY UNITS	WALLS: CONCRETE	WALLS: GYPSUM BOARD	CEIL.: SUSP. ACOUST. LAY-IN	CEIL.: CONCRETE	CEIL.: MINERAL ACOUST. TILE	REMARKS
														● NEW ○ EXISTING
CORRIDOR	100 C	●			●	○	○	○		●	●			NEW CLG. HT. - 9'-8
CORRIDOR	100 D	●			●			○	○	●			○	
OFFICE	107	●			●					●	●			
COMPUTER RM.	107A			●	●					●	●			CLG. HT. - 10'-0
MEN	115		○			○	○	○	○			○		

NOTE: REPAINT EXIST. WALLS, DOOR FRAMES, ETC. IN CORRIDOR 100C, CORRIDOR 100D & MEN 115

GENERAL NOTES:

1. THE EXISTING CONDITIONS ARE SHOWN AS OBSERVED BY SURVEY & AS SHOWN ON RECORD DRAWINGS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IDENTIFYING ANY FEATURES OTHER THAN SHOWN & REPORTING IMMEDIATELY TO THE CONTRACTING OFFICER.
2. STRUCTURAL MEMBERS SHALL NOT BE CUT, NOTCHED OR IN ANY WAY ALTERED WITHOUT NOTIFYING THE CONTRACTING OFFICER.
3. THE CONTRACTOR SHALL REPAIR ALL DAMAGED C.M.U. & GLAZED FACING TILE BY REMOVING THE ENTIRE UNIT & REPLACING W/ NEW UNIT TO MATCH EXISTING.
4. ALL INTERIOR METAL STUD PARTITIONS SHALL BE 3⅝" METAL STUDS @ 16" O.C. & SHALL EXTEND & BE FASTENED TO UNDERSIDE OF STRUCTURAL MEMBERS ABOVE.

NOTES:

- (A) REMOVE C.M.U. PARTITION
- (B) REMOVE WINDOW & METAL FRAME
- (C) REMOVE EXIST. URINALS. PATCH GLAZED FACING TILE TO MATCH EXISTING. INSTALL ONE URINAL IN MEN 115
- (D) REMOVE EXIST. TOWEL DISPENSER & INSTALL ON EXIST. METAL TOILET PARTITION ABOVE EXIST. WASTE RECEPTACLE IN MEN 115
- (E) REMOVE EXIST. FEMININE NAPKIN DISPOSAL & INSTALL IN WOMEN 112 A
- (F) INSTALL SALVAGED GLAZED FACING TILE WITH NEW C.M.U. TO MATCH & LINE-UP WITH EXISTING 4'-6" H. WAINSCOT.
- (G) REMOVE EXIST. STEAM CONVECTOR & PIPING. REPAINT ENTIRE WALL. PATCH ALL HOLES WHERE PIPING IS REMOVED. PATCH TO MATCH EXISTING ASPHALT TILE FLOOR AND MINERAL ACOUSTICAL TILE CEILING. PATCH ALL OTHER SURFACES DAMAGED IN REMOVALS.
- (H) REMOVE LAVATORY. PATCH GLAZED FACING TILE TO MATCH EXISTING.
- (J) REMOVE SECTION OF EXIST. STEEL WINDOW UP TO EXIST. MULLION. CLOSE OPENING W/ C.M.U., STUCCO EXTERIOR & FINISH INTERIOR PER NOTE (F). REPAINT WALL ABOVE WAINSCOT. SEE SHT A-2.

LEGEND:

- CONSTRUCTION SHOWN IN OUTLINE IS EXISTING TO REMAIN
- CONSTRUCTION SHOWN DASHED IS EXISTING TO BE REMOVED
- NEW CONCRETE MASONRY UNITS
- NEW METAL STUD PARTITIONS
- NEW METAL STUD PARTITION W/SOUND DEADENING BOARD & SOUND ATTENUATION BLANKET
- NEW METAL STUD PARTITION W/ SOUND ATTENUATION BLANKET.
- C.M.U. CONCRETE MASONRY UNITS
- M.C.E. METAL CARPET EDGE

NO	DATE	REVISIONS	BY	CK.	PROJ ENGR	ERDA
2	2-22-78	DELETE TELEPHONE BOOTH REVISE ROOM 107A.	MHM	KC		
1	12-8-77	ADDENDUM NO. 1	MHM	KC		

UNITED STATES
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
LOS ALAMOS AREA OFFICE – LOS ALAMOS, NEW MEXICO

HRL BUILDING ADDITION
ARCHITECTURAL
FLOOR PLAN AND SCHEDULE
HRL-1 BLDG   TA-43

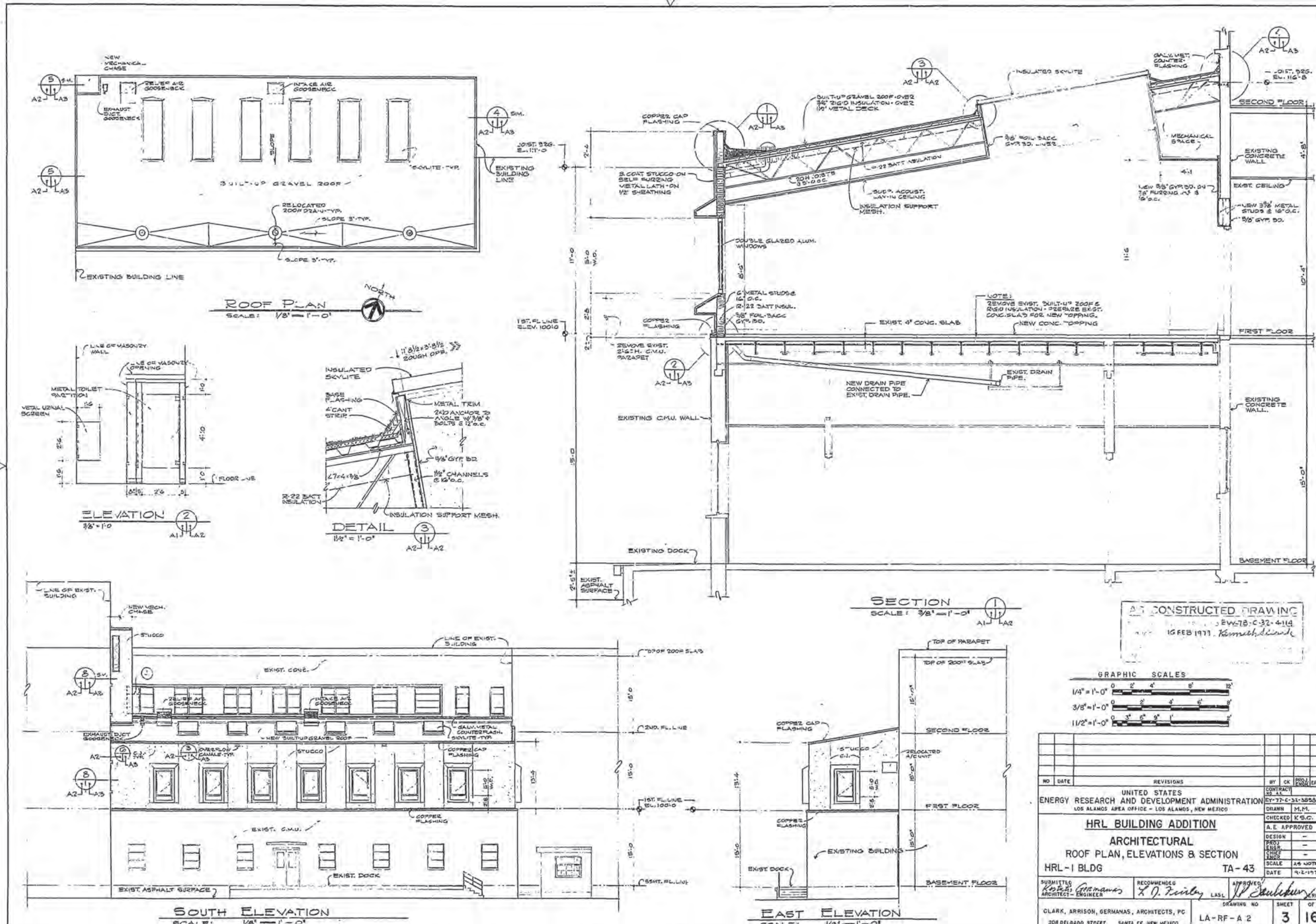
CONTRACT NO. AE	EY-77-C-32-3856
DRAWN	M.M.
CHECKED	K.S.G.
A.E. APPROVED	
DESIGN	—
PROJ ENGR	—
CHIEF ENGR	—
SCALE	AS NOTED
DATE	9-2-1977

SUBMITTED: Kostas Germanas ARCHITECT–ENGINEER
RECOMMENDED: L. J. Finley LASL
APPROVED: ERDA

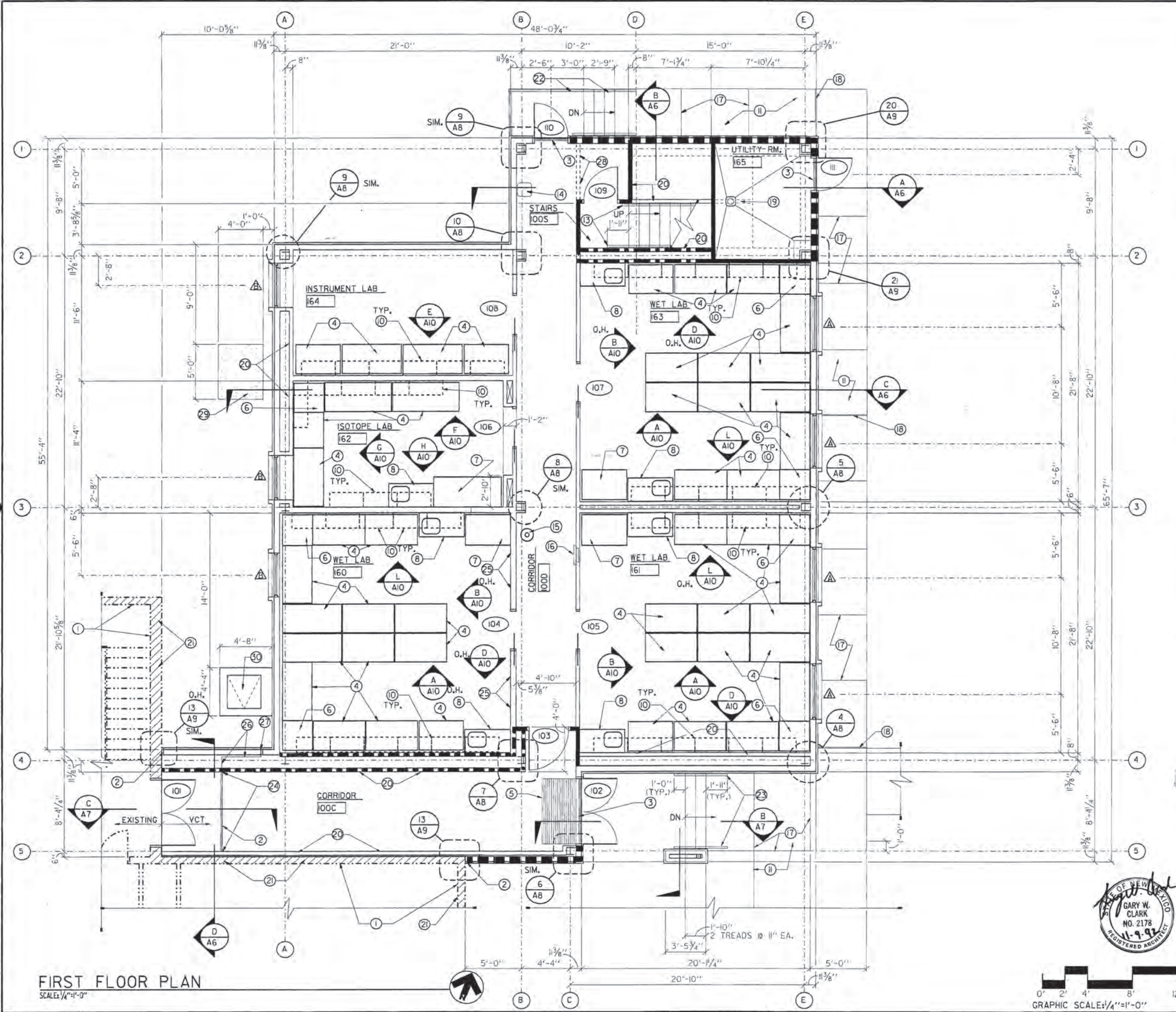
CLARK, ARRISON, GERMANAS, ARCHITECTS, PC
208 DELGADO STREET   SANTA FE, NEW MEXICO

DRAWING NO. LA-RF-A 1   SHEET 2 OF 16

C-43632 L.J. 5632-43



C-43632 L.J. 5632-43



FIRST FLOOR PLAN
SCALE: 1/4"=1'-0"

GRAPHIC SCALE: 1/4"=1'-0"

LEGEND

- 1HR FIRE RATED PARTITION WITH 3 5/8" X 22 GA. MET. STUDS @ 16" O.C. WITH 5/8" TYPE 'X' GYP. BD. FULL HEIGHT BOTH SIDES TO MTL. DECK ABOVE. INSTALL FIRE SAFING BETWEEN TOP TRACK AND METAL DECK.
- 1HR FIRE RATED PARTITION ASSEMBLY WITH 3 5/8" X 22 GA. METAL STUDS @ 16" O.C. WITH 5/8" TYPE 'X' GYP. BD. ONE SIDE TO METAL DECK ABOVE. INSTALL FIRE SAFING BETWEEN TOP TRACK AND METAL DECK.
- PARTITION WITH 3 5/8" X 22 GA. MET. STUDS @ 16" O.C. WITH 5/8" GYP. BD. BOTH SIDES (ONE SIDE IN THE CASE OF A DOUBLE STUD WALL) TO 6" ABOVE CEILING LINE.
- 1HR FIRE RATED EXTERIOR WALL WITH 6" X 18 GA. MET. STUDS @ 16" O.C. WITH 5/8" TYPE 'X' GYP. BD. EA. SIDE - SEE DETAIL 2/A7 FOR GYP. BD. FURRING AT FLOOR BEAM ASSEMBLY.

KEYED NOTES

1. EXISTING HRL-1 BUILDING
2. EXPANSION JOINT - SEE DETAIL 18/A9
3. METAL THRESHOLD
4. LAB FURNISHINGS - ADDITIVE ALTERNATE NO. 1 SEE INTERIOR ELEVATION SHEET A10
5. SURFACE MOUNTED FLOOR MAT. (3'-0" X 6'-0")
6. CORNER UNIT FOR LAB FURNISHINGS MODEL #XFT-10020-ST, TYP. ADD. ALT NO. 1
7. FUMEHOOD
8. SINK (4'-0" LENGTH MAX.)
9. NOT USED.
10. OVERHEAD STORAGE CABINETS - ADDITIVE ALTERNATE NO. 2 SEE INTERIOR ELEVATION SHEET A10
11. CONCRETE SIDEWALK
12. NOT USED.
13. 1 1/2" DIA. STANDARD PIPE HANDRAIL - WALL MOUNTED SEE DETAIL 15/A9
14. ELECTRIC WATER COOLER
15. EMERGENCY EYE WASH & SHOWER
16. SEMI-RECESSED FIRE EXTINGUISHER CABINET
17. SIDEWALK CONTROL JOINT.
18. SIDEWALK EXPANSION JOINT.
19. FLOOR SINK
20. INTERIOR PARTITION NOT TO RECEIVE SOUND ATTENUATION BATTS.
21. EXISTING 8" & 12" THICK CONC. WALL (2 HR AREA SEPARATION WALL).
22. 1 1/2" DIA. STANDARD PIPE GUARDRAIL & HANDRAIL - MOUNT IN CONCRETE WALKS - SEE DETAIL 14/A8
23. 1 1/2" DIA. STANDARD PIPE HANDRAIL - SEE WALL DETAIL B/A7
24. WALL EXPANSION JOINT - SEE DETAIL 16/A9
25. 6" X 22 GA. MTL. STUD @ 16" O.C. @ LAB. NO. 160
26. LINE OF EXIST. CONC. STRUCTURE @ FIN. FLR. LEVEL.
27. VERTICAL EXPANSION JOINT - SEE DETAIL 2/A5
28. LINE OF GYP. BD. SOFFIT ABOVE.
29. CONCRETE PAD FOR ELEC. TRANSFORMER.
30. CRAWL SPACE ACCESS MANHOLE

GENERAL NOTES

1. ALL DIMENSIONS ARE FROM FACE OF STUD & STRUCTURAL COLUMN CENTER LINES, UNLESS OTHERWISE NOTED.
2. ALL INTERIOR PARTITIONS ARE TO RECEIVE 3 1/2" SOUND ATTENUATION BATTS FULL HEIGHT OF PARTITION, UNLESS OTHERWISE NOTED.

NO.	DATE	CLASS REV.	REVISIONS	DWN	DES	CHK'D	REL	SUB	REC	APP
1	6/92	LM	AS-BUILT W/CHANGES	DG	H&N	MB	MB	MB	LM	EC

Holmes & Narver
ALBUQUERQUE, NEW MEXICO

HRL BUILDING ADDITION

FIRST FLOOR PLAN

BLDG. 1 TA-43

DRAWN	MSJ
DESIGN	GWC
CHECKED	JS
RELEASED	MLB
DATE	10/30/90

SUBMITTED M. BLACKMAN — RECOMMENDED L. MARTINEZ — APPROVED E. CAULDER

STATE OF NEW MEXICO GARY W. CLARK NO. 2178 11-9-92 REGISTERED ARCHITECT

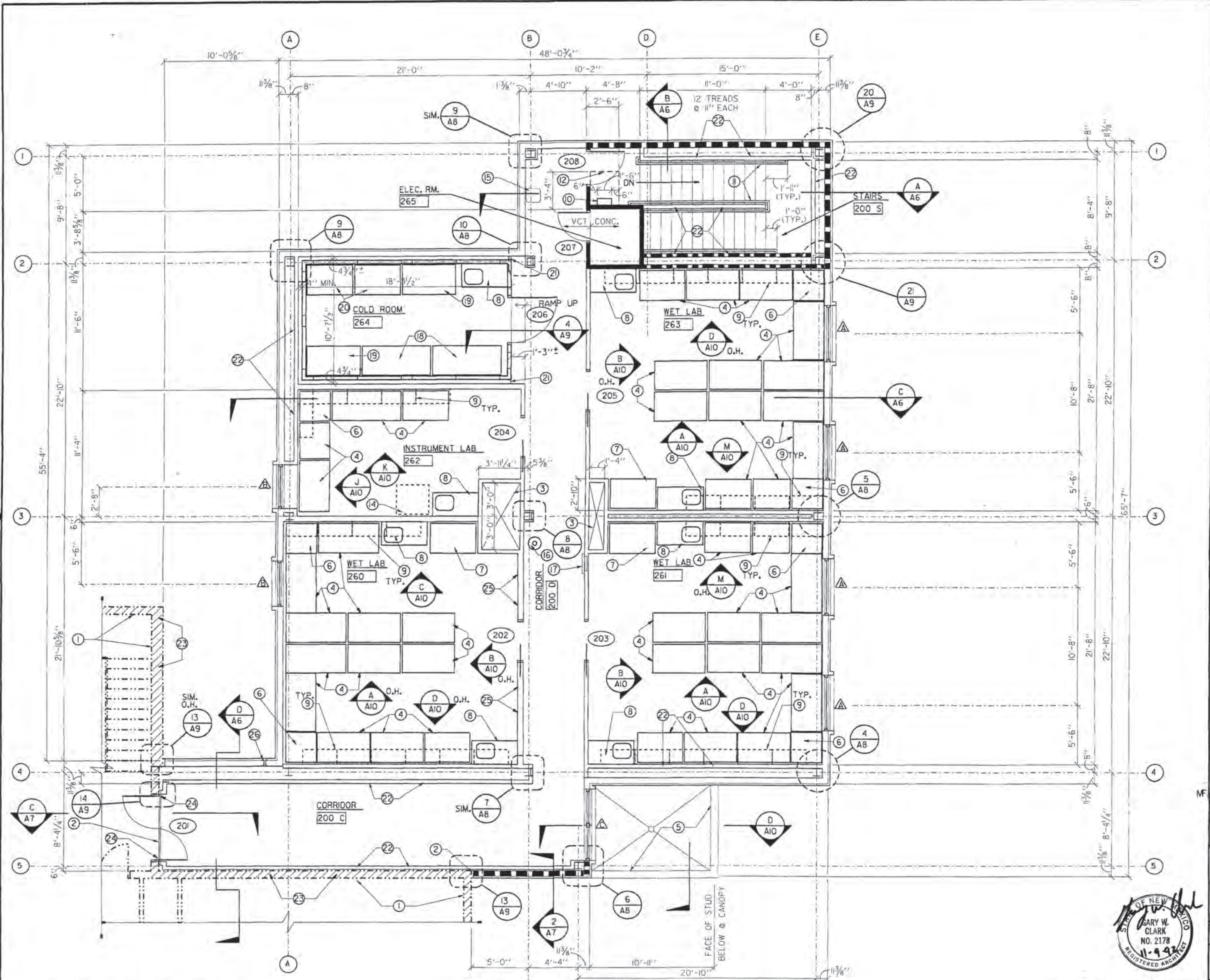
Los Alamos — Los Alamos National Laboratory, Los Alamos, New Mexico 87545

SHEET A1 — 10 OF 51

CLASSIFICATION UNC. — REVIEWER L. MARTINEZ — DATE 9/18/92

LAB JOB NO.	DRAWING NO.	REV.
8571	C45632	1

FILE: /usr/sandia/deb/hr110600 DATE: 10-NOV-1992 11:04



SECOND FLOOR PLAN
SCALE: 1/4"=1'-0"

GRAPHIC SCALE: 1/4"=1'-0"

FILE: /usr/sandia/deb/hr118a00 DATE: 06-NOV-1992 14:48

LEGEND

1HR FIRE RATED PARTITION WITH 3 5/8" X 22 GA. MET. STUDS @ 16" O.C. WITH 5/8" TYPE 'X' GYP. BD. FULL HEIGHT BOTH SIDES TO METAL ROOF DECK ABOVE. INSTALL FIRE SAFING BETWEEN TOP TRACK AND METAL ROOF DECK.

1HR FIRE RATED PARTITION ASSEMBLY WITH 3 5/8" X 22 GA. METAL STUDS @ 16" O.C. WITH 5/8" TYPE 'X' GYP. BD. ONE SIDE TO METAL ROOF DECK ABOVE. INSTALL FIRE SAFING BETWEEN TOP TRACK AND METAL ROOF DECK.

PARTITION WITH 3 5/8" X 22 GA. MET. STUDS @ 16" O.C. WITH 5/8" GYP. BD. BOTH SIDES (ONE SIDE IN THE CASE OF A DOUBLE STUD WALL) TO 6" ABOVE CEILING LINE.

1HR FIRE RATED EXTERIOR WALL WITH 6" X 18 GA. MET. STUDS @ 16" O.C. WITH 5/8" TYPE 'X' GYP. BD. EA. SIDE - SEE DETAIL 1/A7 FOR GYP. BD. FURRING AT ROOF BEAM ASSEMBLY.

KEYED NOTES

1. EXISTING HRL-1 BUILDING
2. EXPANSION JOINT - SEE DETAIL 18/A9
3. MECH. CHASE
4. LAB FURNISHINGS - ADDITIVE ALTERNATE NO. 1 SEE INTERIOR ELEVATION SHEET A10
5. CANOPY ROOF BELOW
6. CORNER UNIT FOR LAB FURNISHINGS MODEL #XFT-10020-ST, TYP. ADD. ALT. NO. 1
7. FUMEHOOD
8. SINK (4'-0" LENGTH MAX.)
9. OVERHEAD STORAGE CABINETS - ADDITIVE ALTERNATE NO. 2 SEE INTERIOR ELEVATION SHEET A10
10. ROOF ACCESS LADDER - SEE DETAIL 19/A9
11. 1 1/2 " DIA. STANDARD PIPE HANDRAIL - WALL MOUNTED. SEE DETAIL 15/A9
12. LINE OF ROOF HATCH ACCESS SHAFT ABOVE
13. NOT USED
14. G.F.E. STILL LOCATION
15. ELECTRIC WATER COOLER
16. EMERGENCY EYEWASH & SHOWER
17. SEMI-RECESSED FIRE EXTINGUISHER CABINET
18. WORKSTATION MODEL NO. FT10111-18 (ADD. ALT. NO. 1)
19. WORKSTATION MODEL NO. FT10111-14 (ADD. ALT. NO. 1)
20. WORKSTATION MODEL NO. FT10111-12 (ADD. ALT. NO. 1)
21. INSTALL SHEET METAL ENCLOSURE PANEL FULL HEIGHT, PAINT TO MATCH GYP. BD. WALLS.
22. INTERIOR PARTITION NOT TO RECEIVE SOUND ATTENUATION BATTS.
23. EXISTING 8" & 12" THICK CONC. WALL (2 HR AREA SEPARATION WALL)
24. WALL EXPANSION JOINT - SEE DETAIL 16/A9
25. 6" X 22 GA. MTL. STUDS @ 16" O.C. @ LAB. NO. 260
26. VERTICAL EXPANSION JOINT - SEE DETAIL 2/A5

GENERAL NOTES

1. ALL DIMENSIONS ARE FROM FACE OF STUD & STRUCTURAL COLUMN CENTER LINES, UNLESS OTHERWISE NOTED.
2. ALL WORKSTATIONS ARE "FLEXTECH" LINE BY KEWAUNEE TECHNICAL WORKSTATION DIVISION.
3. ALL INTERIOR PARTITIONS ARE TO RECEIVE 3 1/2" SOUND ATTENUATION BATTS FULL HEIGHT OF PARTITION, UNLESS OTHERWISE NOTED.

NO.	DATE	CLASS REV.	REVISIONS	DWN	DES	CHK'D	REL	SUB	REC	APP
1	6/92	LM	AS-BUILT W/O CHANGES	DG	H&N	MB	MB	MB	LM	EC

Holmes & Narver
ALBUQUERQUE, NEW MEXICO

HRL BUILDING ADDITION

SECOND FLOOR PLAN

BLDG. 1 TA-43

DRAWN	MSJ
DESIGN	GWC
CHECKED	JS
RELEASED	MLB
DATE	10/30/90

SUBMITTED M. Blackman M. BLACKMAN | RECOMMENDED L. MARTINEZ | APPROVED E. CAULDER

GARY W. CLARK NO. 2178 11-9-92 STATE OF NEW MEXICO REGISTERED ARCHITECT

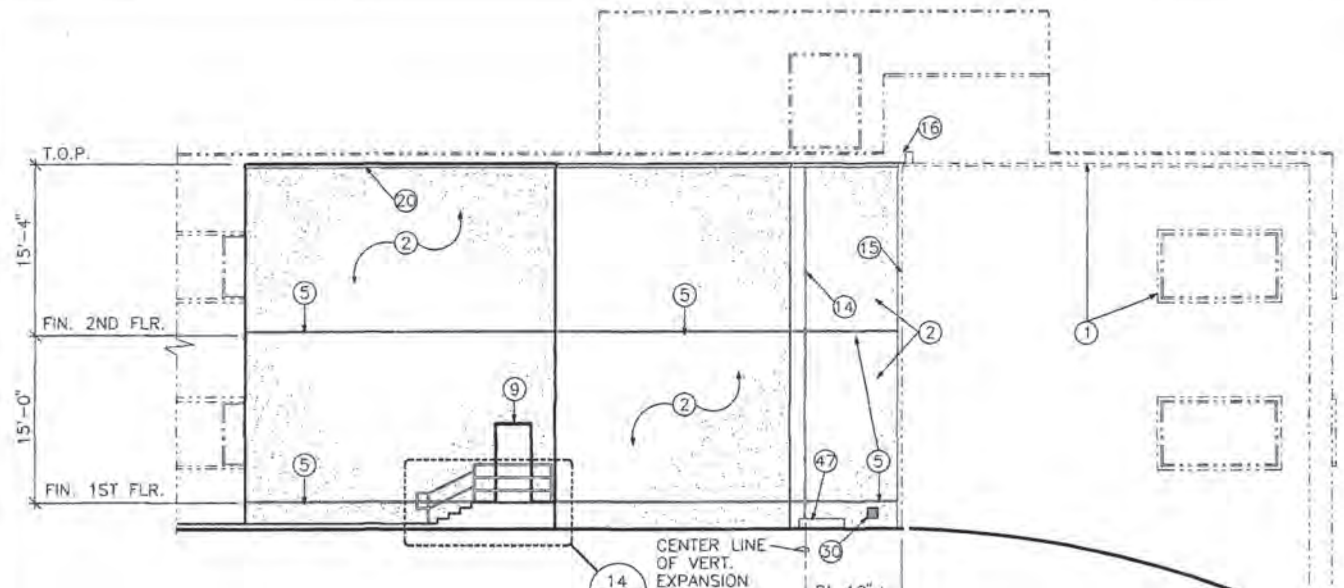
Los Alamos — Los Alamos National Laboratory, Los Alamos, New Mexico 87545

SHEET A2 — 11 OF 51

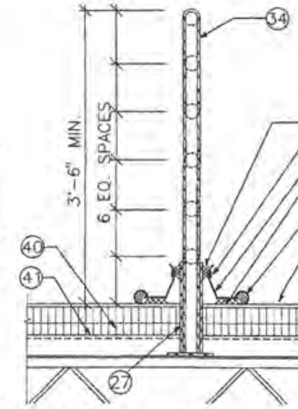
CLASSIFICATION UNC. REVIEWER L. MARTINEZ DATE 9/18/92

LAB JOB NO. 8571 | DRAWING NO. C45632 | REV. 1

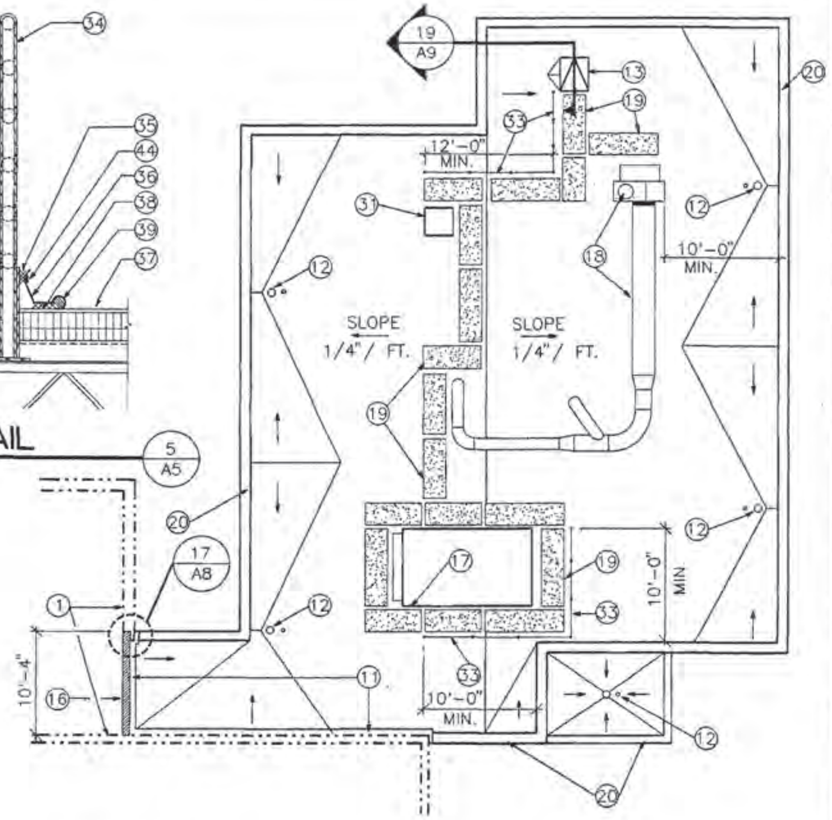
1/8"=1'-0"



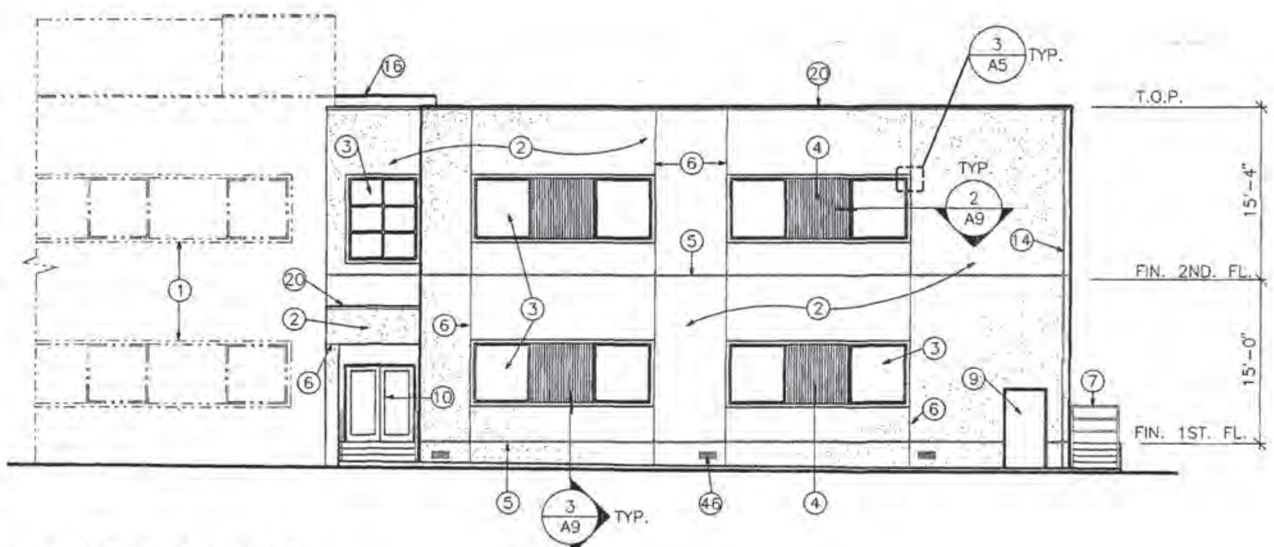
NORTH ELEVATION
SCALE: 1/8"=1'-0"



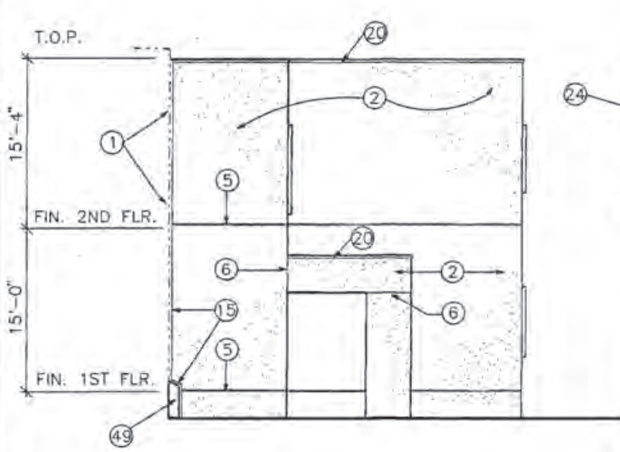
GUARDRAIL
SCALE: 1"=1'-0"



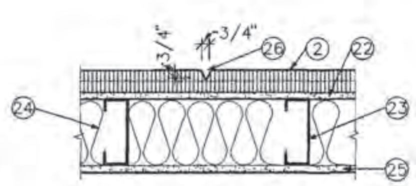
ROOF PLAN
SCALE: 1/8"=1'-0"



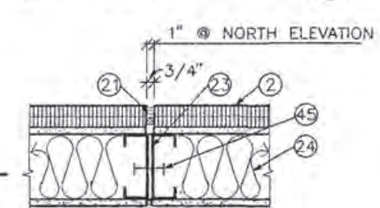
EAST ELEVATION
SCALE: 1/8"=1'-0"



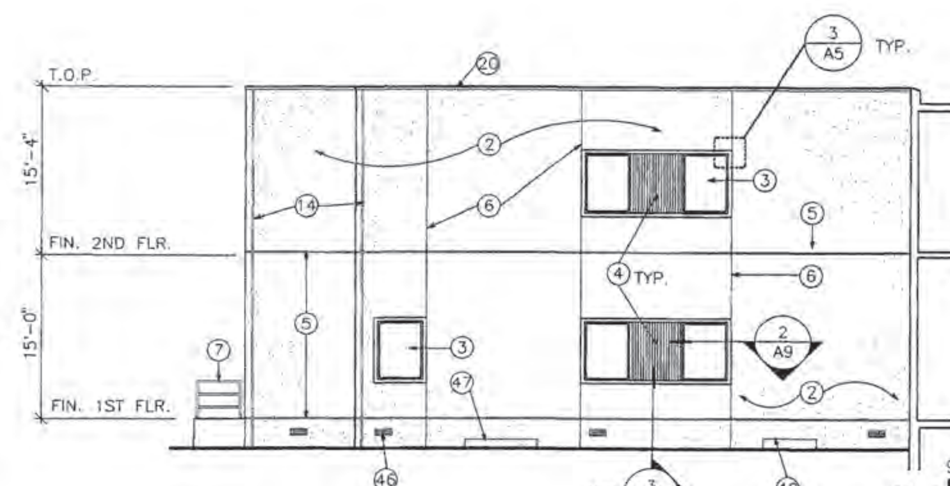
SOUTH ELEVATION
SCALE: 1/8"=1'-0"



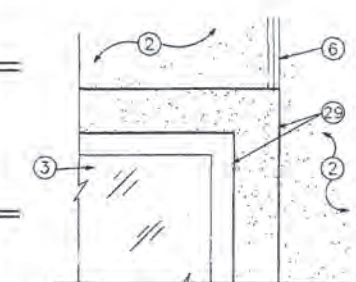
CONTROL JOINT
SCALE: 1 1/2"=1'-0"



VERTICAL EXPANSION JOINT
SCALE: 1 1/2"=1'-0"



WEST ELEVATION
SCALE: 1/8"=1'-0"



CONTROL JOINT LOCATION
SCALE: 1 1/2"=1'-0"

9" 0' 1' 2'
GRAPHIC SCALE: 1 1/2"=1'-0"

8' 4' 0' 8' 16' 24'
GRAPHIC SCALE: 1/8"=1'-0"

GARY W. CLARK
NO. 2178
REGISTERED ARCHITECT
11-9-92

KEYED NOTES

1. EXISTING HRL-1 BUILDING.
2. EXTERIOR FINISH SYSTEM-COLOR TO MATCH EXISTING HRL-1 BUILDING.
3. 1" INSULATED GLASS IN ALUMINUM FRAME.
4. CORRUGATED EXTERIOR FINISH SYSTEM TO MATCH CORRUGATION SECTION & COLOR OF EXISTING CORRUGATED CONCRETE PANELS BETWEEN EXISTING HRL-1 WINDOWS.
5. HORIZONTAL EXPANSION JOINT-SEE DETAILS 2/A8 & 3/A8
6. CONTROL JOINT- SEE DETAIL 1/A5.
7. GUARDRAIL/HANDRAIL- SEE DETAIL 14/A8
8. NOT USED.
9. HOLLOW METAL EXTERIOR DOOR.
10. ALUMINUM ENTRY DOOR.
11. ROOF EXPANSION JOINT- SEE DETAIL 11/A8.
12. ROOF & OVERFLOW DRAINS.
13. ROOF HATCH.
14. VERTICAL EXPANSION JOINT SEE DETAIL 2/A5.
15. EXPANSION JOINT COVER-SEE DETAIL 13/A9. EXPANSION JOINT @ NORTH ELEV. SIM. TO 13/A9.
16. CONCRETE PARAPET EXTENSION-SEE DETAIL 11/A8.
17. MECHANICAL UNIT.
18. EXHAUST SYSTEM & DUCT WORK.
19. PROTECTIVE WALKWAY.
20. ALUMINUM COPING.
21. BACK-UP ROD & SEALANT.
22. 5/8" EXTERIOR GYPSUM BOARD SHEATHING.
23. 6"x18 GA. METAL STUDS.
24. R-19 BATT INSULATION.
25. 5/8" GYPSUM BOARD.
26. ROUTER CONTROL JOINT.
27. 2" DIA. STL. PIPE SLEEVE-WELD TO GRARDRAIL & ROOF STRUCTURE. SEE STRUCT. DWGS. FOR PIPE SLEEVE LOCATIONS.
28. NOT USED.
29. WINDOW SURROUND WITH EXTERIOR FINISH SYSTEM.
30. EXTEND EXISTING VENT GRILLE THROUGH NEW EXTERIOR FINISH SYSTEM AND TRIM.
31. CONDENDING UNIT-SEE SHT M3.
32. SEALANT
33. GUARD RAIL-SEE DETAIL 5/A5.
34. 1 1/2" ϕ STD. STL. PIPE GUARDRAIL/HANDRAIL – GRIND ALL WELDS SMOOTH AND PAINT.
35. WATER CUT-OFF MASTIC
36. PRE-MOLDED PIPE SEAL.
37. MEMBRANE ROOFING.
38. SPLICING CEMENT.
39. LAP SEALANT.
40. RIGID INSULATION.
41. METAL DECK.
42. NOT USED.
43. NOT USED.
44. STAINLESS STL. CLAMPING RING.
45. BOLTED CONNECTION W/ 1 1/4" SLOT VERTICALLY @ 16" O.C. MAX. @ VERTICAL EXPANSION JT. @ NORTH ELEVATION ONLY.
46. ALUMN. CRAWL SPACE VENTS-SEE DETAIL 3/A8 (7 TOTAL).
47. CONC. PAD FOR ELEC. TRANSFORMER.
48. CRAWL SPACE ACCESS MANHOLE.
49. CONC. REINFORCEMENT WALL SEE SHT. S11, ADDITIVE ALTERNATE NO. 4.

GENERAL NOTES

1. REFERENCE MECHANICAL & ELECTRICAL DRAWINGS FOR ADDITION ROOF PENETRATIONS & ROOF OR PARAPET MOUNTED EQUIPMENT.
2. IMPACT RESISTANT EXTERIOR FINISH SYSTEM SHALL BE FROM FINISH GRADE TO 2nd FLOOR HORIZONTAL EXPANSION JOINT AROUND ENTIRE BUILDING ADDITION.

NO.	DATE	CLASS REV.	REVISIONS	DWN	DES	CHK'D	REL	SUB	REC	APP
1	6/92	LM	AS-BUILT W/CHANGES	DG	H&N	MB	MB	MB	LM	EC

Holmes & Narver
ALBUQUERQUE, NEW MEXICO

HRL BUILDING ADDITION

BUILDING ELEVATIONS AND ROOF PLAN

DRAWN	TMS,SEG
DESIGN	GWC
CHECKED	JS
RELEASED	MLB
DATE	10/30/90

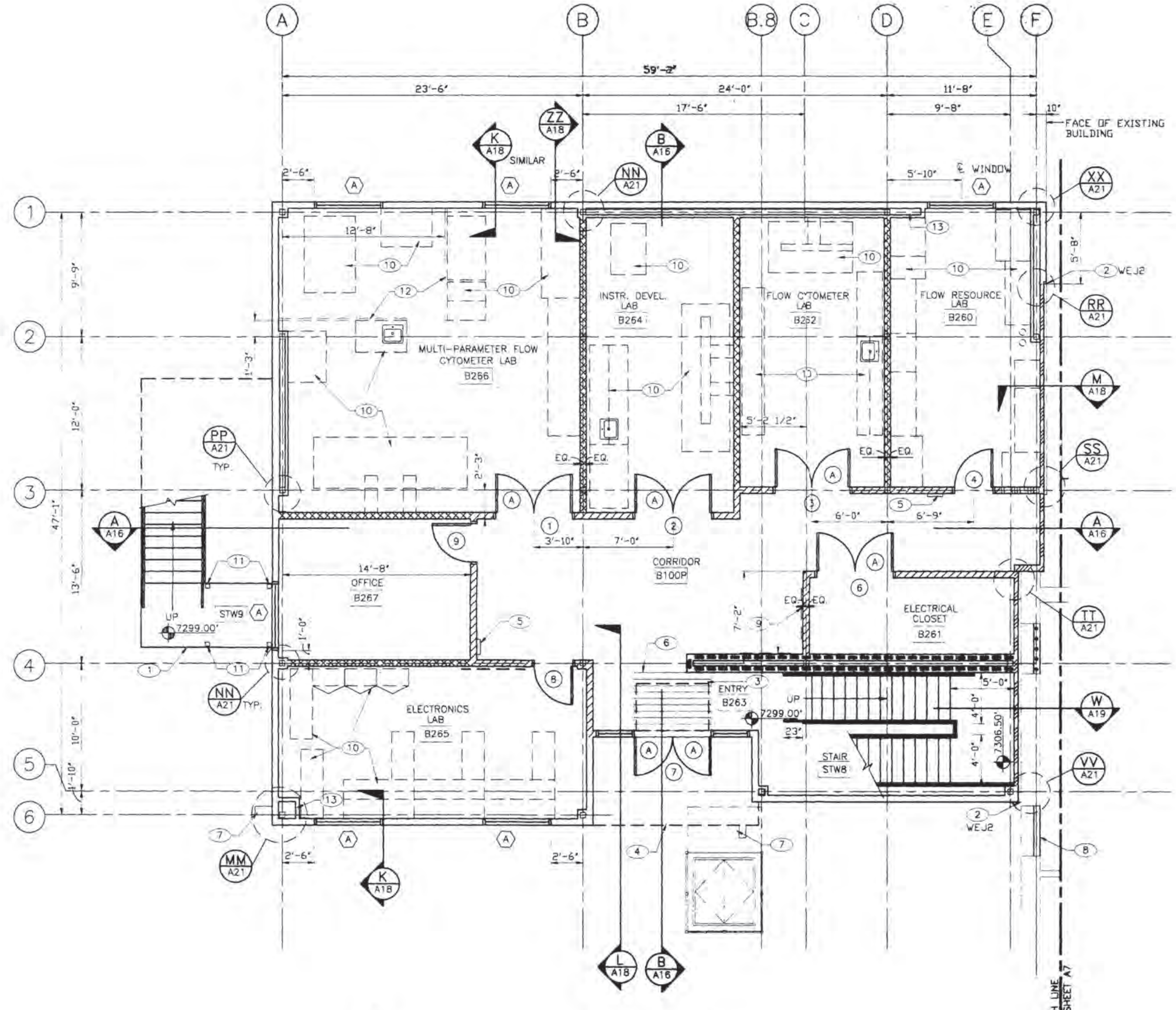
BLDG. 1 TA-43

SUBMITTED M. BLACKMAN | RECOMMENDED L. MARTINEZ | APPROVED E. CAULDER

Los Alamos — Los Alamos National Laboratory, Los Alamos, New Mexico 87545 — SHEET A5 — 14 OF 51

CLASSIFICATION UNC. REVIEWER L. MARTINEZ DATE 9/18/92

LAB JOB NO.	DRAWING NO.	REV.
8571	C45632	1



N

GROUND FLOOR PLAN – AREA A

GENERAL NOTES

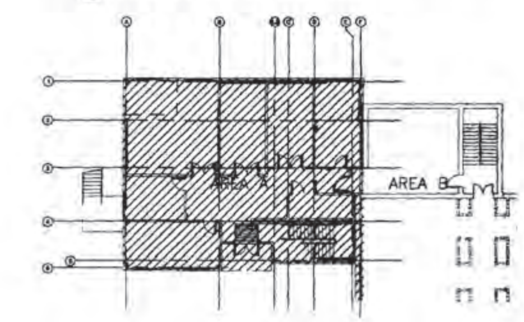
A. ALL DIMENSION ARE TO FACE OF STUD, UNLESS [illegible]
B. CONTRACTOR TO VERIFY EXISTING CONDITIONS AND NOTIFY [illegible] OF ANY DISCREPANCIES BETWEEN EXISTING AND THESE [illegible]

KEYED NOTES

1. CONCRETE STOOP.
2. EXPANSION JOINT COVER.
3. SKYLIGHT ABOVE
4. LINE OF CANOPY ABOVE.
5. 22"X28"X8" SEMI-RECESSED FIRE EXTINGUISHER CABINET. MOUNT DOOR HANDLE AT 42" A.F.F.
6. RECESSED ENTRY MAT
7. 8"X16" CONCRETE SPLASH BLOCK
8. FILL OPENING WITH 1" EIFS SYSTEM OVER 5/8" GYPSUM BOARD SHEATHING OVER 6" METAL STUDS. COLOR TO MATCH EXISTING.
9. 4'-0 X 5'-0" WHITE BOARDS GFE, UNIVERSITY INSTALLED
10. GFE SUPPLIED EQUIPMENT
11. STRUCTURAL STEEL COLUMNS
12. GFE FULL HEIGHT PARTITION.
13. 24" X 24" ACCESS DOOR

LEGEND

- PARTITION TYPE P-1 – 1 HR. FIRE RATED PARTITION.
- PARTITION TYPE P-2 – SOUND PARTITION.
- PARTITION TYPE P-3 – 2 HR. FIRE RATED SHAFT WALL PARITION.
- PARTITION TYPE P-5 – FURRED WALL.
- PARTITION TYPE P-6 – 2HR. RATED PARTITION.
- PARTITION TYPE P-7 – 1HR. RATED PARTITION.
- (A) DENOTES ACTIVE DOOR LEAF



KEYPLAN

NOT FOR CONSTRUCTION

NO	DATE	CLASS REV.	REVISIONS	DWN	DES	CHKD	REL	SUB	REC	APP
1	4/97		RECORD DRAWINGS WITH CHANGES							

CHAVEZ-GRIEVES CONSULTING ENGINEERS INC.
BRIDGERS & PAXTON CONSULTING ENGINEERS INC.
FLATOW MOORE SHAFFER McCABE – CONSULTING ARCHITECTS

BIOPHYSICS LAB ADDITION

ARCH: GROUND FLOOR PLAN – AREA A

BLDG. 01 TA-43

DRAWN	J. [illegible]
DESIGN	T. [illegible]
CHECKED	[illegible]
RELEASED	[illegible]
DATE	[illegible]

SUBMITTED L. WEBSTER
APPROVED B. BURFSCHELE

Los Alamos LOS ALAMOS NATIONAL LABORATORY LOS ALAMOS, NEW MEXICO [illegible]

SHEET A6 25 of 72

CLASSIFICATION REVIEWER

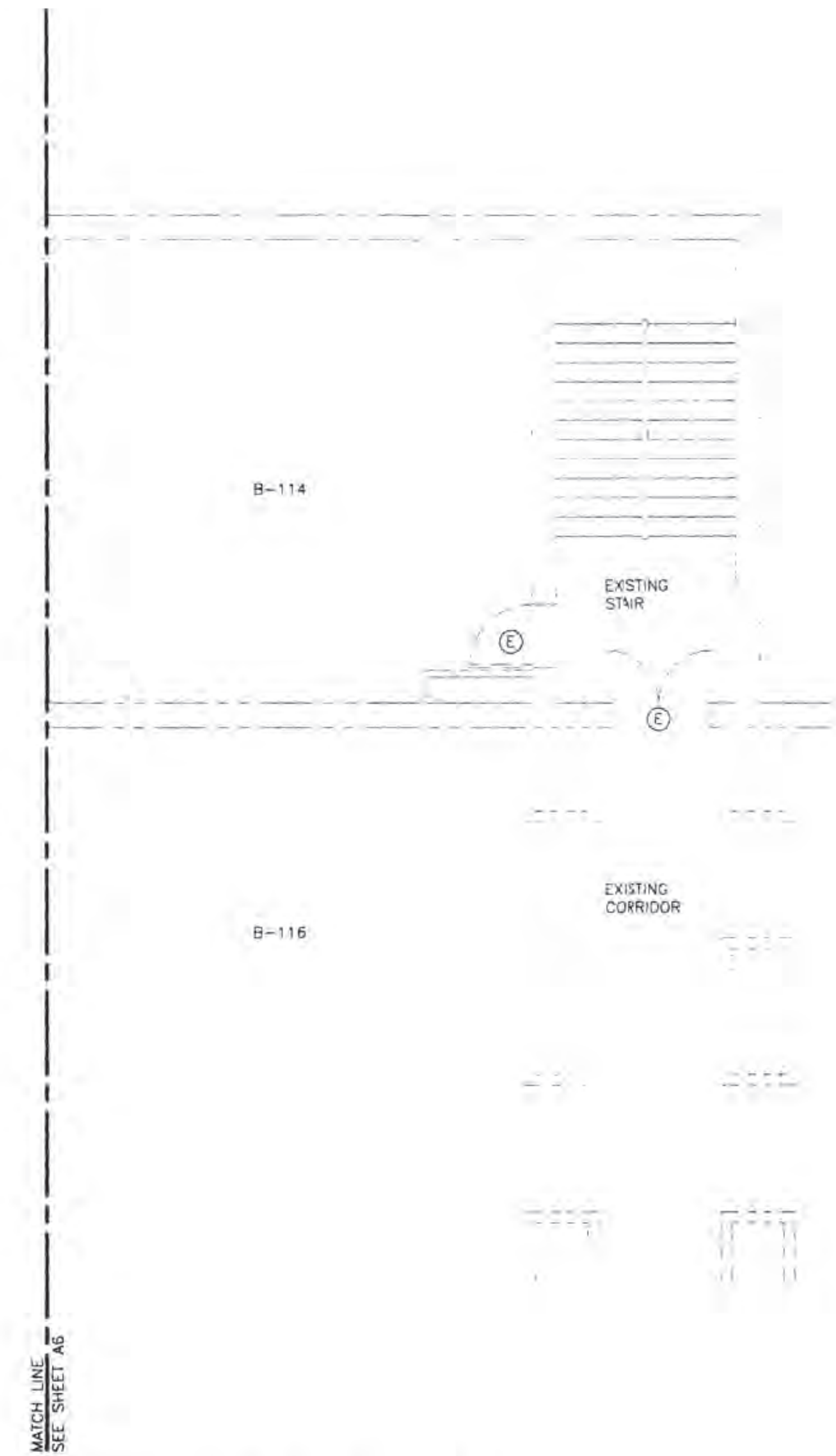
PROJECT I.D. NO. 13178

DRAWING NO. C49784

REV

GENERAL NOTES

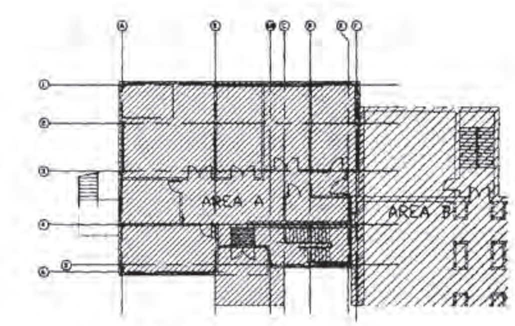
A. CONTRACTOR TO VERIFY EXISTING CONDITIONS AND NOTIFY UNIVERSITY OF ANY DISCREPANCIES BETWEEN EXISTING AND THESE DOCUMENTS.



N

GROUND FLOOR PLAN – AREA B

1/4" = 1'



KEYPLAN

NO	DATE	CLASS REV	REVISIONS	DWN	DES	CHKD	REL	SUB	REC	APP
1	4/97		RECORD DRAWINGS WITH CHANGES							

CHAVEZ–GRIEVES CONSULTING ENGINEERS INC.
BRIDGERS & PAXTON CONSULTING ENGINEERS INC.
FLATOW MOORE SHAFFER McCABE – CONSULTING ARCHITECTS

BIOPHYSICS LAB ADDITION

ARCH: GROUND FLOOR PLAN – AREA B

BLDG. 01 TA–35

DRAWN	J. GONZALES
DESIGN	T. WILBER
CHECKED	T. FLATOW
RELEASED	D. GRIEVES
DATE	02-26-

SUBMITTED L. WEBSTER L. Webster

APPROVED B. BURTSCHELL

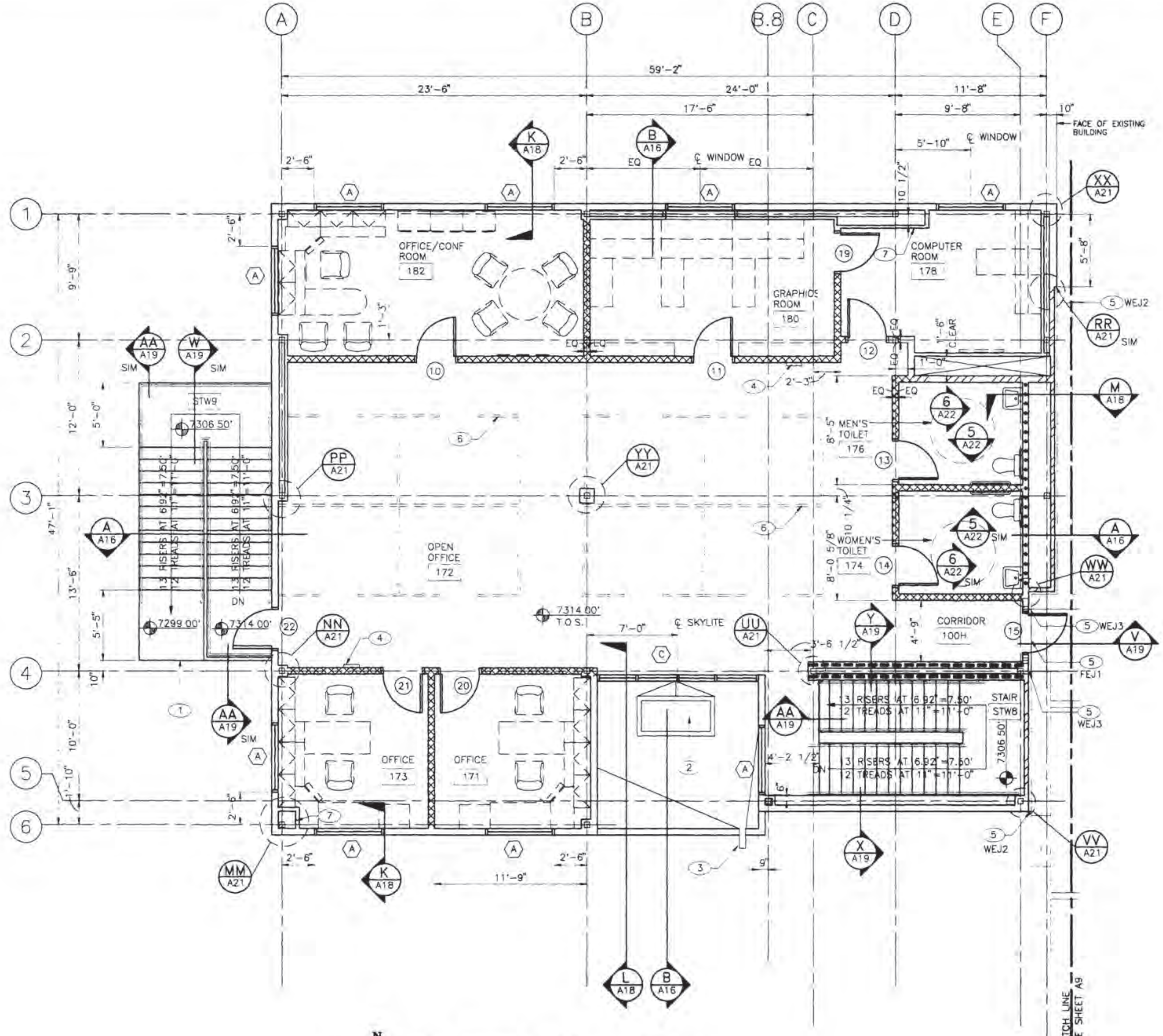
Los Alamos — LOS ALAMOS NATIONAL LABORATORY, LOS ALAMOS, NEW MEXICO 87545

SHEET A7 — 26 OF 72

CLASSIFICATION REVIEWER DATE

PROJECT I.D. NO. 13178

DRAWING NO. C49784



FIRST FLOOR PLAN – AREA A

GENERAL NOTES

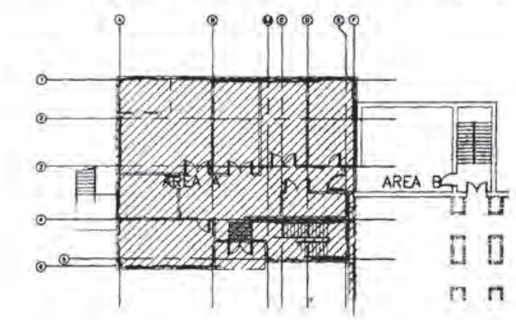
A. ALL DIMENSIONS ARE FROM FACE OF STUD, UNLESS NOTED OTHERWISE.
A. CONTRACTOR TO VERIFY EXISTING CONDITIONS AND NOTIFY UNIVERSITY OF ANY DISCREPANCIES BETWEEN EXISTING AND THESE DOCUMENTS.

KEYED NOTES

1. CONCRETE STOOP
2. SKYLIGHT.
3. SCUPPER. SEE DETAIL FF/A20
4. FIRE EXTINGUISHER CABINET.
5. EXPANSION JOINT COVER
6. OFFICE PARTITIONS, GFE AND INSTALLED.
7. 24" X 24" ACCESS DOOR

LEGEND

- PARTITION TYPE P-1 – 1 HR. FIRE RATED PARTITION.
- PARTITION TYPE P-2 – SOUND PARTITION
- PARTITION TYPE P-3 – 2 HR. FIRE RATED SHAFT WALL PARITION.
- PARTITION TYPE P-4 – 1 HR. FIRE RATED SHAFT WALL PARITION.
- PARTITION TYPE P-5 – FURRED WALL.
- PARTITION TYPE P-6 – 2HR. RATED PARTITION.
- PARTITION TYPE P-7 – 1HR. RATED PARTITION.



KEYPLAN

NOT FOR CONSTRUCTION

NO	DATE	CLASS REV	REVISIONS	DWN	DES	CHKD	REL	SUB	REC	APP
1	4/97		RECORD DRAWINGS WITH CHANGES							

CHAVEZ-GRIEVES CONSULTING ENGINEERS INC.
BRIDGERS & PAXTON CONSULTING ENGINEERS INC.
FLATOW MOORE SHAFFER McCABE – CONSULTING ARCHITECT

BIOPHYSICS LAB ADDITION

ARCH. FIRST FLOOR PLAN – AREA A

BLDG 01 TA-43

DRAWN	J. GONZALES
DESIGN	T. WILBER
CHECKED	T. FLATOW
RELEASED	D. GRIEVES
DATE	02-[illegible]

SUBMITTED L. WEBSTER
APPROVED B. BURTSCHELL

Los Alamos — LOS ALAMOS NATIONAL LABORATORY, LOS ALAMOS, NEW MEXICO [illegible]

SHEET A8 — 27 OF 72

CLASSIFICATION — REVIEWER

PROJECT I.D. NO. 13178

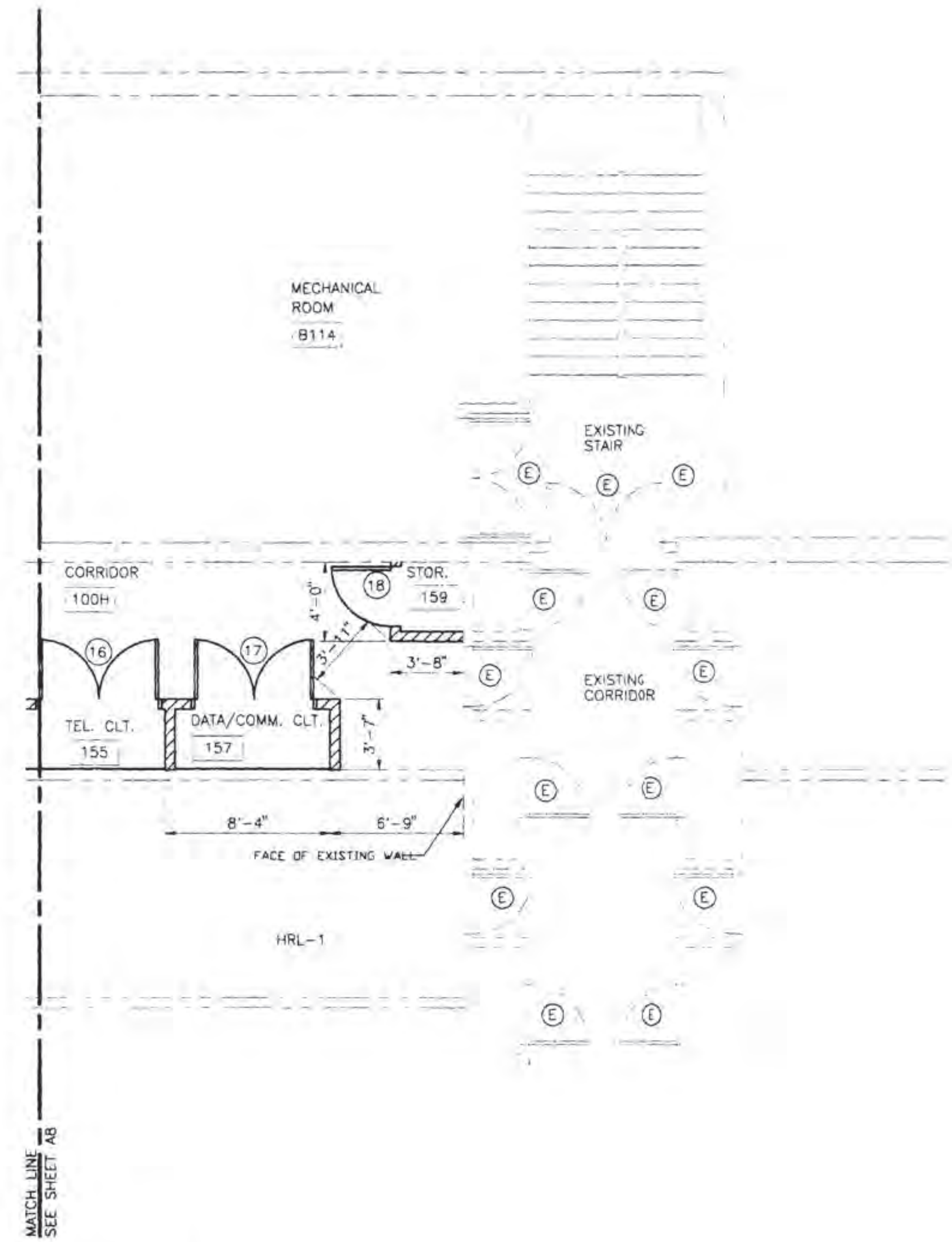
DRAWING NO. C49784

GENERAL NOTES

A. CONTRACTOR TO VERIFY EXISTING CONDITIONS AND NOTIFY ... OF ANY DISCREPANCIES BETWEEN EXISTING AND THESE DOCUMENTS.

LEGEND

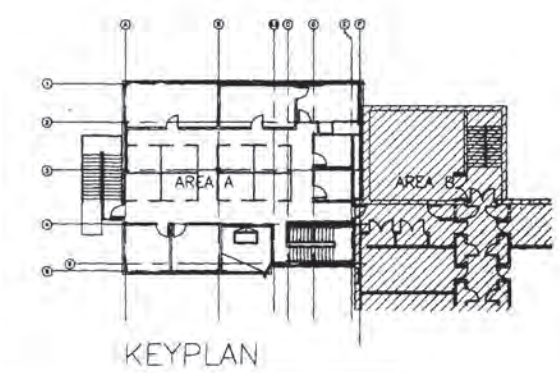
PARTITION TYPE P-1 - 1 HR. FIRE RATED PARTITION



N

FIRST FLOOR PLAN - AREA B

1/4"=1'-0"



KEYPLAN

NO	DATE	CLASS REV.	REVISIONS	DWN	DES	CHKD	REL	SUB	REC	APP
1	4/97		RECORD DRAWINGS WITHOUT CHANGES							

CHAVEZ-GRIEVES CONSULTING ENGINEERS INC.
BRIDGERS & PAXTON CONSULTING ENGINEERS INC.
FLATOW MOORE SHAFFER McCABE - CONSULTING ARCHITECTS

BIOPHYSICS LAB ADDITION

ARCH: FIRST FLOOR PLAN - AREA B

BLDG. 01 TA-35

DRAWN	J. GONZALES
DESIGN	T. WILBER
CHECKED	T. FLATOW
RELEASED	
DATE	

SUBMITTED L. WEBSTER

APPROVED B. BURTSCHELL

Los Alamos — LOS ALAMOS NATIONAL LABORATORY, LOS ALAMOS, NEW MEXICO 87545

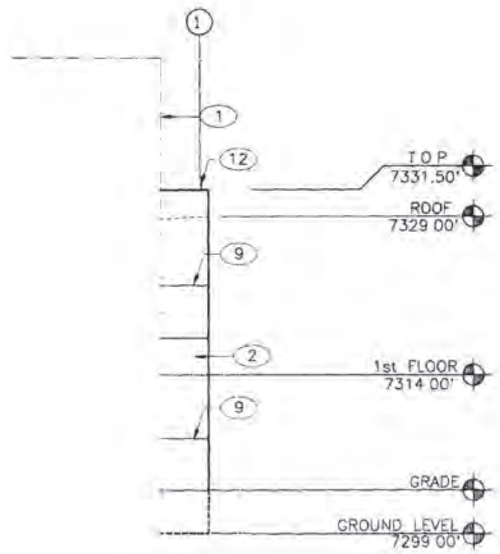
SHEET A9 — 28 OF 72

CLASSIFICATION

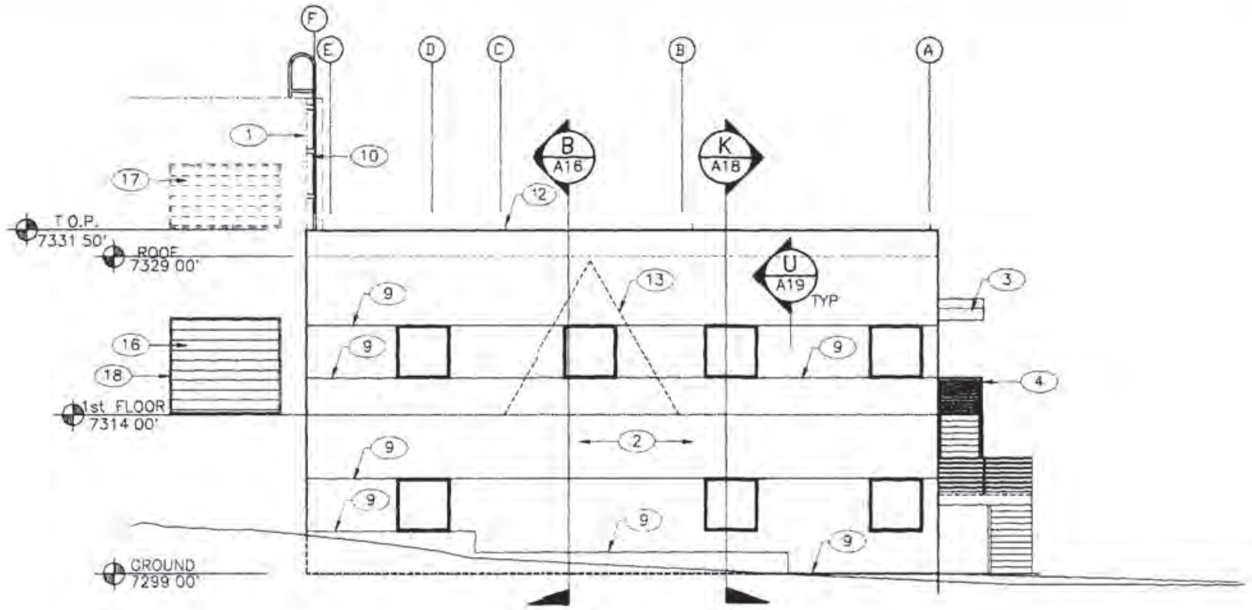
REVIEWER

PROJECT I.D. NO. 13178

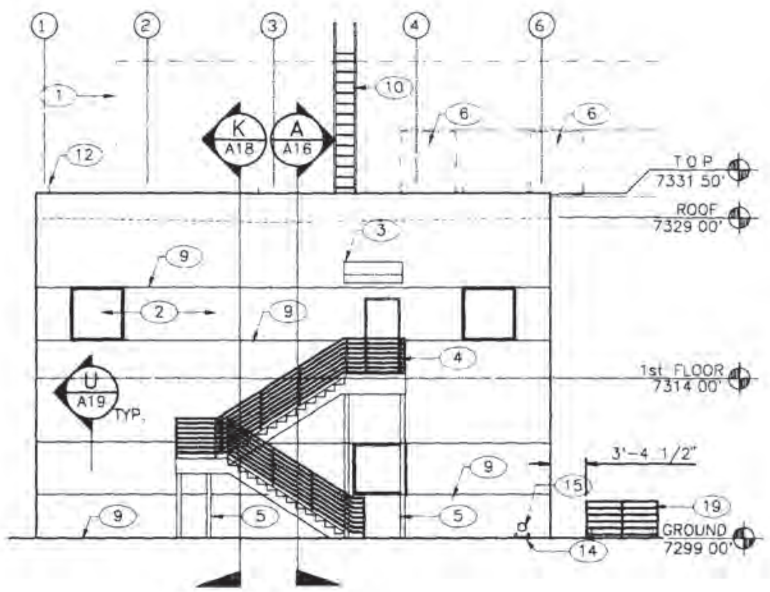
DRAWING NO. C49784



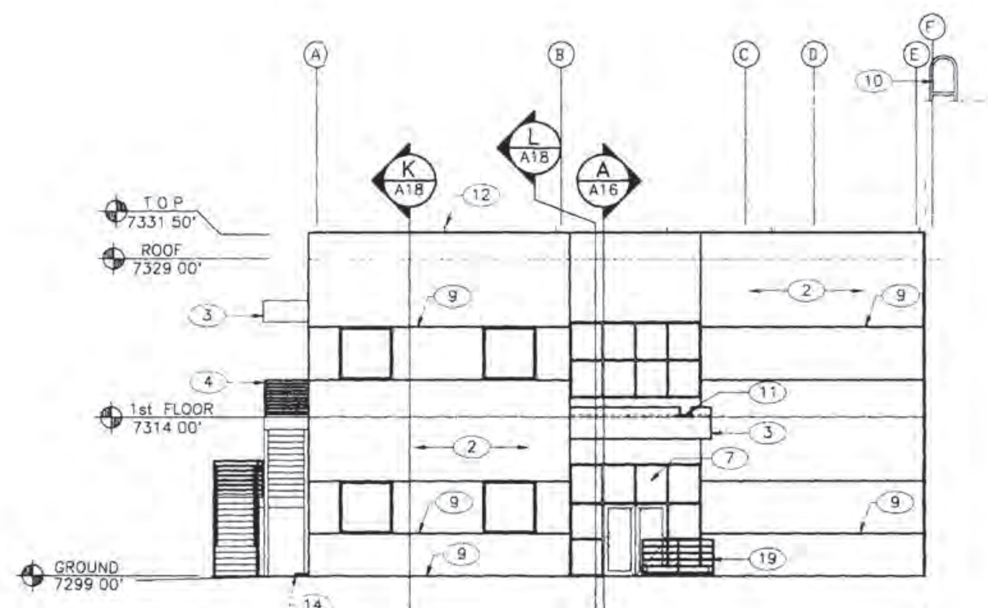
EAST ELEVATION (1/A6)
SCALE 1/8" = 1'-0"



NORTH ELEVATION (2/A6)
SCALE 1/8" = 1'-0"



WEST ELEVATION (3/A6)
SCALE 1/8" = 1'-0"



SOUTH ELEVATION (4/A6)
SCALE 1/8" = 1'-0"

0 1' 2' 4' 10' 20'
1/8"=1'-0"

KEYED NOTES

1. EXISTING BUILDING
2. EXTERIOR INSULATION FINISH SYSTEM. (EIFS)
3. CANOPY
4. 1 1/2" DIA. STEEL PIPE GUARDRAIL
5. T.S. 4 X 4.
6. REPLACE EXISTING GLAZING WITH 1/4" WIRE GLASS
7. STOREFRONT GLAZING SYSTEM
8. NOT USED
9. EIFS REVEAL
10. LADDER
11. SCUPPER. REFERENCE DETAIL FF/A20
12. LIGHTNING PROTECTION ROD
13. LINE OF STRUCTURAL STEEL BRACE
14. 8" X 16" CONCRETE SPLASH BLOCK
15. OVERFLOW DRAIN OUTLET
16. MECHANICAL LOUVER. COORDINATE LOCATION WITH MECHANICAL SHEET M5. PAINT TO MATCH EXISTING LOUVER ABOVE
17. EXISTING LOUVER TO REMAIN
18. PATCH AND REPAIR PERIMETER OF EXISTING WALL. MATCH EXISTING COLOR AND TEXTURE
19. 42" A.F.F. GUARDRAIL AROUND ACCESS HATCH

NO	DATE	CLASS REV	REVISIONS	DWN	DES	CHKD	REL	SUB	REC	APP
1	4/97		RECORD DRAWINGS WITH CHANGES							

CHAVEZ-GRIEVES CONSULTING ENGINEERS INC.
BRIDGERS & PAXTON CONSULTING ENGINEERS INC.
FLATOW MOORE SHAFFER McCABE - CONSULTING ARCHITECT

BIOPHYSICS LAB ADDITION
ARCH BUILDING ELEVATIONS

DRAWN	J. GONZALES
DESIGN	T. WILBER
CHECKED	T. FLATOW
RELEASED	D. GRIEVES
DATE	02-26-96

BLDG 01 TA-43

SUBMITTED L. WEBSTER
APPROVED B. BURTSCHELL

Los Alamos — LOS ALAMOS NATIONAL LABORATORY, LOS ALAMOS, NEW MEXICO 87545

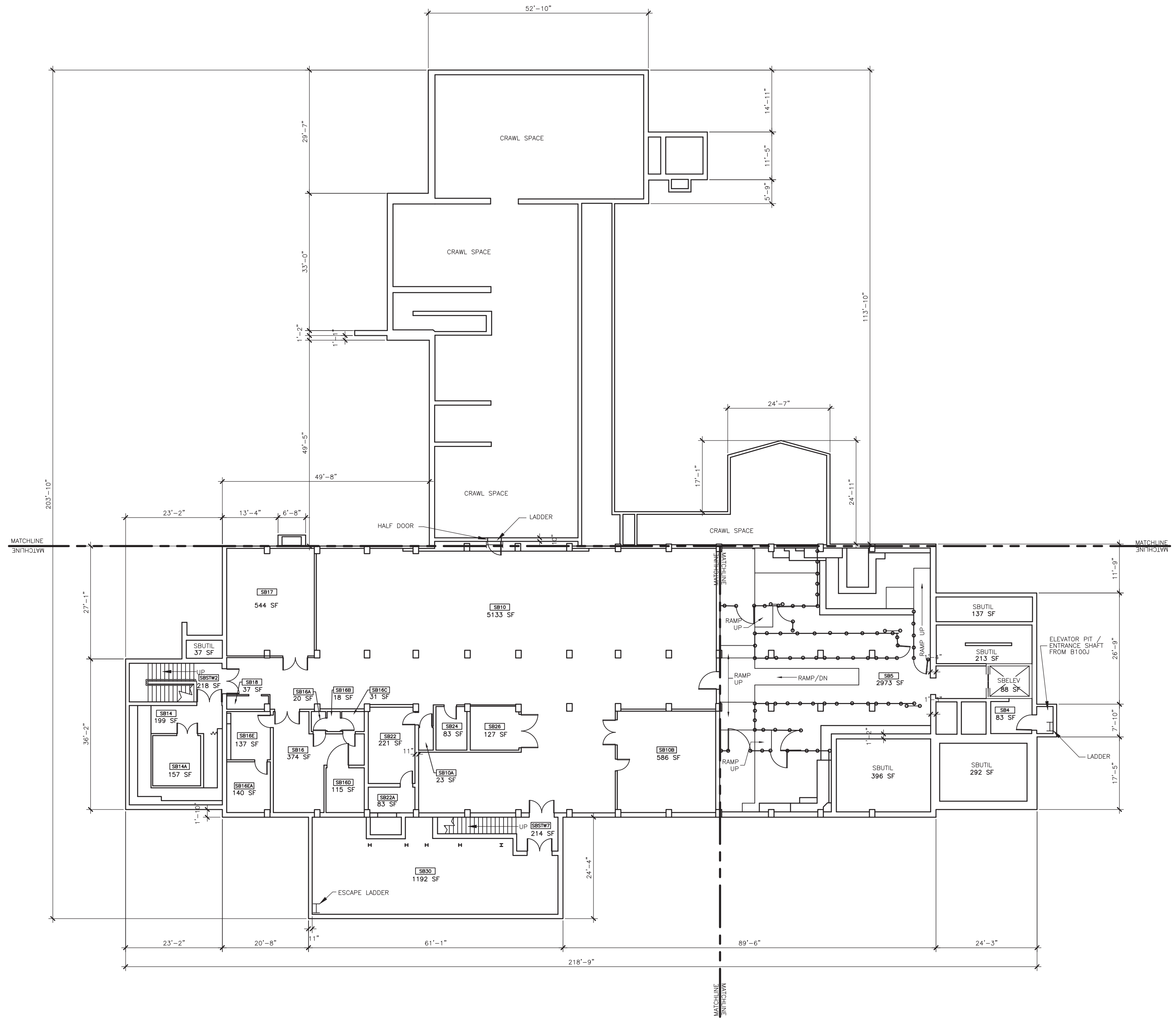
SHEET A15 — 34 of 72

CLASSIFICATION | REVIEWER | DATE

PROJECT I.D. NO. 13178

DRAWING NO. C-049784

STATE OF NEW MEXICO — TOBIAS FLATOW — NO. 1840 — REGISTERED ARCHITECT



SUB-BASEMENT PLAN

4' 0 4' 8' 12' 16'

1/16"=1'-0"

TOTAL EXTERIOR GROSS AREA = 103,369 SF

TOTAL INTERIOR GROSS AREA = 95,675 SF

GENERAL NOTES:

1. IF THIS SHEET IS NOT 24"X36" USE GRAPHIC SCALE ACCORDINGLY
2. EXTERIOR WALL THICKNESS IS 12" UNLESS OTHERWISE NOTED
3. INTERIOR WALL THICKNESS IS 6" UNLESS OTHERWISE NOTED
4. INTERIOR GROSS MEASURED AREA SHALL MEAN THE TOTAL AREA OF A BUILDING ENCLOSED BY THE DOMINANT PORTION, EXCLUDING PARKING AREAS AND LOADING DOCKS (OR PORTION OF SAME) OUTSIDE THE BUILDING CALCULATED BY A FLOOR BY FLOOR BASIS
5. ANAI/BOMA Z65.1-2010 STANDARD METHOD USED FOR MEASURING FLOOR AREA IN BUILDINGS
6. FIELD VALIDATION DATE: 01-14-2004

"PRIORITY DRAWING"

NO	DATE	CLASS REV	DC	DESCRIPTION	DWN	DSGN	CHKD	SUB	APP
0				INITIAL ISSUE					

FACILITY PLANNING

FLOOR PLAN OF RECORD
HEALTH RESEARCH LABORATORY

ARCH: SUB-BASEMENT PLAN

TA-43 BLDG 0001

DRAWN	E. SEAWALT
VERIFIED	V. GALLEGOS
CHECKED	E. SEAWALT
DATE	9/20/2005

SUBMITTED: RICHARD TROUT

APPROVED FOR RELEASE: EDWARD J SEAWALT

Los Alamos NATIONAL LABORATORY

PO Box 1663
Los Alamos, New Mexico 87545

SHEET A-1000

1 OF 1

D.C.: UNCLASSIFIED

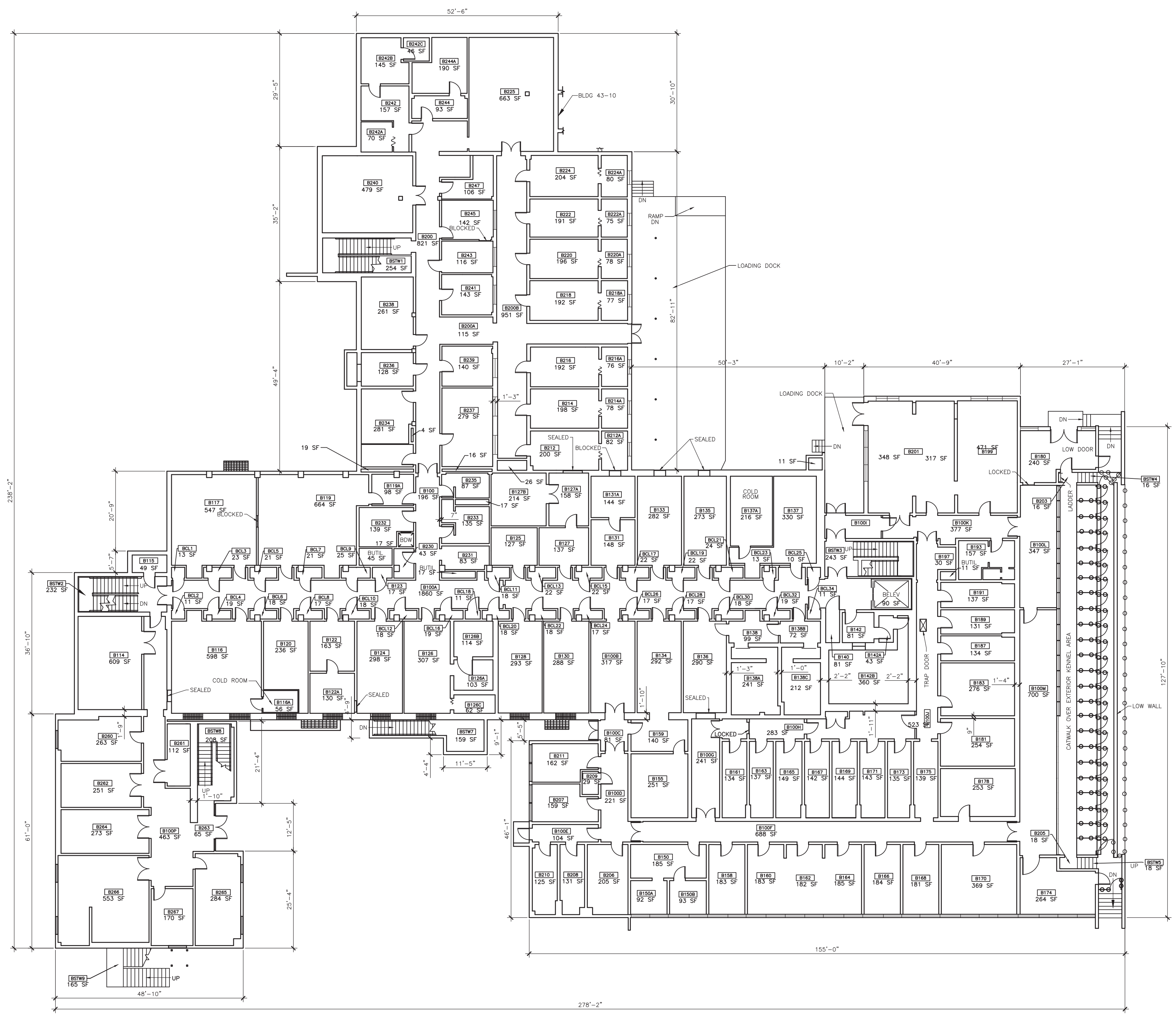
REVIEWER: EDWARD J SEAWALT

DATE: 9/20/2005

PROJECT ID: CHAPTER 4

DRAWING NO: FPR_43_0001_B2

REV 0



BASEMENT PLAN

4' 0 4' 8' 12' 16'

1/16"=1'-0"

TOTAL EXTERIOR GROSS AREA = 103,369 SF

TOTAL INTERIOR GROSS AREA = 95,675 SF

GENERAL NOTES:

1. IF THIS SHEET IS NOT 24"X36" USE GRAPHIC SCALE ACCORDINGLY
2. EXTERIOR WALL THICKNESS IS 12" UNLESS OTHERWISE NOTED
3. INTERIOR WALL THICKNESS IS 6" UNLESS OTHERWISE NOTED
4. INTERIOR GROSS MEASURED AREA SHALL MEAN THE TOTAL AREA OF A BUILDING ENCLOSED BY THE DOMINANT PORTION, EXCLUDING PARKING AREAS AND LOADING DOCKS (OR PORTION OF SAME) OUTSIDE THE BUILDING CALCULATED BY A FLOOR BY FLOOR BASIS
5. ANAI/BOMA Z65.1-2010 STANDARD METHOD USED FOR MEASURING FLOOR AREA IN BUILDINGS
6. FIELD VALIDATION DATE: 01-14-2004

"PRIORITY DRAWING"

NO	DATE	CLASS REV	DC	DESCRIPTION	DWN	DSGN	CHKD	SUB	APP
0				INITIAL ISSUE					

FACILITY PLANNING

FLOOR PLAN OF RECORD
HEALTH RESEARCH LABORATORY

ARCH: BASEMENT PLAN

DRAWN	E. SEAWALT
VERIFIED	V. GALLEGOS
CHECKED	E. SEAWALT
DATE	9/20/2005

TA-43 BLDG 0001

SUBMITTED: RICHARD TROUT

APPROVED FOR RELEASE: EDWARD J SEAWALT

Los Alamos NATIONAL LABORATORY

PO Box 1663
Los Alamos, New Mexico 87545

SHEET A-1000

1 OF 1

D.C.: UNCLASSIFIED

REVIEWER: EDWARD J SEAWALT

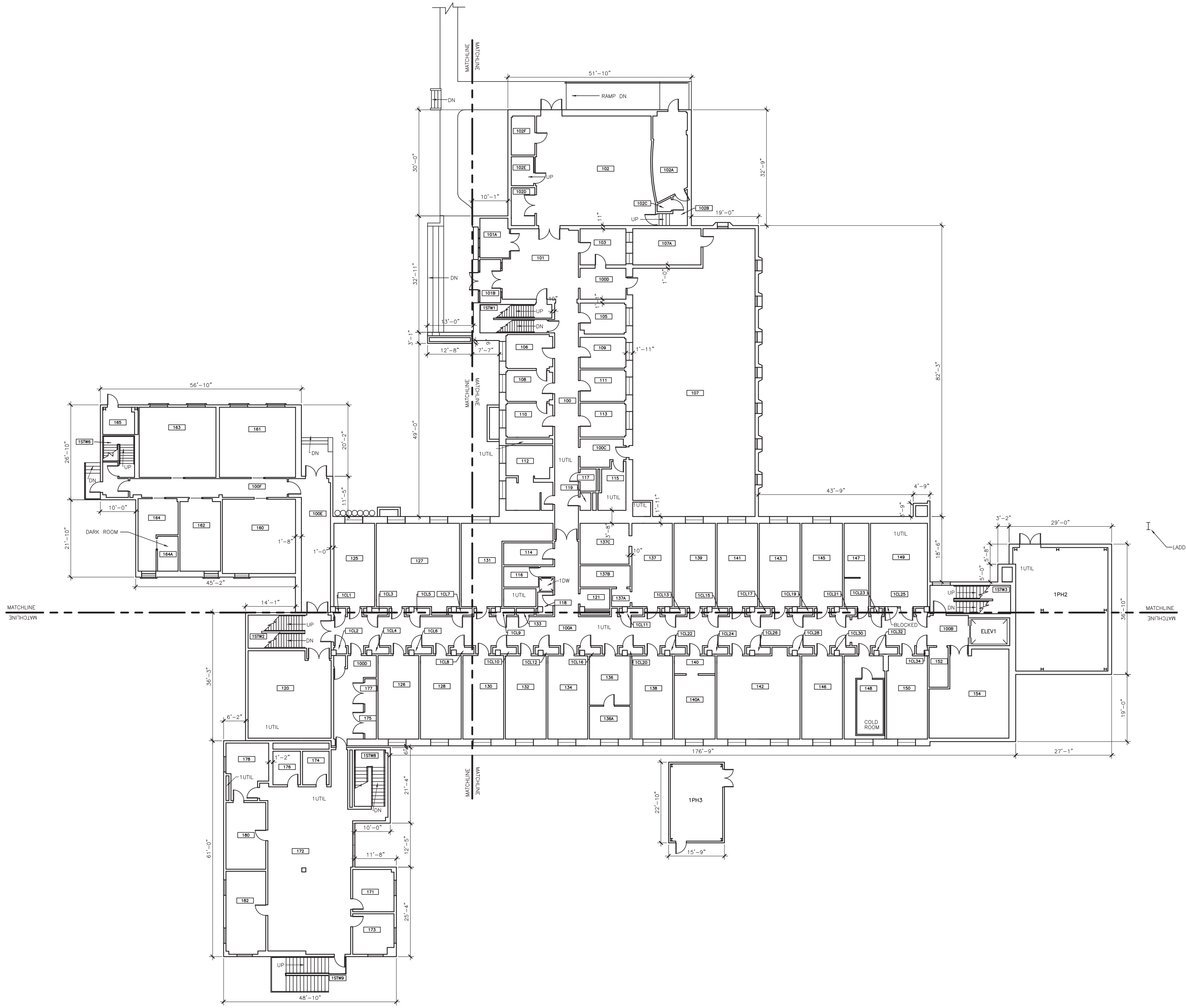
DATE: 9/20/2005

PROJECT ID: CHAPTER 4

DRAWING NO: FPR_43_0001_B1

REV 0

1	2	3	4	5	6



FIRST FLOOR PLAN

4' 0 4' 8' 12' 16'

1/16"=1'-0"

TOTAL EXTERIOR GROSS AREA = 103,369 SF

TOTAL INTERIOR GROSS AREA = 95,675 SF

GENERAL NOTES:

1. IF THIS SHEET IS NOT 24"X36" USE GRAPHIC SCALE ACCORDINGLY
2. EXTERIOR WALL THICKNESS IS 12" UNLESS OTHERWISE NOTED
3. INTERIOR WALL THICKNESS IS 6" UNLESS OTHERWISE NOTED
4. INTERIOR GROSS MEASURED AREA SHALL MEAN THE TOTAL AREA OF A BUILDING ENCLOSED BY THE DOMINANT PORTION, EXCLUDING PARKING AREAS AND LOADING DOCKS (OR PORTION OF SAME) OUTSIDE THE BUILDING CALCULATED BY A FLOOR BY FLOOR BASIS
5. ANAI/BOMA Z65.1-2010 STANDARD METHOD USED FOR MEASURING FLOOR AREA IN BUILDINGS
6. FIELD VALIDATION DATE: 01-14-2004

"PRIORITY DRAWING"

NO	DATE	CLASS REV	DC	DESCRIPTION	DWN	DSGN	CHKD	SUB	APP
0				INITIAL ISSUE					

FACILITY PLANNING

FLOOR PLAN OF RECORD
HEALTH RESEARCH LABORATORY

ARCH: FIRST FLOOR PLAN

TA-43 BLDG 0001

DRAWN: E. SEAWALT
VERIFIED: V. GALLEGOS
CHECKED: E. SEAWALT
DATE: 9/20/2005

SUBMITTED: RICHARD TROUT
APPROVED FOR RELEASE: EDWARD J SEAWALT

Los Alamos NATIONAL LABORATORY

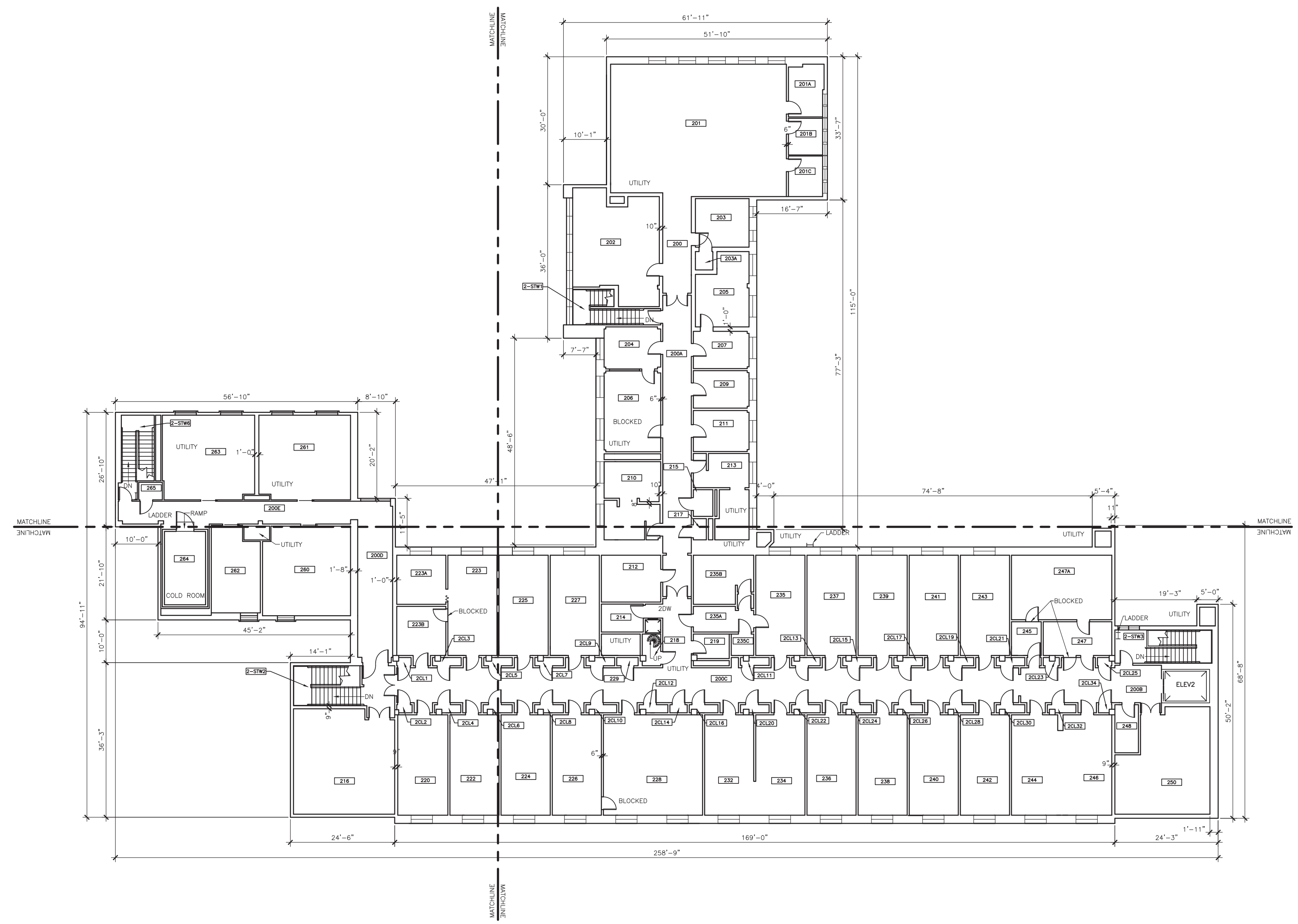
PO Box 1663
Los Alamos, New Mexico 87545

SHEET A-1001
1 OF 1

D.C.: UNCLASSIFIED
REVIEWER: EDWARD J SEAWALT
DATE: 9/20/2005

PROJECT ID: CHAPTER 4
DRAWING NO: FPR_43_0001_01
REV: 0

1	2	3	4	5	6



SECOND FLOOR PLAN

4' 0 4' 8' 12' 16'

1/16"=1'-0"

TOTAL EXTERIOR GROSS AREA = 103,369 SF

TOTAL INTERIOR GROSS AREA = 95,675 SF

GENERAL NOTES:

1. IF THIS SHEET IS NOT 24"X36" USE GRAPHIC SCALE ACCORDINGLY
2. EXTERIOR WALL THICKNESS IS 12" UNLESS OTHERWISE NOTED
3. INTERIOR WALL THICKNESS IS 6" UNLESS OTHERWISE NOTED
4. INTERIOR GROSS MEASURED AREA SHALL MEAN THE TOTAL AREA OF A BUILDING ENCLOSED BY THE DOMINANT PORTION, EXCLUDING PARKING AREAS AND LOADING DOCKS (OR PORTION OF SAME) OUTSIDE THE BUILDING CALCULATED BY A FLOOR BY FLOOR BASIS
5. ANAI/BOMA Z65.1-2010 STANDARD METHOD USED FOR MEASURING FLOOR AREA IN BUILDINGS
6. FIELD VALIDATION DATE: 01-14-2004

"PRIORITY DRAWING"

NO	DATE	CLASS REV	DC	DESCRIPTION	DWN	DSGN	CHKD	SUB	APP
0				INITIAL ISSUE					

FACILITY PLANNING

FLOOR PLAN OF RECORD
HEALTH RESEARCH LABORATORY

ARCH: SECOND FLOOR PLAN

TA-43 BLDG 0001

DRAWN	E. SEAWALT
VERIFIED	V. GALLEGOS
CHECKED	E. SEAWALT
DATE	9/20/2005

SUBMITTED RICHARD TROUT

APPROVED FOR RELEASE EDWARD J SEAWALT

Los Alamos NATIONAL LABORATORY

P0 Box 1663
Los Alamos, New Mexico 87545

SHEET A-1002

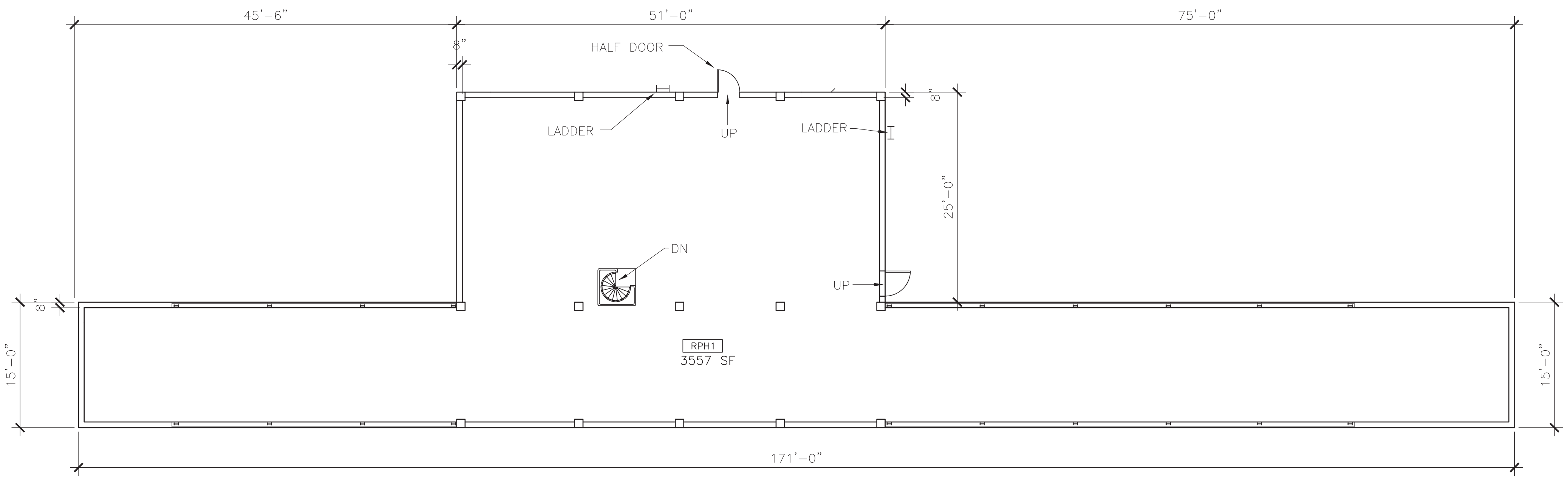
1 OF 1

D.C.: UNCLASSIFIED REVIEWER: EDWARD J SEAWALT DATE: 9/20/2005

PROJECT ID CHAPTER 4

DRAWING NO FPR_43_0001_02

REV 0



PENTHOUSE FLOOR PLAN

4' 2' 0 4' 8' 12'

1/8"=1'-0"

TOTAL EXTERIOR GROSS AREA = 103,369 SF

TOTAL INTERIOR GROSS AREA = 95,675 SF

GENERAL NOTES:

1. IF THIS SHEET IS NOT 24"X36" USE GRAPHIC SCALE ACCORDINGLY
2. EXTERIOR WALL THICKNESS IS 8" UNLESS OTHERWISE NOTED.
3. INTERIOR WALL THICKNESS IS 5" UNLESS OTHERWISE NOTED.
4. INTERIOR GROSS MEASURED AREA SHALL MEAN THE TOTAL AREA OF A BUILDING ENCLOSED BY THE DOMINANT PORTION,EXCLUDING PARKING AREAS AND LOADING DOCKS (OR PORTION OF SAME) OUTSIDE THE BUILDING CALCULATED BY A FLOOR BY FLOOR BASIS
5. ANSI/BOMA Z65.1-2010 STANDARD METHOD USED FOR MEASURING FLOOR AREA IN BUILDINGS
6. FIELD VALIDATION DATE: 01-14-04

"PRIORITY DRAWING"

NO	DATE	CLASS REV	DC	DESCRIPTION	DWN	DSGN	CHKD	SUB	APP
0				INITIAL ISSUE					

FACILITY PLANNING

FLOOR PLAN OF RECORD
HEALTH RESEARCH LABORATORY
ARCH: PENTHOUSE FLOOR PLAN

TA-43 BLDG 0001

DRAWN	K.BREWER
VERIFIED	G.LOPEZ
CHECKED	E.SEAWALT
DATE	02-02-05

SUBMITTED RICHARD TROUT

APPROVED FOR RELEASE EDWARD J SEAWALT

Los Alamos NATIONAL LABORATORY

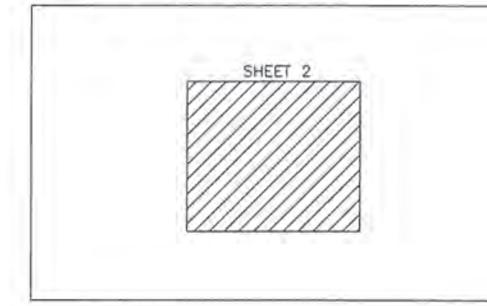
PO Box 1663
Los Alamos, New Mexico 87545

SHEET A-1003
1 OF 1

D.C.: UNCLASSIFIED REVIEWER: EDWARD J SEAWALT DATE: 07-29-02

PROJECT ID CHAPTER 4 DRAWING NO FPR_43_0001_PH1 REV 0

KEY MAP



STRUCTURE LOCATION INDEX

STRUCTURE TA NUMBER	STRUCTURE DESIGNATION	STRUCTURE NOMENCLATURE	LOCATOR SHEET NO.	LOCATOR MAP KEY
43-1	43-1	HEALTH RESEARCH LABORATORY	2	B-3
43-10	43-10	SEWAGE LIFT STATION	2	B-2
43-12	43-12	WAREHOUSE	2	B-3
43-22	43-22	METAL SHED	2	B-3
43-28	43-28	GARAGE SHED	2	B-3
43-36	43-36	STORAGE SHED	2	B-3
43-37	43-37	TRAILER	2	B-2
43-44	43-44	COOLING TOWER	2	A-3
43-46	43-46	STORAGE BLDG.	2	B-3
43-47	43-47	SAFETY STORAGE SHED	2	B-3
43-49	43-49	SAFETY STORAGE SHED	2	B-3
43-61	43-61	SAFETY STORAGE SHED	2	B-3

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NO	DATE	CLASS REV	DESCRIPTION	DWN	VER	CHKD	SUB	APP
7	07-02-13		REVISED TO REMOVE STRUCTURE 20	RDG	RDG	RAG	HMS	GFB
6	06-26-12		REVISED TO REMOVE STRUCTURES 24 & 45	RDG	RDG	RAG	HMS	GFB
5	01-31-08		REVISED TO STATUS OF 01-31-08	LHV	HPR	RAG	HMS	MGB
4	03-26-01		REVISED TO STATUS OF 03-26-01	HPR	SAD	CES	HMS	LAB

UTILITIES AND INSTITUTIONAL FACILITIES

AS-BUILT STRUCTURE LOCATION MAPS

TA-43

HEALTH RESEARCH LAB & DOE HDQRS

DRAWN	M. GALLEGOS
VERIFIED	M. GALLEGOS
CHECKED	H. SALAZAR
DATE	02-22-95

SUBMITTED HAROLD SALAZAR

APPROVED FOR RELEASE LARRY BAYS

Los Alamos NATIONAL LABORATORY PO Box 1663 Los Alamos, New Mexico 87545

SHEET 2

2 OF 2

CLASSIFICATION

REVIEWER H. SALAZAR

DATE

PROJECT ID JCI NO 91-020 11952

DRAWING NO AB33

REV 7

Appendix G: TA-43-0001 List of All Drawings

Technical Area	Facility Number	Object Name	LANL Title	Date on Document
43	0001	SK994-00003	MEDICAL RESEARCH LABORATORY, ARCH; SECOND FLOOR PLAN & ROOF PLANS	27-Jul-1949
43	0001	UE C011233	Index Sheet	16-Aug-1951
43	0001	UE C011235	Plot Plan Grading & Drainage	20-Aug-1951
43	0001	UE C011240	Structural Roof Framing Plan	20-Aug-1951
43	0001	UE C011243	Structural Schedules Sheet 2	20-Aug-1951
43	0001	UE C011246	Structural Standard Details	20-Aug-1951
43	0001	UE C011248	Architectural Basement Plan - Room Fin. Sched.	20-Aug-1951
43	0001	UE C011252	Architectural Elevations	20-Aug-1951
43	0001	UE C011256	Architectural Window Schedule & Details	20-Aug-1951
43	0001	UE C011261	Architectural Room Elevation & Details	20-Aug-1951
43	0001	UE C011265	Occupancy Basement South	20-Aug-1951
43	0001	UE C011269	Occupancy Second Floor South	20-Aug-1951
43	0001	UE C011274	Plumbing First Floor Wastes & Vents Piping & Details	20-Aug-1951
43	0001	UE C011276	Plumbing Roof Plan Sprinkler Heads & Piping and Piping Diagrams	20-Aug-1951
43	0001	UE C011281	Plumbing Basement South Half Laboratory Services	20-Aug-1951
43	0001	UE C011286	Plumbing Penthouse Laboratory Services	20-Aug-1951
43	0001	UE C011291	Plumbing Laboratory Waste & Vent Diagrams	20-Aug-1951
43	0001	UE C011296	Mechanical Basement Heating & Ventilating	20-Aug-1951
43	0001	UE C011300	Mechanical Sub-Basement South Half Heating & Ventilating	20-Aug-1951
43	0001	UE C011303	Mechanical First Floor North Half Heating & Ventilating	20-Aug-1951
43	0001	UE C011307	Mechanical Penthouse Heating & Ventilating	20-Aug-1951
43	0001	UE C011310	Mechanical Equipment Details	20-Aug-1951
43	0001	UE C011314	Electrical Riser Diagram of Power Station	20-Aug-1951
43	0001	UE C011317	Electrical Typical Lighting Fixture Details	20-Aug-1951
43	0001	UE C011239	Structural Second Floor Framing Plan	20-Aug-1951
43	0001	UE C011242	Structural Schedules Sheet 1	20-Aug-1951
43	0001	UE C011245	Structural Details Sheet	20-Aug-1951
43	0001	UE C011247	Architectural Sub-Basement Plan	20-Aug-1951
43	0001	UE C011251	Architectural Elevations	20-Aug-1951
43	0001	UE C011255	Architectural Stair Details	20-Aug-1951
43	0001	UE C011260	Architectural Miscellaneous Wall Elevations & Details	20-Aug-1951
43	0001	UE C011264	Occupancy Basement North	20-Aug-1951
43	0001	UE C011268	Occupancy Second Floor North	20-Aug-1951
43	0001	UE C011273	Plumbing Basement Wastes & Vents Piping & Details	20-Aug-1951
43	0001	UE C011280	Plumbing Basement North Half Laboratory Services	20-Aug-1951
43	0001	UE C011285	Plumbing Second Floor South Half Laboratory Services	20-Aug-1951
43	0001	UE C011290	Plumbing Hot Water & Hot Water Circulating Risers Diagrams	20-Aug-1951
43	0001	UE C011295	Mechanical Sub-Basement Heating	20-Aug-1951

Appendix G: TA-43-0001 List of All Drawings

Technical Area	Facility Number	Object Name	LANL Title	Date on Document
43	0001	UE C011299	Mechanical Sub-Basement North Half Heating & Ventilating	20-Aug-1951
43	0001	UE C011302	Mechanical Basement South Half Heating & Ventilating	20-Aug-1951
43	0001	UE C011306	Mechanical Second Floor South Half Heating & Ventilating	20-Aug-1951
43	0001	UE C011309	Mechanical Equipment Details	20-Aug-1951
43	0001	UE C011313	Electrical New Switch Gear in Electrical Sub-Station N Los Alamos Hospital	20-Aug-1951
43	0001	UE C011316	Electrical Laboratory Riser Diagrams	20-Aug-1951
43	0001	UE C011328	Electrical Penthouse Electric & Communications	20-Aug-1951
43	0001	UE C011236	Structural Foundation & Sub-Basement Plan	20-Aug-1951
43	0001	UE C011238	Structural First Floor Framing Plan	20-Aug-1951
43	0001	UE C011241	Structural Penthouse Roof Framing	20-Aug-1951
43	0001	UE C011244	Structural Details Sheet 2	20-Aug-1951
43	0001	UE C011250	Architectural Second Fl. Plan - Room Fin. Sched.	20-Aug-1951
43	0001	UE C011254	Architectural Details	20-Aug-1951
43	0001	UE C011259	Architectural Roof Plan - Penthouse Plan - Exp. Joint Details	20-Aug-1951
43	0001	UE C011263	Architectural Miscellaneous Details & Fume Hood Schedule	20-Aug-1951
43	0001	UE C011267	Occupancy First Floor South	20-Aug-1951
43	0001	UE C011272	Plumbing Sub-Basement Sewers, Drains, Wastes, & Mains	20-Aug-1951
43	0001	UE C011279	Plumbing Sub-Basement South Half Laboratory Services	20-Aug-1951
43	0001	UE C011284	Plumbing Second Floor North Half Laboratory Services	20-Aug-1951
43	0001	UE C011289	Plumbing Distilled Water Diagrams & Miscellaneous Diagrams	20-Aug-1951
43	0001	UE C011294	Plumbing Miscellaneous Connection & Diagrams	20-Aug-1951
43	0001	UE C011298	Mechanical Second Floor Heating & Ventilating	20-Aug-1951
43	0001	UE C011301	Mechanical Basement North Half Heating & Ventilating	20-Aug-1951
43	0001	UE C011305	Mechanical Second Floor North Half Heating & Ventilating	20-Aug-1951
43	0001	UE C011308	Mechanical Heating & Cooling Equipment Schedule	20-Aug-1951
43	0001	UE C011312	Electrical Plot Plan & Lighting Protection System	20-Aug-1951
43	0001	UE C011315	Electrical Motor & Starter Data Sheet	20-Aug-1951
43	0001	UE C011337	Utilities Sewage Lift Station Plans & Details	20-Aug-1951
43	0001	UE C011249	Architectural First Fl. Plan - Room Fin. Sched.	20-Aug-1951
43	0001	UE C011253	Architectural Building Sections & Partition Details	20-Aug-1951
43	0001	UE C011258	Architectural Elevators - Dumbwaiter Spiral Stair - Color Schedule	20-Aug-1951
43	0001	UE C011262	Architectural Miscellaneous Details	20-Aug-1951
43	0001	UE C011266	Occupancy First Floor North	20-Aug-1951
43	0001	UE C011271	Occupancy Equipment Diagrams	20-Aug-1951
43	0001	UE C011278	Plumbing Sub-Basement North Half Laboratory Services	20-Aug-1951
43	0001	UE C011283	Plumbing First Floor South Half Laboratory Services	20-Aug-1951
43	0001	UE C011288	Plumbing Chilled Water & Ch. Water Return Risers Diagrams	20-Aug-1951
43	0001	UE C011293	Plumbing Gas-Compressed Air & Dry Vacuum Risers	20-Aug-1951

Technical Area	Facility Number	Object Name	LANL Title	Date on Document
43	0001	UE C011297	Mechanical First Floor Heating & Ventilating	20-Aug-1951
43	0001	UE C011304	Mechanical First Floor South Half Heating & Ventilating	20-Aug-1951
43	0001	UE C011311	Mechanical Refrigerating Equipment Diagrams & Schedules	20-Aug-1951
43	0001	UE C011336	Utilities Water, Sewer, Gas, & Steam Lines and Acid Sewers	20-Aug-1951
43	0001	UE C011234	Plot Plan Typical Road & Parking Lot Details & Sections	20-Aug-1951
43	0001	UE C011257	Architectural Cold Room Details & Door Schedule	20-Aug-1951
43	0001	UE C011270	Occupancy Equipment Diagrams	20-Aug-1951
43	0001	UE C011282	Plumbing First Floor North Half Laboratory Services	20-Aug-1951
43	0001	UE C011287	Plumbing Cold Water Riser Diagrams	20-Aug-1951
43	0001	UE C011330	Electrical Sub-Basement Fire Alarm System	23-Apr-1952
43	0001	UE C011331	Electrical Basement Fire Alarm System	23-Apr-1952
43	0001	UE C011334	Electrical Penthouse Fire Alarm	23-Apr-1952
43	0001	UE C011333	Electrical Second Floor Fire Alarm System	23-Apr-1952
43	0001	UE C011332	Electrical First Floor Fire Alarm System	23-Apr-1952
43	0001	UE C011237	Structural Basement Plan	28-May-1952
43	0001	UD C002053	Medical Research Laboratory, Type F Vacuum Hood, Rooms 220, 222, 224, 227	17-Nov-1952
43	0001	UE C011327	Electrical Second Floor Plan	29-Nov-1952
43	0001	UE C011321	Electrical Basement Floor Plan	29-Nov-1952
43	0001	UE C011323	Electrical First Floor Plan	29-Nov-1952
43	0001	UE C011326	Electrical Second Floor Plan	29-Nov-1952
43	0001	UE C011320	Electrical Basement Floor Plan	29-Nov-1952
43	0001	C3096-00001	EQUIPMENT INSTALLATION, MECH. PLAN RMS. 139, 141, 143 & 145, TA-43, LAB MR BLDG.	3-Jul-1953
43	0001	C3097-00002	EQUIPMENT INSTALLATION, ELEVATIONS & DETAILS RMS. 139, 141, 143 & 145, TA-43, LA	3-Jul-1953
43	0001	C3098-00003	EQUIPMENT INSTALLATION, ELECT. PLAN, DIAGRAMS & NOTES MR BLDG. RMS. 139, 141, 14	3-Jul-1953
43	0001	UE C011335	Electric Load on Laboratory Panels	3-Jul-1953
43	0001	UE C011319	Electrical Basement Floor Plan & Details	3-Aug-1953
43	0001	UE C011318	Electrical Sub-Basement Floor Plan & Details	3-Aug-1953
43	0001	UE C011322	Electrical First Floor Plan & Details	3-Aug-1953
43	0001	UE C011325	Electrical Second Floor Plan & Details	3-Aug-1953
43	0001	R151-00001	STRUCTURE LOCATION PLAN, MEDICAL RESEARCH LABORATORY	13-Oct-1953
43	0001	UD C003096	Equipment Installation Mechanical Plan, Rooms 139, 141, 143, and 145	22-Dec-1953
43	0001	UD C003097	Equipment Installation Elevations and Details, Rooms 139, 141, 143, and 145	22-Dec-1953
43	0001	UD C003098	Equipment Installation Elect. Plan, diagrams,a nd Notes, Rooms 139, 141, 143, and 145	22-Dec-1953
43	0001	C3287-00001	BLOCK PARTITION RM. 103, PLANS & DETAILS	18-Feb-1954
43	0001	UD C003287	Block partition Plans and Details, Room 103	23-Mar-1954
43	0001	C7598-00001	CONNECTION OF FLOOR DRAINS TO SANITARY SEWER, BLDG. ML-1 (SEE ENG-C 11272 (VOID)	17-Jun-1954

Technical Area	Facility Number	Object Name	LANL Title	Date on Document
43	0001	C8379-00001	RELOCATION OF FRESH AIR INTAKE, BLDG. ML-1, PARTIAL SUB BASEMENT PLAN	2-Jul-1954
43	0001	C8380-00002	RELOCATION OF FRESH AIR INTAKE, MECH. SECTIONS & DETAILS	2-Jul-1954
43	0001	C8381-00003	RELOCATION OF FRESH AIR INTAKE, PENTHOUSE PLAN & DETAILS	2-Jul-1954
43	0001	C8382-00004	RELOCATION OF FRESH AIR INTAKE, PNEUMATIC CONTROLS A/C/ UNITS 1 & 2	2-Jul-1954
43	0001	C8383-00005	RELOCATION OF FRESH AIR INTAKE, EXHAUST LOUVER REPLACEMENT	2-Jul-1954
43	0001	C10649-00001	DESIGN CHANGES TO CHILLED WATER SYS., BLDG. ML-1, PLAN & DETAILS	6-Aug-1954
43	0001	C16025-00001	LAB. MOD., RMS. 127, 138, 140, & 142; ML-1 - FLOOR PLAN & GENERAL NOTES	30-Sep-1954
43	0001	C16026-00002	HOOD & EXHAUST DETAILS, BLDG. ML-1	30-Sep-1954
43	0001	C16027-00003	PLANS & PIPING DIAGRAMS	30-Sep-1954
43	0001	C17360-00001	MODIFICATIONS TO HEATING & VENTILATING SYSTEM, SEMINAR ROOM VENT.	31-Mar-1955
43	0001	C17366-00007	MOD. TO H & V SYS., PLANS DETAILS & MATERIALS	31-Mar-1955
43	0001	C10432-00001	EXHAUSE SYSTEM MODIFICATIONS, BLDG. ML-1	8-Jun-1955
43	0001	C10433-00002	EXHAUST SYSTEM DETAILS	8-Jun-1955
43	0001	C10434-00003	EXHAUST SYSTEM MOD., CONDENSATE PIPING REV., FIRST FLOOR, EQUIP. ROOMS	8-Jun-1955
43	0001	C10435-00004	EXHAUST SYS. MOD., CONDENSATE PIPING REV., SECOND FLOOR, EQUIP. ROOMS	8-Jun-1955
43	0001	R166-00001	STRUCTURE LOCATION PLAN, HEALTH RESEARCH LABORATORY	31-Aug-1955
43	0001	UD C011232	Elec. Modifications - Air Conditioning System Medical Research Laboratory	26-Sep-1955
43	0001	UE C011324	Electrical First Floor Plan	13-Mar-1956
43	0001	UD C011498	Additional Parking Facilities Med. Research Laboratory TA-43	2-May-1956
43	0001	UE C011292	Plumbing Gas-Compressed Air & Dry Vacuum Diagrams	21-May-1956
43	0001	C17416-00001	ELEVATOR EXTENSION & STORAGE FACILITIES HRL-1, SUB-BASEMENT - PLAN & DETAIL	3-Dec-1956
43	0001	C18315-00001	ADDITIONAL ANIMAL QUARTERS, ARCH; PLOT PLAN & FLOOR PLAN	15-Mar-1957
43	0001	C18316-00002	ADDITIONAL ANIMAL QUARTERS, ARCH; TYPICAL SECTIONS	15-Mar-1957
43	0001	SK4610-00001	ADDITIONAL ANIMAL QUARTERS PLOT PLAN AND FLOOR PLAN	15-Mar-1957
43	0001	SK4611-00002	ADDITIONAL ANIMAL QUARTERS TYPICAL SECTIONS	15-Mar-1957
43	0001	C18865-00001	LOW LEVEL CRYSTAL COUNTER SUB-BASEMENT, BLDG. HRL-1 - PLAN & DETAILS	20-Mar-1957
43	0001	C18866-00002	LOW LEVEL CRYSTAL COUNTER, SUBBASEMENT, DOOR DETAILS	20-Mar-1957

Technical Area	Facility Number	Object Name	LANL Title	Date on Document
43	0001	C18867-00003	LOW LEVEL CRYSTAL COUNTER, SUBBASEMENT, MONORAIL DETAILS	20-Mar-1957
43	0001	C18868-00004	LOW LEVEL CRYSTAL COUNTER, SUB-BASEMENT	20-Mar-1957
43	0001	C19040-00001	DUST & VAPOR TEST CHAMBER, ROOM 1278, STRUCT; FLOOR & CEILING PLANS & ELEVATION	15-Apr-1957
43	0001	C19041-00002	DUST & VAPOR TEST CHAMBER, ROOM 1278, STRUCT; DOOR SECTIONS & DETAILS	15-Apr-1957
43	0001	C19042-00003	DUST & VAPOR TEST CHAMBER, ROOM 1278, MECH; FLOOR PLAN, MATERIAL LIST, SECTIONS	15-Apr-1957
43	0001	C19043-00004	DUST & VAPOR TEST CHAMBER, ROOM 1278, ELEC; PARTIAL FLOOR PLAN, SINGLE LINE DIAGRAM, SCOPE OF WORK	15-Apr-1957
43	0001	C19044-00005	DUST & VAPOR TEST CHAMBER, ROOM 1278, ELEC; ELEVATIONS, NAMEPLATE SCHEDULE & BILL OF MATERIALS	15-Apr-1957
43	0001	C18990-00001	AIR CONDITIONING HUMAN COUNTER FACILITIES, BLDG. HRL-1, SUB-BSMT - VENTILATION	7-May-1957
43	0001	C18991-00002	AIR CONDITIONING HUMAN COUNTER FACILITIES, PLAN & ELEVATION	7-May-1957
43	0001	C18992-00003	AIR CONDITIONING HUMAN COUNTER FACILITIES, ELEVATIONS & DETAILS	7-May-1957
43	0001	C18993-00004	AIR CONDITIONING HUMAN COUNTER FACILITIES, PIPING DIAGRAM & EQUIPMENT LIST	7-May-1957
43	0001	C18994-00005	AIR CONDITIONING HUMAN COUNTER FACILITIES, PLAN & WIRING DIAGRAM	7-May-1957
43	0001	C18995-00006	AIR CONDITIONING HUMAN COUNTER FACILITIES, BILL OF MATERIAL, SCOPE OF WORK	7-May-1957
43	0001	C13440-00001	INCINERATOR STACK EXTENSION, STRUCT; DETAILS, STACK PLAN, SECTIONS, SOUTH ELEVATION	24-Jan-1958
43	0001	C18525-00002	NEW LOW-LEVEL DETECTORS, SUB-BASEMENT, CUTTING SCHEDULE	24-Feb-1958
43	0001	C18524-00001	NEW LOW - LEVEL DETECTORS BLDG. SUB-BASEMENT - STRUCT. PLANS, SECTIONS	5-May-1958
43	0001	C18526-00003	NEW LOW-LEVEL DETECTORS, SUB-BASEMENT, ARCHITECTURAL - SECTIONS & DETAILS	5-May-1958
43	0001	C18527-00004	NEW LOW-LEVEL DETECTORS, SUB-BASEMENT, DOOR HINGE DETAILS	5-May-1958
43	0001	UE C011275	Plumbing Second Floor Wastes & Vents Piping & Details	20-May-1958
43	0001	UE C011277	Plumbing Stand Pipe & Hose Rack Diagrams & Details Emerg. Showers Diagrams	20-May-1958
43	0001	R1505-00001	UTILITY LOCATION PLAN, MEDICAL RESEARCH LAB, WATER SYSTEM	26-Jun-1958
43	0001	R1506-00001	UTILITY LOCATION PLAN, MEDICAL RESEARCH LAB, FUEL SYSTEM	26-Jun-1958
43	0001	R1509-00001	UTILITY LOCATION PLAN, MEDICAL RESEARCH LAB, SEWER SYSTEM	26-Jun-1958

Appendix G: TA-43-0001 List of All Drawings

Technical Area	Facility Number	Object Name	LANL Title	Date on Document
43	0001	C18830-00003	ADDITIONAL ANIMAL QUARTERS BUILDING, WEST SIDE, CIVIL, PLOT PLAN & LEGEND	30-Sep-1958
43	0001	C20646-00004	ADDITIONAL ANIMAL QUARTERS BUILDING, WEST SIDE, ARCH; BASEMENT FLOOR PLAN	30-Sep-1958
43	0001	C20647-00005	ADDITIONAL ANIMAL QUARTERS BUILDING, WEST SIDE, ARCH; SUB-BASEMENT UTILITY ROOM	30-Sep-1958
43	0001	C20648-00006	ADDITIONAL ANIMAL QUARTERS BUILDING, WEST SIDE, ARCH; ELEVATIONS	30-Sep-1958
43	0001	C20649-00007	ADDITIONAL ANIMAL QUARTERS BUILDING, WEST SIDE, ARCH; ELEVATIONS	30-Sep-1958
43	0001	C20650-00008	ADDITIONAL ANIMAL QUARTERS BUILDING, WEST SIDE, ARCH; OCCUPANCY AREA "A" FLOOR PLAN	30-Sep-1958
43	0001	C20651-00009	ADDITIONAL ANIMAL QUARTERS BUILDING, WEST SIDE, ARCH; SERVICES OCCUPANCY, AREA "A", FLOOR PLAN	30-Sep-1958
43	0001	C20652-00010	ADDITIONAL ANIMAL QUARTERS BUILDING, WEST SIDE, ARCH; OCCUPANCY AREA "B", FLOOR PLAN	30-Sep-1958
43	0001	C20653-00011	ADDITIONAL ANIMAL QUARTERS BUILDING, WEST SIDE, ARCH; SERVICES OCCUPANCY, AREA "B", FLOOR PLAN	30-Sep-1958
43	0001	C20654-00012	ADDITIONAL ANIMAL QUARTERS BUILDING, WEST SIDE, ARCH; OCCUPANCY & SERVICES, AREA "C", FLOOR PLAN	30-Sep-1958
43	0001	C20655-00013	ADDITIONAL ANIMAL QUARTERS BUILDING, WEST SIDE, ARCH; DOG & MONKEY CAGES & RUNS	30-Sep-1958
43	0001	C20656-00014	ADDITIONAL ANIMAL QUARTERS BUILDING, WEST SIDE, ARCH; DETAILS	30-Sep-1958
43	0001	C20657-00015	ADDITIONAL ANIMAL QUARTERS BUILDING, WEST SIDE, ARCH; DETAILS	30-Sep-1958
43	0001	C25857-00001	BLACKTOP ROADWAY, BLDG. HRL-1, CIVIL	10-Oct-1960
43	0001	C25932-00001	ELECTRON MICROSCOPE VENTILATION, ROOM 121, BLDG. HLR-1, MECH.-ELEC. PLAN, SECTIONS	27-Jan-1961
43	0001	C26134-00001	SUB-BASEMENT AREA MODIFICATION, NEW SHOP TREATMENT & EQUIPMENT AREAS, NORTH SIDE, ARCH; FLOOR PLAN, DOOR DETAILS & SCHEDULE	24-Apr-1961
43	0001	C26135-00002	SUB-BASEMENT AREA MODIFICATION, NEW SHOP TREATMENT & EQUIPMENT AREAS, MECH; FLOOR PLAN, PIPING DIAGRAM, DETAILS	24-Apr-1961
43	0001	C26136-00003	SUB-BASEMENT AREA MODIFICATION, NEW SHOP TREATMENT & EQUIPMENT AREAS, MECH; FLOOR PLAN, PIPING NOTES & DETAILS	24-Apr-1961
43	0001	C26137-00004	SUB-BASEMENT AREA MODIFICATION, NEW SHOP TREATMENT & EQUIPMENT AREAS, MECH; CEILING PLAN, AIR SUPPLY & EXHAUST SYSTEM, METAL PAN CEILING	24-Apr-1961

Technical Area	Facility Number	Object Name	LANL Title	Date on Document
43	0001	C26138-00005	SUB-BASEMENT AREA MODIFICATION, NEW SHOP TREATMENT & EQUIPMENT AREAS, ELEC; FLOOR PLAN, SINGLE LINE DIAGRAM, LIST OF EQUIPMENT, NAMEPLATE SCHEDULE	24-Apr-1961
43	0001	C26139-00006	SUB-BASEMENT AREA MODIFICATION, NEW SHOP TREATMENT & EQUIPMENT AREAS, ELEC; MULTI-OUTLET ASSEMBLY WIRING DIAGRAM, LEGEND	24-Apr-1961
43	0001	C26159-00001	REFRIGERATION SYSTEM MODIFICATIONS, ROOMS B-126-A, B-126-B, 137-C & 228-A	29-May-1961
43	0001	C26160-00002	REFRIGERATION SYSTEM MODIFICATIONS, ROOMS B-126-A, B-126-B, 137-C & 228-A	29-May-1961
43	0001	R2316-00001	FALLOUT SHELTER SURVEY, SUB-BASEMENT FLOOR PLAN, HEALTH RESEARCH LAB.	18-Dec-1961
43	0001	R2317-00002	FALLOUT SHELTER SURVEY, BASEMENT FLOOR PLAN, HEALTH RESEARCH LAB.	19-Dec-1961
43	0001	R2318-00003	FALLOUT SHELTER SURVEY, FIRST FLOOR PLAN, HEALTH RESEARCH LAB.	22-Dec-1961
43	0001	C29002-00001	HEALTH RESEARCH LABORATORY, CIVIL, ALTERATIONS TO PARKING AREA PLOT PLAN, POST DETAIL & SECTION	11-Dec-1962
43	0001	C26176-00001	SAFETY LADDER & EYEBOLT INSTALLATION, BLDG. HRL-1, STRUCTURAL	18-Sep-1963
43	0001	C48807-00002	ELECTRICAL SYSTEM IMPROVEMENTS TECHNICAL AREAS, FY-1964, ELEC; HRL & LA MEDICAL CENTER AREA PLAN & LEGEND, MANHOLE LOCATIONS	28-Jan-1964
43	0001	C48807-00003	ELECTRICAL SYSTEM IMPROVEMENTS TECHNICAL AREAS, FY-1964, ELEC; HRL & LA MEDICAL CENTER FLOOR PLANS & DETAILS, ONE LINE DIAGRAM 13.2 KV SWITCHGEAR	28-Jan-1964
43	0001	C28380-00001	MODIFICATIONS, RM. SB-17, BLDG. HRL-1 - PLANS, ELEVATIONS, DETAILS & NOTES, ARCH	8-May-1964
43	0001	C28381-00002	MODIFICATIONS, RM. SB-17	8-May-1964
43	0001	C32380-00020	AUTOMATIC SPRINKLER INSTALLATION, HR LABORATORY BUILDING, FP; SPRINKLER HEAD & PIPING FLOOR PLAN, ALARM RISER DIAGRAM	15-Dec-1964
43	0001	R1462-00001	LOS ALAMOS FAMILY DAYS, 1965, HEALTH RESEARCH LABORATORY, SIGN LOCATIONS	1-Jul-1965
43	0001	C34321-00001	EQUIPMENT INSTALLATION, ARCH; & MECH; PARTIAL SECOND & FIRST FLOOR PLANS, SECTION, CEILING DETAIL	3-Jun-1966
43	0001	C34322-00002	EQUIPMENT INSTALLATION, MECH; PARTIAL SUB BASEMENT & FIRST FLOOR PLANS & SECTION, EQUIPMENT LIST	3-Jun-1966
43	0001	C34323-00003	EQUIPMENT INSTALLATION, ELEC; PARTIAL FIRST, SECOND & SUB BASEMENT FLOOR PLAN, ONE LINE DIAGRAMS, BILL OF MATERIAL, NAMEPLATE SCHEDULE, SCOPE OF WORK	3-Jun-1966
43	0001	R769-00001	BASIC DATA, HEALTH RESEARCH LABORATORY	9-Jun-1966

Technical Area	Facility Number	Object Name	LANL Title	Date on Document
43	0001	C34395-00001	EQUIPMENT RELOCATION, ARCH; PARTIAL BASEMENT PLAN, ROOM 127, ROOM B-114, ROOM LAYOUTS	23-Jun-1966
43	0001	R3843-00002	EQUIPMENT SURVEILLANCE SYSTEMS, BASEMENT FLOOR PLAN	15-Sep-1966
43	0001	R3844-00003	EQUIPMENT SURVEILLANCE SYSTEMS, FIRST FLOOR PLAN	15-Sep-1966
43	0001	R3845-00004	EQUIPMENT SURVEILLANCE SYSTEMS, SECOND FLOOR PLAN	15-Sep-1966
43	0001	C34940-00001	UTILITY PLOT RECOMMENDED, BLDG. HRL-1	22-Dec-1966
43	0001	C34932-00001	VENTILATION SYSTEM MODIFICATIONS, BLDG. HRL-1	14-Feb-1967
43	0001	C52356-00001	LOW VOLTAGE UNIT SUBSTATION, ELEC., ONE LINE DIAGRAM & ELEVATION	14-Jun-1967
43	0001	C52356-00002	LOW VOLTAGE UNIT SUBSTATION, ELEC., DATA SHEET, PROTECTIVE DEVICES, UNIT SUBSTATION INVENTORY, TRANSFORMER	14-Jun-1967
43	0001	R949-00001	AS BUILT INCINERATOR WIRING DIAGRAM	4-Aug-1967
43	0001	R4294-00001	AUDIO SYSTEM EQUIP. LOCATION, SUB-BASEMENT FLOOR PLAN	12-Sep-1967
43	0001	R4295-00001	AUDIO SYSTEM EQUIP. LOCATION, BASEMENT FLOOR PLAN	12-Sep-1967
43	0001	R4296-00001	AUDIO SYSTEM EQUIP. LOCATION, FIRST FLOOR PLAN	12-Sep-1967
43	0001	R4297-00001	AUDIO SYSTEM EQUIP. LOCATION, SECOND FLOOR PLAN	12-Sep-1967
43	0001	R4298-00001	AUDIO SYSTEM EQUIP. LOCATION, PENTHOUSE FLOOR PLAN	15-Sep-1967
43	0001	R4299-00001	AUDIO SYSTEM BLOCK DIAGRAM	22-Sep-1967
43	0001	R4293-00001	AUDIO SYSTEM EQUIP. LOCATION, STRUCTURE LOCATION PLAN, HEALTH RESEARCH LABORATORY	1-Nov-1967
43	0001	C34396-00002	EQUIPMENT RELOCATION, MECH; PARTIAL FIRST, SECOND & SUB-BASMENT FLOOR PLANS, EQUIPMENT SCHEDULE & LEGEND	27-May-1968
43	0001	C34397-00003	EQUIPMENT RELOCATION, ELEC; PARTIAL BASEMENT, SUB-BASEMENT & SECOND FLOOR PLAN, NAMEPLATE SCHEDULE, BILL OF MATERIAL, SCOPE OF WORK, NOTES	27-May-1968
43	0001	C27974-00001	ADDITIONAL ANIMAL QUARTERS, WEST SIDE, TITLE SHEET AND INDEX TO DRAWINGS	5-Jun-1968
43	0001	C27975-00002	ADDITIONAL ANIMAL QUARTERS, WEST SIDE, PLOT PLAN, UTILITIES, PAVING & GRADING, FIRE HYDRANT, SANITARY SEWER, MANHOLE DETAILS	5-Jun-1968
43	0001	C27976-00003	ADDITIONAL ANIMAL QUARTERS, WEST SIDE, STRUCT; FOUNDATION PLAN, SECTION & ELEVATION	5-Jun-1968
43	0001	C27977-00004	ADDITIONAL ANIMAL QUARTERS, WEST SIDE, STRUCT; BASEMENT FLOOR PLAN, SECTION & DETAILS	5-Jun-1968

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43	0001	C27978-00005	ADDITIONAL ANIMAL QUARTERS, WEST SIDE, STRUCT; ROOF FRAMING PLAN, ELEVATION & SECTION	5-Jun-1968
43	0001	C27979-00006	ADDITIONAL ANIMAL QUARTERS, WEST SIDE, STRUCT; FRAMING DETAILS	5-Jun-1968
43	0001	C27980-00007	ADDITIONAL ANIMAL QUARTERS, WEST SIDE, STRUCT; DETAILS, EXHAUST TOWER FRAMING, ELEVATION	5-Jun-1968
43	0001	C27981-00008	ADDITIONAL ANIMAL QUARTERS, WEST SIDE, ARCH; BASEMENT FLOOR PLAN, WINDOW & ROOM FINISH SCHEDULES	5-Jun-1968
43	0001	C27982-00009	ADDITIONAL ANIMAL QUARTERS, WEST SIDE, ARCH; ELEVATIONS	5-Jun-1968
43	0001	C27983-00010	ADDITIONAL ANIMAL QUARTERS, WEST SIDE, ARCH; TRANSVERSE SECTIONS, ROOF DRAIN DETAILS, RADIANT PIPING DETAIL	5-Jun-1968
43	0001	C27984-00011	ADDITIONAL ANIMAL QUARTERS, WEST SIDE, ARCH; SECTIONS & DETAILS, PENTHOUSE DETAIL, EXHAUST TOWER DETAIL, TRANSVERSE DETAIL	5-Jun-1968
43	0001	C27985-00012	ADDITIONAL ANIMAL QUARTERS, ARCH; WINDOW & DOOR DETAILS & SCHEDULE	5-Jun-1968
43	0001	C27986-00013	ADDITIONAL ANIMAL QUARTERS, ARCH; DETAILS, STORAGE BINS, MOUSE CAGE RACK, DRYING ROOM & SHOWER	5-Jun-1968
43	0001	C27987-00014	ADDITIONAL ANIMAL QUARTERS, ARCH; DETAILS, CHUTE, ROOF WALK, WIRE MESH PARTITIONS, ROOF DRAINAGE PLAN	5-Jun-1968
43	0001	C27988-00015	ADDITIONAL ANIMAL QUARTERS, ARCH; DETAILS, CAGE WASHING & MOUSE CAGE ROOM, EQUIPMENT SCHEDULE	5-Jun-1968
43	0001	C27989-00016	ADDITIONAL ANIMAL QUARTERS, MECH; PLUMBING FLOOR PLAN & PENTHOUSE PLAN, FIXTURE SCHEDULE	5-Jun-1968
43	0001	C27990-00017	ADDITIONAL ANIMAL QUARTERS, MECH; PLUMBING SCHEMATIC PIPING DIAGRAMS	5-Jun-1968
43	0001	C27991-00018	ADDITIONAL ANIMAL QUARTERS, MECH; SUB-BASEMENT PLAN PIPING, DETAILS & CONNECTIONS, STEAM CONTROL VALVE SCHEDULE	5-Jun-1968
43	0001	C27992-00019	ADDITIONAL ANIMAL QUARTERS, MECH; HEATING & AIR CONDITIONING PLAN & SCHEDULE, SCHEMATIC OF DRAINS	5-Jun-1968
43	0001	C27993-00020	ADDITIONAL ANIMAL QUARTERS, MECH; HEATING & AIR CONDITIONING, HEATING, REFRIGERATION PIPING SCHEMATIC	5-Jun-1968
43	0001	C27994-00021	ADDITIONAL ANIMAL QUARTERS, MECH; HEATING & AIR CONDITIONING DETAILS, PNEUMATIC CONTROL DIAGRAM, LEGEND	5-Jun-1968

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43	0001	C27995-00022	ADDITIONAL ANIMAL QUARTERS, ELEC; BASEMENT & PENTHOUSE LIGHTING FLOOR PLAN, EMERGENCY LIGHT, LEGEND	5-Jun-1968
43	0001	C27996-00023	ADDITIONAL ANIMAL QUARTERS, ELEC; BASEMENT & PENTHOUSE POWER FLOOR PLANS, FIRE ALARM WIRING DIAGRAM NOTES	5-Jun-1968
43	0001	C27997-00024	ADDITIONAL ANIMAL QUARTERS, ELEC; ONE LINE DIAGRAMS & SCHEDULES, MOTOR CONTROL CENTER	5-Jun-1968
43	0001	C27998-00025	ADDITIONAL ANIMAL QUARTERS, ELEC; MOTOR WIRING DIAGRAM & LEGEND	5-Jun-1968
43	0001	C27999-00026	ADDITIONAL ANIMAL QUARTERS, ELEC; MOTOR WIRING DIAGRAM, SCHEDULE FOR MOTOR STARTERS & CONTROLS	5-Jun-1968
43	0001	C34172-00003	ELECTRICAL SYSTEM IMPROVEMENTS, CIVIL, HRL & LAMC AREA PLAN & LEGEND, MANHOLE LOCATIONS	6-Jun-1968
43	0001	C34173-00004	ELECTRICAL SYSTEM IMPROVEMENTS, CIVIL, HRL PARTIAL SUB-BASEMENT FLOOR PLAN & PRIMARY SWITCHGEAR IN LAMC, ONE LINE DIAGRAM 13.2 KV SWITCHGEAR	6-Jun-1968
43	0001	C37642-00001	FACILITY IMPROVEMENTS, NORTHWEST SIDE, TITLE SHEET, INDEX TO DRAWINGS, PLOT PLAN, LOCATION PLAN & NOTES	3-Sep-1969
43	0001	C37643-00002	FACILITY IMPROVEMENTS, ARCH; PARTIAL BASEMENT & PENTHOUSE FLOOR PLANS & WINDOW SCHEDULE, DETAILS	3-Sep-1969
43	0001	C37644-00003	FACILITY IMPROVEMENTS, ARCH; ELEVATIONS & SECTIONS	3-Sep-1969
43	0001	C37645-00004	FACILITY IMPROVEMENTS, ARCH; SECTIONS & DETAILS, ROOF EXPANSION JOINT DETAIL, PENTHOUSE EAVE DETAIL	3-Sep-1969
43	0001	C37646-00005	FACILITY IMPROVEMENTS, STRUCT; FOUNDATION & SLAB PLANS	3-Sep-1969
43	0001	C37648-00007	FACILITY IMPROVEMENTS, ARCH; FRAMING DETAILS	3-Sep-1969
43	0001	C37649-00008	FACILITY IMPROVEMENTS, ARCH; DOOR & WINDOW DETAILS & SCHEDULE	3-Sep-1969
43	0001	C37650-00009	FACILITY IMPROVEMENTS, MECH; BASEMENT, PENTHOUSE & ROOF PLANS, SECTIONS & HUMIDIFIER INSTALLATION DETAILS	3-Sep-1969
43	0001	C37651-00010	FACILITY IMPROVEMENTS, MECH; BASEMENT PLAN, DETAILS & HOT WATER HEATING PIPING , STEAM & CONDENSATE RETURN SCHEMATICS	3-Sep-1969
43	0001	C37652-00011	FACILITY IMPROVEMENTS, MECH; SECTION, DETAIL & SCHEMATICS, AIR HANDLING UNIT & CONVERTER CONTROL, REFRIGERANT PIPING SCHEMATIC	3-Sep-1969
43	0001	C37653-00012	FACILITY IMPROVEMENTS, MECH; FOUNDATION PIPING PLAN & DETAILS, EQUIPMENT CODE LIST	3-Sep-1969

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43	0001	C37654-00013	FACILITY IMPROVEMENTS, MECH; PIPING PLAN & SECTIONS	3-Sep-1969
43	0001	C37655-00014	FACILITY IMPROVEMENTS, MECH; EQUIPMENT LIST	3-Sep-1969
43	0001	C37656-00015	FACILITY IMPROVEMENTS, MECH; EQUIPMENT LIST & NOTES	3-Sep-1969
43	0001	C37657-00016	FACILITY IMPROVEMENTS, ELEC; BILL OF MATERIAL, NAMEPLATE SCHEDULE & NOTES	3-Sep-1969
43	0001	C37658-00017	FACILITY IMPROVEMENTS, ELEC; FIRE DETECTION, TELEPHONE & POWER PLANS, PENTHOUSE & ROOF PLAN, ELEVATION	3-Sep-1969
43	0001	C37659-00018	FACILITY IMPROVEMENTS, ELEC; LIGHTING PLANS, DETAILS & SCHEMATICS, AIR CONDITIONING, HUMIDIFIER, UNIT HEATER	3-Sep-1969
43	0001	C37660-00019	FACILITY IMPROVEMENTS, ELEC; ONE LINE DIAGRAM	3-Sep-1969
43	0001	C38038-00001	FACILITY IMPROVEMENTS, WEST SIDE, ARCH; BASEMENT FLOOR PLAN & NOTES	2-Oct-1969
43	0001	C38039-00002	FACILITY IMPROVEMENTS, WEST SIDE, ARCH; PARTIAL BASEMENT ENLARGED FLOOR PLANS & WINDOW DETAILS	2-Oct-1969
43	0001	C38040-00003	FACILITY IMPROVEMENTS, WEST SIDE, ARCH; DOOR TYPES & SCHEDULE AND FRAME & WINDOWA DETAILS	2-Oct-1969
43	0001	C38041-00004	FACILITY IMPROVEMENTS, WEST SIDE, ARCH; SECTIONS AND DETAILS	2-Oct-1969
43	0001	C38042-00005	FACILITY IMPROVEMENTS, WEST SIDE, MECH; PARTIAL BASEMENT & SUB-BASEMENT PLAN	2-Oct-1969
43	0001	C38043-00006	FACILITY IMPROVEMENTS, WEST SIDE, MECH; PLAN VIEWS, SECTIONS & HUMIDIFIER INSTALLATION DETAIL	2-Oct-1969
43	0001	C38044-00007	FACILITY IMPROVEMENTS, WEST SIDE, MECH; PARTIAL BASEMENT PLAN, SECTIONS, DETAIL, PNEUMATIC CONTROL & STEAM & CONDENSATE RETURN PIPING SCHEMATICS	2-Oct-1969
43	0001	C38045-00008	FACILITY IMPROVEMENTS, WEST SIDE, MECH; SECTION, DETAIL, NOTES	2-Oct-1969
43	0001	C38046-00009	FACILITY IMPROVEMENTS, WEST SIDE, MECH; EQUIPMENT LIST	2-Oct-1969
43	0001	C38047-00010	FACILITY IMPROVEMENTS, WEST SIDE, ELEC; PARTIAL BASEMENT & ROOF PLANS, ONE LINE DIAGRAM, BILL OF MATERIAL, NAMEPLATE SCHEDULE, HUMIDIFIER SCHEMATIC	2-Oct-1969
43	0001	C38048-00011	FACILITY IMPROVEMENTS, WEST SIDE, ELEC; PARTIAL BASEMENT PLAN	2-Oct-1969
43	0001	C38049-00001	FACILITY IMPROVEMENTS, ARCH; BASEMENT FLOOR PLAN, LOCATION PLAN & NOTES	11-Feb-1970
43	0001	C38050-00002	FACILITY IMPROVEMENTS, ARCH; PARTIAL BASEMENT FLOOR PLAN & DOOR DETAILS	11-Feb-1970

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43	0001	C38051-00003	FACILITY IMPROVEMENT, MECH; PARTIAL BASEMENT PLAN, DISTILLED WATER PIPING INSTALLATION, LEGEND	11-Feb-1970
43	0001	C38052-00004	FACILITY IMPROVEMENT, MECH; HUMIDIFIER INSTALLATION DETAIL, SECTION, NOTES	11-Feb-1970
43	0001	C38053-00005	FACILITY IMPROVEMENT, ELEC; PARTIAL BASEMENT PLAN, BILL OF MATERIAL, NAMEPLATE SCHEDULE, NOTES, SCOPE OF WORK	11-Feb-1970
43	0001	C37013-00001	LAB MODIFICATIONS RMS. 235 & 237 PLAN & DETAILS	4-Nov-1971
43	0001	C37014-00002	LAB MODIFICATIONS RMS. 235 & 237 ARCHITECTURAL DETAILS	4-Nov-1971
43	0001	C40889-00001	PHYSICAL SECURITY IMPROVEMENTS VICINITY MAP AND DRAWING INDEX	17-Jan-1973
43	0001	C40890-00002	PHYSICAL SECURITY IMPROVEMENTS, LOCATION PLAN	17-Jan-1973
43	0001	C40894-00006	PHYSICAL SECURITY IMPROVEMENTS, CHAIN LINK FENCE AND SECURITY SCREEN DETAILS	17-Jan-1973
43	0001	C40895-00007	PHYSICAL SECURITY IMPROVEMENTS, FIRST FLOOR ELECTRICAL PLAN & DETAILS	17-Jan-1973
43	0001	C40897-00009	PHYSICAL SECURITY IMPROVEMENTS, LIST OF EQUIPMENT AND NOTES	17-Jan-1973
43	0001	R4410-00012	TA-43 Area Office Plot Plan Report	25-May-1973
43	0001	C42873-00006	LAB OFFICE ADDITION, ARCH; ELEVATIONS AND DETAILS, CONCRETE CANOPY DETAIL, ROOF PLAN	28-May-1974
43	0001	C42873-00007	LAB OFFICE ADDITION, ARCH; BUILDING SECTION, LONGITUDINAL SECTION	28-May-1974
43	0001	C42873-00008	LAB OFFICE ADDITION, ARCH; DETAILS, WINDOW & DOOR	28-May-1974
43	0001	C42873-00016	LAB OFFICE ADDITION, ELEC; LIGHTING PLAN	17-Mar-1975
43	0001	C42873-00017	LAB OFFICE ADDITION, ELEC; POWER & SPECIAL SYSTEMS PLAN, SYMBOL LEGEND, NOTES	17-Mar-1975
43	0001	C42873-00018	LAB OFFICE ADDITION, ELEC; POWER & TELEPHONE RISER DIAGRAM, PAGING SYSTEM ONE LINE DIAGRAM & PANEL DETAILS	18-Mar-1975
43	0001	C42873-00010	LAB OFFICE ADDITION, MECH; HEATING & AIR CONDITIONING PLAN, EXHAUST DUCT FIRE DAMPER	6-May-1975
43	0001	C42873-00014	LAB OFFICE ADDITION, MECH; PLUMBING PLAN, RISER DIAGRAMS, ACID SEWER, VENT THROUGH ROOF	6-May-1975
43	0001	C42873-00015	LAB OFFICE ADDITION, MECH; CONTROL AND FLOW DIAGRAMS, STEAMCONVERTER CONTROL, REFRIGERANT PIPING DIAGRAM, STEAM & HOT WATER FLOW DIAGRAM	6-May-1975
43	0001	C42873-00000	LAB OFFICE ADDITION, TITLE SHEET & INDEX TO DRAWINGS	15-May-1975
43	0001	C42873-00001	LAB OFFICE ADDITION, CIVIL, SITE LAYOUT PLAN & DETAILS	15-May-1975

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43	0001	C42873-00002	LAB OFFICE ADDITION, CIVIL, UTILITIES PLAN, SANITARY SEWER CLEANOUT, VALVE BOX & FIRE HYDRANT SETTING, LEGEND	15-May-1975
43	0001	C42873-00003	LAB OFFICE ADDITION, STRUCT; FOUNDATION, FLOOR AND ROOF FRAMING PLANS & DETAILS	15-May-1975
43	0001	C42873-00004	LAB OFFICE ADDITION, STRUCT; DETAILS	15-May-1975
43	0001	C42873-00005	LAB OFFICE ADDITION, ARCH; FLOOR PLAN, WINDOW, DOOR & ROOM FINISH SCHEDULE, HANDRAIL DETAILS	15-May-1975
43	0001	C42873-00009	LAB OFFICE ADDITION, ARCH; CASEWORK, PARTIAL FLOOR PLAN, ELEVATION, REFLECTED CEILING PLAN	15-May-1975
43	0001	C42873-00012	LAB OFFICE ADDITION, MECH; SCHEDULES AND DETAILS	15-May-1975
43	0001	C42873-00011	LAB OFFICE ADDITION, MECH; SECTONS, ROOF PLAN, PIPING DIAGRAM, SUB-BASEMENT PARTIAL PLAN, FRESH AIR INTAKE DETAIL	23-May-1975
43	0001	C42873-00013	LAB OFFICE ADDITION, MECH; DETAILS AND PIPING SCHEDULE, FIRE PROTECTION PLAN, SUB-BASEMENT UTILITY CONNECTION	23-May-1975
43	0001	R2477-00001	STRUCTURE LOCATION PLAN, HEALTH RESEARCH LABORATORY	19-Jun-1975
43	0001	C43368-00001	LAB SPACE CONVERSIONS, ROOM B101A, ARCH; PARTIAL FLOOR PLAN, ELEVATION, DOOR SCHEDULE	12-Aug-1977
43	0001	C43368-00002	LAB SPACE CONVERSIONS, ROOM B101A, MECH; PARTIAL FLOOR PLAN, FIRE HOSE CABINET RELOCATION, PARTIAL SUB-BASEMENT PLAN, UTILITY PIPING	12-Aug-1977
43	0001	C43368-00003	LAB SPACE CONVERSIONS, ROOM B101A, MECH; PARTIAL SUB-BASEMENT SANITARY SEWER PIPING PLAN	12-Aug-1977
43	0001	C43368-00004	LAB SPACE CONVERSIONS, ROOM B101A, MECH; SECTIONS AND DETAILS	12-Aug-1977
43	0001	C43368-00005	LAB SPACE CONVERSIONS, ROOM B101A, MECH; SANITARY SEWER & UTILITY PIPING SCHEMATICS	12-Aug-1977
43	0001	C43368-00006	LAB SPACE CONVERSIONS, ROOM B101A, MECH; NOTES AND EQUIPMENT LIST	12-Aug-1977
43	0001	C43368-00007	LAB SPACE CONVERSIONS, ROOM B101A, ELEC; FLOOR PLAN & ELEVATION OF EAST WALL	12-Aug-1977
43	0001	C43368-00008	LAB SPACE CONVERSIONS, ROOM B101A, ELEC; PARTIAL BASEMENT FLOOR PLAN, PANEL LAYOUT DETAIL, NOTES, BILL OF MATERIAL & NAMEPLATE SCHEDULE	12-Aug-1977
43	0001	C43632-00000	HRL BUILDING ADDITION, TITLE SHEET & INDEX OF DRAWINGS	2-Sep-1977
43	0001	C43632-00001	HRL BUILDING ADDITION, CIVIL, SITE LAYOUT PLAN AND VICINITY MAP	2-Sep-1977
43	0001	C43632-00003	HRL BUILDING ADDITION , ARCH; ROOF PLAN, ELEVATIONS AND SECTION	2-Sep-1977

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43	0001	C43632-00004	HRL BUILDING ADDITION , ARCH; DETAILS	2-Sep-1977
43	0001	C43632-00006	HRL BUILDING ADDITION , STRUCT; FIRST FLOOR FRAMING PLAN	2-Sep-1977
43	0001	C43632-00007	HRL BUILDING ADDITION , STRUCT; ROOF FRAMING PLAN	2-Sep-1977
43	0001	C43632-00010	HRL BUILDING ADDITION , MECH; BASEMENT FLOOR PLAN	2-Sep-1977
43	0001	C43632-00012	HRL BUILDING ADDITION , MECH; DETAILS & CONTROL DIAGRAM, REFRIGERANT & COIL PIPING, ROOF DRAIN, GOOSENECK DETAIL & PLUMBING RISER	2-Sep-1977
43	0001	C43632-00016	HRL BUILDING ADDITION , ELEC; LEGEND & SCHEDULES, EQUIPMENT LIST	2-Sep-1977
43	0001	C43632-00013	HRL BUILDING ADDITION , ELEC; PARTIAL BASEMENT & ROOF PLANS, CONTROL WIRING DIAGRAMS	21-Sep-1977
43	0001	C49047-00001	CONDENSATE LINE REPLACEMENT HRL SERVICE LINE TO MANHOLE 91, PROFILE, PLOT PLANS & DETAILS	18-Nov-1977
43	0001	C43632-00005	HRL BUILDING ADDITION , ARCH; DETAILS, DOOR SCHEDULE	8-Dec-1977
43	0001	C43632-00014	HRL BUILDING ADDITION , ELEC; FIRST FLOOR LIGHTING PLAN, FIXTURE MOUNTING DETAIL	21-Feb-1978
43	0001	C43632-00015	HRL BUILDING ADDITION , ELEC; FIRST FLOOR POWER & SPECIAL SYSTEMS PLAN	21-Feb-1978
43	0001	C43632-00002	HRL BUILDING ADDITION , ARCH; FIRST FLOOR PLAN AND SCHEDULE	22-Feb-1978
43	0001	C43632-00009	HRL BUILDING ADDITION , FP; FIRST FLOOR FIRE PROTECTION PLAN	22-Feb-1978
43	0001	C43632-00011	HRL BUILDING ADDITION , MECH; FIRST FLOOR & ROOF PLANS AND EQUIPMENT SCHEDULE	22-Feb-1978
43	0001	C42928-00001	FIRE PROTECTION IMPROVEMENTS, BLDG. HRL-1, TA-43. TITLE SHEET	26-Mar-1978
43	0001	C43632-00008	HRL BUILDING ADDITION , MECH; FIRST FLOOR PLUMBING PLAN	7-Jul-1978
43	0001	C43649-00001	CROSS CONNECTION CONTROL; LOCATION PLAN, LEGEND & INDEX TO DWG. BLDG	24-Sep-1979
43	0001	C43649-00002	CROSS CONNECTION CONTROL; SUB BASEMENT FLOOR PLAN	24-Sep-1979
43	0001	C43649-00003	CROSS CONNECTION CONTROL; PARTIAL BASEMENT FLOOR PLAN, ISOMETRIC & DETAILS	24-Sep-1979
43	0001	C43649-00004	CROSS CONNECTION CONTROL; PARTIAL SUB BASEMENT FLOOR PLAN & ELEVATION	24-Sep-1979
43	0001	C43649-00005	CROSS CONNECTION CONTROL; DETAIL & PIPING ISOMETRICS	24-Sep-1979
43	0001	C43649-00006	CROSS CONNECTION CONTROL; MECHANICAL NOTES	24-Sep-1979
43	0001	C43649-00007	CROSS CONNECTION CONTROL; MECHANICAL EQUIPMENT LIST	24-Sep-1979

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43	0001	C43649-00008	CROSS CONNECTION; PARTIAL BASEMT. FLR. PLN. NOTES, BILL OF MATERIAL & NMPLATE	24-Sep-1979
43	0001	C43689-00001	VAPOR HOOD EXHAUST SYSTEM, CIVIL, LOCATION PLAN, DETAIL AND ELEVATIONS BLDG. HR	11-Dec-1979
43	0001	C43689-00002	VAPOR HOOD EXHAUST SYSTEM, MECH. PLAN AND ELEVATION	11-Dec-1979
43	0001	C43689-00003	VAPOR HOOD EXHAUST SYSTEM, MECH. SECTIONS AND ELEVATION	11-Dec-1979
43	0001	C43689-00004	VAPOR HOOD EXHAUST SYSTEM, MECH. NOTES AND EQUIPMENT LIST	11-Dec-1979
43	0001	C43689-00005	VAPOR HOOD EXHAUST SYSTEM, ELEC. PLAN, DIAGRAM AND NOTES	11-Dec-1979
43	0001	C44065-00077	FIRE PROTECTION IMPROVEMENTS, CIVIL; TITLE SHEET, INDEX TO DRAWINGS, PLOT PLAN	15-Sep-1980
43	0001	C44065-00078	FIRE PROTECTION IMPROVEMENTS, CIVIL; PLOT PLAN AND LEGEND	15-Sep-1980
43	0001	C44065-00079	FIRE PROTECTION IMPROVEMENTS, CIVIL; SECTION & DETAIL, FIRE HYDRANT, TRENCH SECTION, GATE VALVE, GROUND WIRE CONNECTION	15-Sep-1980
43	0001	C44065-00080	FIRE PROTECTION IMPROVEMENTS, MECH; SUB-BASEMENT PLAN & LEGEND	15-Sep-1980
43	0001	C44065-00081	FIRE PROTECTION IMPROVEMENTS, MECH; PARTIAL BASEMENT PLAN	15-Sep-1980
43	0001	C44065-00082	FIRE PROTECTION IMPROVEMENTS, MECH; PARTIAL BASEMENT PLAN	15-Sep-1980
43	0001	C44065-00083	FIRE PROTECTION IMPROVEMENTS, MECH; PARTIAL BASEMENT PLAN	15-Sep-1980
43	0001	C44065-00084	FIRE PROTECTION IMPROVEMENTS, MECH; PARTIAL FIRST FLOOR PLAN	15-Sep-1980
43	0001	C44065-00085	FIRE PROTECTION IMPROVEMENTS, MECH; PARTIAL FIRST FLOOR PLAN	15-Sep-1980
43	0001	C44065-00086	FIRE PROTECTION IMPROVEMENTS, MECH; PARTIAL SECOND FLOOR PLAN	15-Sep-1980
43	0001	C44065-00087	FIRE PROTECTION IMPROVEMENTS, MECH; PARTIAL SECOND FLOOR PLAN	15-Sep-1980
43	0001	C44065-00088	FIRE PROTECTION IMPROVEMENTS, MECH; PARTIAL PENTHOUSE PLAN	15-Sep-1980
43	0001	C44065-00089	FIRE PROTECTION IMPROVEMENTS, MECH; SECTION	15-Sep-1980
43	0001	C44065-00090	FIRE PROTECTION IMPROVEMENTS, MECH; SECTION	15-Sep-1980
43	0001	C44065-00091	FIRE PROTECTION IMPROVEMENTS, MECH; SECTION AND DETAILS	15-Sep-1980
43	0001	C54683-00000	DOE/LAAO, HEATING SYSTEMS, PHASE II, TITLE SHEET & INDEX TO DRAWINGS	22-Nov-1982
43	0001	C54683-00001	DOE/LAAO, HEATING SYSTEMS, CIVIL, SITE PLAN	22-Nov-1982

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43	0001	C54683-00002	DOE/LAAO, HEATING SYSTEMS, CIVIL, GAS LINE PLAN & PROFILE	22-Nov-1982
43	0001	C54683-00003	DOE/LAAO, HEATING SYSTEMS, CIVIL, GAS LINE PLAN & PROFILE	22-Nov-1982
43	0001	C54683-00004	DOE/LAAO, HEATING SYSTEMS, CIVIL, SITE WORK DETAILS, GAS LINE CATHODIC PROTECTION, GAS REGULATING STATION, SOIL BORING LOGS, MANHOLE COVER	22-Nov-1982
43	0001	C54683-00005	DOE/LAAO, HEATING SYSTEMS, CIVIL, SECURITY FENCE DETAILS, GROUNDING DETAILS, GATE & PEDESTRAIN GATE DETAILS	22-Nov-1982
43	0001	C54683-00006	DOE/LAAO, HEATING SYSTEMS, STRUCT; BOILER ROOM PLAN IN BASEMENT & PARTIAL FIRST FLOOR PLAN, ELEVATION	22-Nov-1982
43	0001	C54683-00007	DOE/LAAO, HEATING SYSTEMS, STRUCT; DETAILS, SECTION THRU SUMP PIT, STACK FOUNDATION SECTION	22-Nov-1982
43	0001	C54683-00008	DOE/LAAO, HEATING SYSTEMS, STRUCT; SUB BASEMENT FOUNDATION PLAN, EXTERIOR WALL, AIRWELL, COLUMN BASE, SUMP PIT DETAILS	22-Nov-1982
43	0001	C54683-00009	DOE/LAAO, HEATING SYSTEMS, STRUCT; ROOF FRAMING & SLAB PLAN & DETAILS	22-Nov-1982
43	0001	C54683-00010	DOE/LAAO, HEATING SYSTEMS, MECH; BASEMENT FLOOR PLAN, STEAM & CONDENSATE PLAN, COLD & WATER MAKE UP SYSTEM, PRESSURE REDUCING STATION & GAS DROP	22-Nov-1982
43	0001	C54683-00011	DOE/LAAO, HEATING SYSTEMS, MECH; PIPING PLAN & DETAILS, HEATER STEAM & CONDENSATE, PLUMBING & DOMESTIC WATER	22-Nov-1982
43	0001	C54683-00012	DOE/LAAO, HEATING SYSTEMS, MECH; BOILER ROOM FLOOR PLAN, CHEMICAL FEED SYSTEM, DEAERATOR FEED CONTROL	22-Nov-1982
43	0001	C54683-00013	DOE/LAAO, HEATING SYSTEMS, MECH; REMOVAL & DETAILS, BACKFLOW PREVENTER, PENTHOUSE PIPING, EXHAUST FAN, FEED PANEL, DEAERATOR PIPING DETAIL, SUMP PUMP	22-Nov-1982
43	0001	C54683-00014	DOE/LAAO, HEATING SYSTEMS, MECH; SCHEMATIC FLOW DIAGRAM	22-Nov-1982
43	0001	C54683-00015	DOE/LAAO, HEATING SYSTEMS, MECH; PIPING REMOVAL & DETAILS, FIN RADIATION PLAN, PRESSURE REDUCING STATION & GAS DROP DETAIL, EXHAUST FAN	22-Nov-1982
43	0001	C54683-00016	DOE/LAAO, HEATING SYSTEMS, MECH; PIPING PLANS & DETAILS, STEAM & CONDENSATE, PLUMBING & BREACHING, WATER HEATING PIPING & FLOOR PLAN	22-Nov-1982
43	0001	C54683-00017	DOE/LAAO, HEATING SYSTEMS, MECH; SECOND FLOOR HVAC MECHANICAL PLAN, SEQUENCE OF OPERATION	22-Nov-1982

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43	0001	C54683-00018	DOE/LAAO, HEATING SYSTEMS, MECH; EQUIPMENT SCHEDULE & LEGEND	22-Nov-1982
43	0001	C54683-00019	DOE/LAAO, HEATING SYSTEMS, ELEC; BOILER ROOM PLAN IN BASEMENT, ONE LINE DIAGRAM & POWER SOURCE, PANEL SCHEDULE, HOT WATER HEATER CONTROL, PANELBOARD	22-Nov-1982
43	0001	C54683-00020	DOE/LAAO, HEATING SYSTEMS, MECH; ONE LINE DIAGRAM & POWER SOURCE, BOILER ROOM FIRST FLOOR PLAN & SECOND FLOOR PLAN	22-Nov-1982
43	0001	C54683-00021	DOE/LAAO, HEATING SYSTEMS, MECH; BOILER ROOM PLAN IN BASEMENT, PANEL SCHEDULE, ONE LINE DIAGRAM & POWER SOURCE, PANEL SCHEDULE, CONTROLS	22-Nov-1982
43	0001	C44000-00001	LABORATORY SPACE MODIFICATION BLDG. HRL-1, TA-43 CRITERIA	1-Dec-1982
43	0001	C49248-00001	TA-43 Mods to Sanitary Sewer Service Pump Rm 282 & Manhole 690, Plans & Details	29-Jun-1983
43	0001	C44182-00002	LABORATORY SPACE MODIFICATIONS, GEN; PARTIAL BASEMENT PLAN REMOVALS	18-Jul-1983
43	0001	C44182-00003	LABORATORY SPACE MODIFICATIONS, CIVIL; PLOT PLAN & FENCE DETAILS, VEHICLE GATE, INTERMEDIATE BRACE, CORNER DETAILS	18-Jul-1983
43	0001	C44182-00004	LABORATORY SPACE MODIFICATIONS, STRUCT; PARTIAL FLOOR PLAN, CONCRETE PADS & ROOF STACK DETAILS	18-Jul-1983
43	0001	C44182-00014	LABORATORY SPACE MODIFICATIONS, MECH; REFRIGERANT PIPING DETAILS	18-Jul-1983
43	0001	C44182-00015	LABORATORY SPACE MODIFICATIONS, MECH; SERVICE PIPING ISOMETRIC& PARTIAL BASEMENT & SUS-BASEMENT PIPING PLANS & DETAILS	18-Jul-1983
43	0001	C44182-00016	LABORATORY SPACE MODIFICATIONS, MECH; PARTIAL BASEMENT FIRE PROTECTION PLAN & DETAIL	18-Jul-1983
43	0001	C44182-00020	LABORATORY SPACE MODIFICATIONS, ELEC; BILL OF MATERIAL & LEGEND	18-Jul-1983
43	0001	C44182-00021	LABORATORY SPACE MODIFICATIONS, ELEC; "SUS-A" ONE LINE DIAGRAM	18-Jul-1983
43	0001	C44182-00022	LABORATORY SPACE MODIFICATIONS, ELEC; ONE LINE DIAGRAMS & DUCT HEATER WIRING DIAGRAM	18-Jul-1983
43	0001	C44182-00023	LABORATORY SPACE MODIFICATIONS, ELEC; PARTIAL SUB-BASEMENT POWER LAYOUT	18-Jul-1983
43	0001	C44182-00027	LABORATORY SPACE MODIFICATIONS, ELEC; PARTIAL BASEMENT LIGHTING LAYOUT	18-Jul-1983
43	0001	C44182-00030	LABORATORY SPACE MODIFICATIONS, ELEC; ROOMS B101F & B102 POWER LAYOUT	18-Jul-1983
43	0001	C44182-00031	LABORATORY SPACE MODIFICATIONS, ELEC; MULTIOUTLET ASSEMBLY INSTALLATION PARTIAL EAST & WEST WALL ELEVATION	18-Jul-1983

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43	0001	C44182-00032	LABORATORY SPACE MODIFICATIONS, ELEC; SUBSTATION & DISTRIBUTION PANEL ELEVATIONS & DETAILS	18-Jul-1983
43	0001	C44182-00033	LABORATORY SPACE MODIFICATIONS, ELEC; PANEL "PP-A" & "LP-115" SCHEDULES	18-Jul-1983
43	0001	C44182-00034	LABORATORY SPACE MODIFICATIONS, ELEC; PANEL "LP-1" "LP-6" "LP-9" "LP-12" SCHEDULES	18-Jul-1983
43	0001	C44182-00036	LABORATORY SPACE MODIFICATIONS, ELEC; PANEL "LP-113" AND "LP-114" SCHEDULES	18-Jul-1983
43	0001	C44182-00001	LABORATORY SPACE MODIFICATIONS, TITLE SHEET & INDEX TO DRAWINGS	13-Oct-1983
43	0001	C44182-00005	LABORATORY SPACE MODIFICATIONS, ARCH; FLOOR & REFLECTED CEILING PLANS & SECTION	13-Oct-1983
43	0001	C44182-00006	LABORATORY SPACE MODIFICATIONS, ARCH; WALL SECTION	13-Oct-1983
43	0001	C44182-00007	LABORATORY SPACE MODIFICATIONS, ARCH; DOOR AND FINISH SCHEDULES, ELEVATIONS, DETAILS	13-Oct-1983
43	0001	C44182-00008	LABORATORY SPACE MODIFICATIONS, ARCH; FLOOR PLAN & FURNITURE LAYOUT SCHEDULE	13-Oct-1983
43	0001	C44182-00009	LABORATORY SPACE MODIFICATIONS, MECH; PARTIAL BASEMENT PLAN WEST, LEGEND & STEAM PIPING IISOMETRIC	13-Oct-1983
43	0001	C44182-00010	LABORATORY SPACE MODIFICATIONS, MECH; PARTIAL BASEMENT PLAN EAST	13-Oct-1983
43	0001	C44182-00011	LABORATORY SPACE MODIFICATIONS, MECH; SECTIONS AND DETAILS	13-Oct-1983
43	0001	C44182-00012	LABORATORY SPACE MODIFICATIONS, MECH; PARTIAL ROOF PLAN SECTIONS & DETAILS	13-Oct-1983
43	0001	C44182-00013	LABORATORY SPACE MODIFICATIONS, MECH; CONTROL SCHEMES	13-Oct-1983
43	0001	C44182-00017	LABORATORY SPACE MODIFICATIONS, MECH; PARTIAL BASEMENT FIRE PROTECTION PLAN & ISOMETRIC DETAIL	13-Oct-1983
43	0001	C44182-00024	LABORATORY SPACE MODIFICATIONS, ELEC; PARTIAL BASEMENT POWER LAYOUT	13-Oct-1983
43	0001	C44182-00025	LABORATORY SPACE MODIFICATIONS, ELEC; PARTIAL BASEMENT & ROOF POWER LAYOUT	13-Oct-1983
43	0001	C44182-00026	LABORATORY SPACE MODIFICATIONS, ELEC; PARTIAL BASEMENT LIGHTING LAYOUT	13-Oct-1983
43	0001	C44182-00028	LABORATORY SPACE MODIFICATIONS, ELEC; PARTIAL BASEMENT TELEPHONE LAYOUT	13-Oct-1983
43	0001	C44182-00029	LABORATORY SPACE MODIFICATIONS, ELEC; PARTIAL BASEMENT FIRE ALARM DETECTION LAYOUT	13-Oct-1983
43	0001	C44182-00035	LABORATORY SPACE MODIFICATIONS, ELEC; PANEL "LP-22" AND "LP-112" SCHEDULES	13-Oct-1983
43	0001	C44182-00037	LABORATORY SPACE MODIFICATIONS, ELEC; NAMEPLATE SCHEDULE	13-Oct-1983

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43	0001	C44182-00018	LABORATORY SPACE MODIFICATIONS, MECH; EQUIPMENT LIST	17-Oct-1983
43	0001	C44182-00019	LABORATORY SPACE MODIFICATIONS, MECH; EQUIPMENT LIST	17-Oct-1983
43	0001	R3150-00001	HEALTH RESEARCH LABORATORY, ARCH. ROOM INDEX	27-Jun-1984
43	0001	R3151-00002	HEALTH RESEARCH LABORATORY, ARCH; SUB-BASEMENT FLOOR PLAN	6-Jul-1984
43	0001	SK7300-00001	SPRINKER ADDITION, WALK IN COOLER	6-Sep-1984
43	0001	C44326-00002	REPLACEMENT OF 600 KVA, SUBSTATION, GEN., REMOVAL PLAN AND CONSTRUCTION SCHEDULE	31-Dec-1984
43	0001	C44326-00003	REPLACEMENT OF 600 KVA SUBSTATION, GEN., SUBMITTALS	31-Dec-1984
43	0001	C44326-00004	REPLACEMENT OF 600 KVA SUBSTATION, ARCH., PLOT PLAN, SUBASEMENT FLOOR PLAN, CONC. FOUNDATION WALL SECTION AND NOTES	31-Dec-1984
43	0001	C44326-00005	REPLACEMENT OF 600 KVA SUBSTATION, ARCH., DOOR AND FINISHES	31-Dec-1984
43	0001	C44326-00006	REPLACEMENT OF 600 KVA SUBSTATION, MECH., AIR CONDITIONING, FLOOR PLAN AND SECTION	31-Dec-1984
43	0001	C44326-00007	REPLACEMENT OF 600 KVA SUBSTATION, MECH., EQUIPMENT LIST AND NOTES	31-Dec-1984
43	0001	C44326-00008	REPLACEMENT OF 600 KVA SUBSTATION, ELEC., BILL OF MATERIAL, NAMEPLATES, NOTES AND SCOPE OF WORK	31-Dec-1984
43	0001	C44326-00009	REPLACEMENT OF 600 KVA SUBSTATION, ELEC., ONE LINE DIAGRAM	31-Dec-1984
43	0001	C44326-00010	REPLACEMENT OF 600 KVA SUBSTATION, ELEC., POWER AND LIGHTING LAYOUTS	31-Dec-1984
43	0001	C44326-00011	REPLACEMENT OF 600 KVA SUBSTATION, ELEC., EMERGENCY LIGHTING LAYOUT SUB BASEMENT	31-Dec-1984
43	0001	C44326-00012	REPLACEMENT OF 600 KVA SUBSTATION, ELEC., EMERGENCY LIGHTING LAYOUT BASEMENT	31-Dec-1984
43	0001	C44326-00013	REPLACEMENT OF 600 KVA SUBSTATION, ELEC., EMERGENCY LIGHTING LAYOUT FIRST FLOOR	31-Dec-1984
43	0001	C44326-00014	REPLACEMENT OF 600 KVA SUBSTATION, ELEC., EMERGENCY LIGHTING LAYOUT SECOND FLOOR	31-Dec-1984
43	0001	C44326-00015	REPLACEMENT OF 600 KVA SUBSTATION, ELEC., EMERGENCY LIGHTING LAYOUT PENTHOUSE	31-Dec-1984
43	0001	C44716-00001	SUB-MICRON FILTER SYSTEM ROOM 125-B, ARCH; PLANS, SECTIONS, DETAILS	22-Mar-1985
43	0001	C44716-00002	SUB-MICRON FILTER SYSTEM ROOM 125-B, GEN; SUBMITTAL LIST	22-Mar-1985
43	0001	C44716-00003	SUB-MICRON FILTER SYSTEM ROOM 125-B, MECH; FLOOR PLAN, REMOVAL & LEGEND	22-Mar-1985
43	0001	C44716-00004	SUB-MICRON FILTER SYSTEM ROOM 125-B, MECH; FLOOR PLAN, NEW WORK & SECTION	22-Mar-1985
43	0001	C44716-00005	SUB-MICRON FILTER SYSTEM ROOM 125-B, MECH; EQUIPMENT SCHEDULE & NOTES	22-Mar-1985

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43	0001	C44716-00006	SUB-MICRON FILTER SYSTEM ROOM 125-B, ELEC; REMOVAL PLAN, NEW LIGHTING PLAN & LEGEND	22-Mar-1985
43	0001	C44716-00007	SUB-MICRON FILTER SYSTEM ROOM 125-B, ELEC; PARTIAL FLOOR PLAN & WIRING DIAGRAM	22-Mar-1985
43	0001	C44716-00008	SUB-MICRON FILTER SYSTEM ROOM 125-B, ELEC; PANEL LP-4 SCHEDULE	22-Mar-1985
43	0001	C44716-00009	SUB-MICRON FILTER SYSTEM ROOM 125-B, ELEC; BILL OF MATERIAL, NAMEPLATE SCHEDULE, NOTES & SCOPE OF WORK	22-Mar-1985
43	0001	C44784-00001	ROOM MODIFICATIONS ROOM B247, ARCH; ROOF & FRAME PLAN & SECTIONS	18-Jul-1985
43	0001	C44784-00002	ROOM MODIFICATIONS ROOM B247, MECH; FLOOR, ROOF, LOCATION PLANS & LEGEND	18-Jul-1985
43	0001	C44784-00003	ROOM MODIFICATIONS ROOM B247, MECH; SECTIONS & PIPING DETAILS	18-Jul-1985
43	0001	C44784-00004	ROOM MODIFICATIONS ROOM B247, MECH; NOTES & EQUIPMENT LIST	18-Jul-1985
43	0001	C44784-00005	ROOM MODIFICATIONS ROOM B247, ELEC; BILL OF MATERIAL, NOTES, NAMEPLATE SCHEDULE & SCOPE OF WORK	18-Jul-1985
43	0001	C44784-00006	ROOM MODIFICATIONS ROOM B247, ELEC; FLOOR PLANS, LEGEND & DETAIL	18-Jul-1985
43	0001	C44784-00007	ROOM MODIFICATIONS ROOM B247, ELEC; SECTION & PANEL SCHEDULE	18-Jul-1985
43	0001	C44784-00008	ROOM MODIFICATIONS ROOM, B247, GEN; SUBMITTALS	18-Jul-1985
43	0001	C44359-00001	EMERGENCY ACCESS, CIVIL, & STRUCT., SITE PLAN, FLOOR PLAN, DETAILS AND SECTIONS	12-Aug-1985
43	0001	C44359-00002	EMERGENCY ACCESS, ELEC., LIGHTING PLAN, NOTES, AND BILL OF MATERIAL	12-Sep-1985
43	0001	C45700-00001	HEALTH RESEARCH LABORATORY HEATING SYSTEM, TITLE SHEET & INDEX TO DRAWING	20-Nov-1985
43	0001	C45700-00002	HEALTH RESEARCH LABORATORY HEATING SYSTEM, MECH; SCHEMATIC FLOW DIAGRAM	20-Nov-1985
43	0001	C45700-00003	HEALTH RESEARCH LABORATORY HEATING SYSTEM, MECH; BOILER ROOM FLOOR PLAN	20-Nov-1985
43	0001	C45700-00004	HEALTH RESEARCH LABORATORY HEATING SYSTEM, MECH; DETAILS, BOILER PIPING, STEAM TRAP, DRIP LEG, UNIT HEATER, BOILER STACK SUPPORT DETAILS	20-Nov-1985
43	0001	C45700-00005	HEALTH RESEARCH LABORATORY HEATING SYSTEM, MECH; DETAILS, BOILER FEED CONTROL, DEAERATOR FEED CONTROL, SAMPLE & CHEMICAL FEED PANEL DETAIL	20-Nov-1985
43	0001	C45700-00006	HEALTH RESEARCH LABORATORY HEATING SYSTEM, MECH; EQUIPMENT SCHEDULE & LEGEND	20-Nov-1985
43	0001	C45700-00007	HEALTH RESEARCH LABORATORY HEATING SYSTEM, MECH; DEMOLITION EQUIPMENT ROOM FLOORPLAN	20-Nov-1985

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43	0001	C45700-00008	HEALTH RESEARCH LABORATORY HEATING SYSTEM, MECH; BOILER ROOM SECTIONS	20-Nov-1985
43	0001	C45700-00009	HEALTH RESEARCH LABORATORY HEATING SYSTEM, ELEC; ONE LINE DIAGRAM & POWER SOURCE & FLOOR PLAN (DEMOLITION), PANEL SCHEDULE	20-Nov-1985
43	0001	C45700-00010	HEALTH RESEARCH LABORATORY HEATING SYSTEM, ELEC; PANELBOARD SINGLE LINE DIAGRAM, BOILER ROOM PLAN, PANEL NO. "PP", ONE LINE DIAGRAM	20-Nov-1985
43	0001	SK7385-00001	SPRINKLER ADDITION	18-Dec-1985
43	0001	R3153-00004	HEALTH RESEARCH LABORATORY, ARCH; FIRST FLOOR PLAN	5-Feb-1986
43	0001	C44923-00001	ROOM MODIFICATIONS, ROOMS B138A & B138B, TITLE SHEET & INDEX TO DRAWING	13-Feb-1986
43	0001	C44923-00002	ROOM MODIFICATIONS, ROOMS B138A & B138B, GEN; SUBMITTALS	13-Feb-1986
43	0001	C44923-00003	ROOM MODIFICATIONS, ROOMS B138A & B138B, GEN; DEMOLITION PLAN & SECTIONS, REFLECTED CEILING PLAN & SECTION	13-Feb-1986
43	0001	C44923-00004	ROOM MODIFICATIONS, ROOMS B138A & B138B, STRUCT; GENERAL NOTES	13-Feb-1986
43	0001	C44923-00005	ROOM MODIFICATIONS, ROOMS B138A & B138B, STRUCT; PARTIAL PLAN, SECTIONS & DETAILS	13-Feb-1986
43	0001	C44923-00006	ROOM MODIFICATIONS, ROOMS B138A & B138B, MECH; PARTIAL PLAN, SECTION & HOUSE AIR & VACUUM ISOMETRIC DETAILS	13-Feb-1986
43	0001	C44923-00007	ROOM MODIFICATIONS, ROOMS B138A & B138B, MECH; DETAIL & SPECIFICATION FOR NEW SHIELD DOOR	13-Feb-1986
43	0001	C44923-00008	ROOM MODIFICATIONS, ROOMS B138A & B138B, MECH; GENERAL NOTES	13-Feb-1986
43	0001	C44923-00009	ROOM MODIFICATIONS, ROOMS B138A & B138B, MECH; EQUIPMENT LIST	13-Feb-1986
43	0001	C44923-00010	ROOM MODIFICAITONS, ROOMS B138A & B138B, ELEC; NOTES, EQUIPMENT LIST, NAMEPLATE SCHED., SYMBOL LIST	13-Feb-1986
43	0001	C44923-00011	ROOM MODIFICAITONS, ROOMS B138A & B138B, ELEC; DEMOLITION, LIGHTING & POWER PLAN, DOOR OPENER WIRING DIAGRAM	13-Feb-1986
43	0001	C44923-00012	ROOM MODIFICAITONS, ROOMS B138A & B138B, ELEC; C.C.T.VIDEO SECURITY PLAN, BLOCK DIAGRAM, SECTION & DETAIL	13-Feb-1986
43	0001	R3152-00003	HEALTH RESEARCH LABORATORY, ARCH; BASEMENT FLOOR PLAN	13-Feb-1986
43	0001	R3153-00003	HEALTH RESEARCH LABORATORY, ARCH; BASEMENT FLOOR PLAN	13-Feb-1986
43	0001	R3155-00006	HEALTH RESEARCH LABORATORY, ARCH; FLOOR PLAN	13-Feb-1986

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43	0001	R3154-00005	HEALTH RESEARCH LABORATORY, ARCH; SECOND FLOOR PLAN	18-Feb-1986
43	0001	C44993-00001	DRAINAGE DIVERSION, TITLE SHEET AND INDEX TO DRAWINGS, LOCATION PLAN	25-Mar-1986
43	0001	C44993-00002	DRAINAGE DIVERSION, GEN., SUBMITTALS	25-Mar-1986
43	0001	C44993-00003	DRAINAGE DIVERSION, STRUCT., GENERAL NOTES	25-Mar-1986
43	0001	C44993-00004	DRAINAGE DIVERSION, STRUCT., CHILLER UNITS 1, 2, & 4 SUPPORT DETAILS, FOUNDATION PAD FOR CHILLER UNITS	25-Mar-1986
43	0001	C44993-00005	DRAINAGE DIVERSION, STRUCT., UNIT 3 CHILLER SUPPORT PLATFORM AND FOUNDATION DETAILS	25-Mar-1986
43	0001	C44993-00006	DRAINAGE DIVERSION, MECH., PARTIAL PIPING PLAN, DETAIL & LEGEND, ISOMETRIC DETAIL, LEGEND	25-Mar-1986
43	0001	C44993-00007	DRAINAGE DIVERSION, MECH., PARTIAL PIPING PLAN, DETAIL & LEGEND, ISOMETRIC DETAIL	25-Mar-1986
43	0001	C44993-00008	DRAINAGE DIVERSION, MECH., SECTION	25-Mar-1986
43	0001	C44993-00009	DRAINAGE DIVERSION, MECH., PARTIAL PIPING PLAN, SECTIONS, & LEGEND, PIPING ISOMETRIC	25-Mar-1986
43	0001	C44993-00010	DRAINAGE DIVERSION, MECH., PARTIAL PIPING PLAN, SECTIONS, ELEVATION & LEGEND	25-Mar-1986
43	0001	C44993-00011	DRAINAGE DIVERSION, MECH., GENERAL NOTES	25-Mar-1986
43	0001	C44993-00012	DRAINAGE DIVERSION, MECH., EQUIPMENT LIST	25-Mar-1986
43	0001	C44993-00013	DRAINAGE DIVERSION, ELEC., GENERAL NOTES, NAMEPLATE SCHEDULE AND EQUIPMENT LIST	25-Mar-1986
43	0001	C44993-00014	DRAINAGE DIVERSION, ELEC., CHILLED WATER UNIT NO. 1 POWER PLAN AND NOTES	25-Mar-1986
43	0001	C44993-00015	DRAINAGE DIVERSION, ELEC., CHILLED WATER UNITS NO. 2 & NO. 3 POWER PLAN AND NOTES	25-Mar-1986
43	0001	C44993-00016	DRAINAGE DIVERSION, ELEC., CHILLED WATER UNIT NO. 4 POWER PLAN, NOTES, DETAIL AND ONE LINE DAIGRAM	25-Mar-1986
43	0001	C44993-00017	DRAINAGE DIVERSION, ELEC., CONTROL SCHEMATICS AND DETAILS, PACKAGED CHILLERS, WARNING SYSTEM,	25-Mar-1986
43	0001	C44993-00018	DRAINAGE DIVERSION, ELEC., MOTOR CONTROL CENTER MCC-E	25-Mar-1986
43	0001	C51666-00001	FIRE PROTECTION MAPS. TA-43.	3-Oct-1986
43	0001	ENG 43-7-00001	TA-43 ANIMAL CARE TRANSPORTABLE; TOPOGRAPHY	2-Jul-1987
43	0001	C45381-00001	HRL 2 MANHOLE COVER REPLACEMENT, STRUCT; MANHOLE & COVER PLAN, SECTION & DETAILS	29-Sep-1987
43	0001	C45357-00001	HVAC MODIFICATIONS, ARCH; FLOOR & ROOF PLANS, DETAILS AND NOTES	29-Jan-1988
43	0001	C45357-00002	HVAC MODIFICATIONS, STRUCT; ROOF & SUPPORT FRAMING PLAN, ELEVATIONS AND DETAILS	29-Jan-1988

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43	0001	C45357-00003	HVAC MODIFICATIONS, MECH; PARTIAL REMOVAL FLOOR PLAN, NOTES & LEGEND	29-Jan-1988
43	0001	C45357-00004	HVAC MODIFICATIONS, MECH; FLOOR PLAN, SECTION & NOTES	29-Jan-1988
43	0001	C45357-00005	HVAC MODIFICATIONS, MECH; NOTES	29-Jan-1988
43	0001	C45357-00006	HVAC MODIFICATIONS, MECH; EQUIPMENT LIST	29-Jan-1988
43	0001	C45357-00007	HVAC MODIFICATIONS, ELEC; POWER, LIGHTNING PROTECTION & GROUNDING PLAN	29-Jan-1988
43	0001	C45357-00008	HVAC MODIFICATIONS, ELEC; BILL OF MATERIAL, NAMEPLATE SCHEDULE & NOTES	29-Jan-1988
43	0001	C51666-00002	FIRE PROTECTION MAPS. TA-43. ADDED TRAILER, REMOVE BLDG 11	1-Feb-1989
43	0001	C51666-00003	FIRE PROTECTION MAPS. TA-43	1-Feb-1989
43	0001	C45673-00001	HRL OFFICE CONVERSION, ARCH, DEMOLITION PLAN & FLOOR PLAN	19-Jul-1989
43	0001	ENG 43-9-00001	TA-43 TEMPERATURE CONTROL MODS.	6-Feb-1990
43	0001	C45826-00002	HRL OFFICE CONVERSION, ARCH; SECOND FLOOR PLAN & DEMOLITION PLAN	6-Mar-1990
43	0001	C45826-00003	HRL OFFICE CONVERSION, ARCH; REFLECTED CEILING PLAN & DETAILS	6-Mar-1990
43	0001	C45826-00004	HRL OFFICE CONVERSION, ARCH; SPECIFICATIONS	6-Mar-1990
43	0001	C45826-00005	HRL OFFICE CONVERSION, FP; FIRE PROTECTION PLAN & LEGEND	6-Mar-1990
43	0001	C45826-00006	HRL OFFICE CONVERSION, FP; PIPING ISOMETRIC AND NOTES	6-Mar-1990
43	0001	C45826-00007	HRL OFFICE CONVERSION, ELEC; DEMOLITION & POWER, DATA & TELEPHONE PLANS, LEGEND	6-Mar-1990
43	0001	C45826-00008	HRL OFFICE CONVERSION, ELEC; SUB-BASEMENT, BASEMENT SECOND FLOOR PLAN-CONDUIT ROUTING	6-Mar-1990
43	0001	C45826-00009	HRL OFFICE CONVERSION, ELEC; LIGHTING PLAN AND NOTES	6-Mar-1990
43	0001	C45826-00010	HRL OFFICE CONVERSION, ELEC; BILL OF MATERIAL, NAMEPLATE AND PANEL SCHEDULE	6-Mar-1990
43	0001	R5123-00001	STRUCTURE LOCATION PLAN, TA-43, HEALTH RESEARCH LABORATORY	26-Mar-1990
43	0001	C45771-00020	TEMPERATURE CONTROL MODS., ELEC., FACILITY POWER PLAN	6-Jul-1990
43	0001	C45771-00021	TEMPERATURE CONTROL MODS., ELEC., POWER PLAN, COOLING TOWER & SITE PLAN	6-Jul-1990
43	0001	C45913-00001	LIGHTNING PROTECTION AND GROUNDING SYSTEM, ELEC; SCOPE OF WORK, BILL OF MATERIAL & LEGEND	28-Sep-1990
43	0001	C45913-00002	LIGHTNING PROTECTION AND GROUNDING SYSTEM, ELEC; ROOF PLAN AND PARTIAL SUB-BASEMENT FLOOR PLAN	28-Sep-1990

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43	0001	C45913-00003	LIGHTNING PROTECTION AND GROUNDING SYSTEM, ELEC; ISOMETRIC, WEST	28-Sep-1990
43	0001	C45913-00004	LIGHTNING PROTECTION AND GROUNDING SYSTEM, ELEC; ISOMETRIC, EAST	28-Sep-1990
43	0001	C45913-00005	LIGHTNING PROTECTION AND GROUNDING SYSTEM, ELEC; DETAILS, AIR TERMINAL MOUNTING	28-Sep-1990
43	0001	C54787-00001	HRL ADDITION, FP; FIRST & SECOND FLOOR PLAN, HANGER & HEADER DETAIL	10-Apr-1991
43	0001	C51667-00001	FIRE PROTECTION MAPS. TA-43.	22-Apr-1991
43	0001	C51667-00002	FIRE PROTECTION MAPS. TA-43.	22-Apr-1991
43	0001	C51667-00003	FIRE PROTECTION MAPS. TA-43.	22-Apr-1991
43	0001	C51667-00004	FIRE PROTECTION MAPS. TA-43.	22-Apr-1991
43	0001	C46158-00001	HRL SHORING, STRUCT; REMOVAL PLAN, PLAN AND SECTIONS (PHASE A)	3-Jul-1991
43	0001	C46158-00002	HRL SHORING, STRUCT; GENERAL NOTES	3-Jul-1991
43	0001	C45772-00001	FIRST AND SECOND FLOOR HVAC UPGRADES, TITLE SHEET AND INDEX TO DRAWINGS	3-Feb-1992
43	0001	C45772-00002	FIRST AND SECOND FLOOR HVAC UPGRADES, ARCH; ROOF PLAN & DETAILS	3-Feb-1992
43	0001	C45772-00003	FIRST AND SECOND FLOOR HVAC UPGRADES, ARCH; SECOND FLOOR PLAN & DEMOLITION PLAN	3-Feb-1992
43	0001	C45772-00004	FIRST AND SECOND FLOOR HVAC UPGRADES, ARCH; REFLECTED CEILING	3-Feb-1992
43	0001	C45772-00005	FIRST AND SECOND FLOOR HVAC UPGRADES, MECH; 1ST FLOOR REMOVAL PLAN AND LEGEND (ADMINISTRATION WING)	3-Feb-1992
43	0001	C45772-00006	FIRST AND SECOND FLOOR HVAC UPGRADES, MECH; FIRST FLOOR - DUCT LAYOUT (ADMINISTRATION WING)	3-Feb-1992
43	0001	C45772-00007	FIRST AND SECOND FLOOR HVAC UPGRADES, MECH; SECOND FLOOR - DUCT LAYOUT (ADMINISTRATION WING)	3-Feb-1992
43	0001	C45772-00008	FIRST AND SECOND FLOOR HVAC UPGRADES, MECH; ROOF PLAN (ADMINISTRATION WING)	3-Feb-1992
43	0001	C45772-00009	FIRST AND SECOND FLOOR HVAC UPGRADES, MECH; SECTIONS	3-Feb-1992
43	0001	C45772-00010	FIRST AND SECOND FLOOR HVAC UPGRADES, MECH; SECTIONS	3-Feb-1992
43	0001	C45772-00011	FIRST AND SECOND FLOOR HVAC UPGRADES, MECH; HOT WATER HEATING - FIRST FLOOR (ADMINISTRATION WING)	3-Feb-1992
43	0001	C45772-00012	FIRST AND SECOND FLOOR HVAC UPGRADES, MECH; HOT WATER HEATING - SECOND FLOOR (ADMINISTRATION WING)	3-Feb-1992
43	0001	C45772-00013	FIRST AND SECOND FLOOR HVAC UPGRADES, MECH; SECOND FLOOR PIPING PLAN (ADMINISTRATION WING)	3-Feb-1992

Technical Area	Facility Number	Object Name	LANL Title	Date on Document
43	0001	C45772-00014	FIRST AND SECOND FLOOR HVAC UPGRADES, MECH; CONTROL SEQUENCE OF OPERATION AND SYSTEM POINT SCHEDULE	3-Feb-1992
43	0001	C45772-00015	FIRST AND SECOND FLOOR HVAC UPGRADES, MECH; DETAILS, COOLING & HEATING & VAV HEATING COIL PIPING	3-Feb-1992
43	0001	C45772-00016	FIRST AND SECOND FLOOR HVAC UPGRADES, MECH; EQUIPMENT SCHEDULES AND CODE ASSIGNMENT	3-Feb-1992
43	0001	C45772-00017	FIRST AND SECOND FLOOR HVAC UPGRADES, FP; FIRE PROTECTION PLAN SECOND FLOOR & LEGEND	3-Feb-1992
43	0001	C45772-00018	FIRST AND SECOND FLOOR HVAC UPGRADES, FP; PIPING ISOMETRIC & SPRINKLER MODIFICATIONS	3-Feb-1992
43	0001	C45772-00019	FIRST AND SECOND FLOOR HVAC UPGRADES, ELEC; FIRST FLOOR POWER, CONTROL PLAN & LEGEND, V.A.V. CONNECTION DIAGRAM	3-Feb-1992
43	0001	C45772-00020	FIRST AND SECOND FLOOR HVAC UPGRADES, ELEC; SECOND FLOOR POWER & CONTROL PLAN, V.A.V CONNECTION DIAGRAM	3-Feb-1992
43	0001	C45772-00021	FIRST AND SECOND FLOOR HVAC UPGRADES, ELEC; DEMOLITION PLAN AND CONDUIT ROUTING PLANS (ADMINISTRATION WING)	3-Feb-1992
43	0001	C45772-00022	FIRST AND SECOND FLOOR HVAC UPGRADES, ELEC; POWER, DATA AND TELEPHONE AND PANEL SCHEDULE (ADMINISTRATION WING)	3-Feb-1992
43	0001	C45772-00023	FIRST AND SECOND FLOOR HVAC UPGRADES, ELEC; LIGHTING PLAN (ADMINISTRATION WING)	3-Feb-1992
43	0001	C45772-00024	FIRST AND SECOND FLOOR HVAC UPGRADES, ELEC; ROOF PLAN POWER (ADMINISTRATION WING)	3-Feb-1992
43	0001	C45772-00025	FIRST AND SECOND FLOOR HVAC UPGRADES, ELEC; NOTES, BILL OF MATERIAL AND NAMEPLATE SCHEDULE	3-Feb-1992
43	0001	SK7854-00001	TEMPERATURE CONTROL MODIFICATIONS, MECH; EQUIPMENT ROOM 154 & 152 FLOOR PLAN, PIPING DETAILS & NOTES	3-Feb-1992
43	0001	C46241-00001	MODIFICATION TO BASEMENT LABS., ARCH; REMOVAL AND NEW WORK PLANS	12-Feb-1992
43	0001	C46241-00002	MODIFICATION TO BASEMENT LABS., ARCH; ELEVATIONS AND SECTIONS	12-Feb-1992
43	0001	C46241-00003	MODIFICATION TO BASEMENT LABS., ARCH; GENERAL NOTES	12-Feb-1992
43	0001	C46241-00004	MODIFICATION TO BASEMENT LABS., MECH; GENERAL NOTES	12-Feb-1992
43	0001	C46241-00005	MODIFICATION TO BASEMENT LABS., MECH; REMOVAL & RELOCATION PLAN, TEST AND INSPECTION PLANS, NOTES, EQUIPMENT LIST	12-Feb-1992
43	0001	C46241-00006	MODIFICATION TO BASEMENT LABS., MECH; PARTIAL BASEMENT PLAN AND SECTIONS	12-Feb-1992

Technical Area	Facility Number	Object Name	LANL Title	Date on Document
43	0001	C46241-00007	MODIFICATION TO BASEMENT LABS., ELEC; DEMOLITION, PARTIAL BASEMENT PLAN, FUME HOOD ELEVATION	12-Feb-1992
43	0001	C46241-00008	MODIFICATION TO BASEMENT LABS., ELEC; INSTALLATION, PARTIAL BASEMENT PLAN & ELEVATION	12-Feb-1992
43	0001	C46241-00009	MODIFICATION TO BASEMENT LABS., ELEC; NOTES & NAMEPLATE & PANELBOARD SCHEDULES, BILL OF MATERIAL	12-Feb-1992
43	0001	C45771-00001	TEMPERATURE CONTROL MODIFICATION, TITLE SHEET AND INDEX TO DRAWINGS	22-Apr-1992
43	0001	C45771-00002	TEMPERATURE CONTROL MODS, CIVIL, SITE PLAN, SECTIONS & DETAILS, LEGEND	22-Apr-1992
43	0001	C45771-00003	TEMPERATURE CONTROL MODS, STRUCT., TOWER FOUNDATION PLANS AND DETAILS	22-Apr-1992
43	0001	C45771-00004	TEMPERATURE CONTROL MODS., MECH., SUB-BASEMENT REMOVAL PLAN, LEGEND AND CLASS A REMOVAL	22-Apr-1992
43	0001	C45771-00005	TEMPERATURE CONTROL MODS., MECH., FIRST FLOOR REMOVAL PLANS (LAB WINGS)	22-Apr-1992
43	0001	C45771-00006	TEMPERATURE CONTROL MODS., MECH., PENTHOUSE-1 AND SECOND FLOOR REMOVAL PLANS (LAB WING)	22-Apr-1992
43	0001	C45771-00007	TEMPERATURE CONTROL MODS., MECH., SUB-BASEMENT COIL PIPING (LAB WING)	22-Apr-1992
43	0001	C45771-00008	TEMPERATURE CONTROL MODS., MECH., COOLING TOWER AND EQUIPMENT ROOM PIPING PLANS	22-Apr-1992
43	0001	C45771-00009	TEMPERATURE CONTROL MODS., MECH., FIRST FLOOR COIL PIPING (LAB WING)	22-Apr-1992
43	0001	C45771-00010	TEMPERATURE CONTROL MODS., MECH., SECOND FLOOR CHILLED WATER PIPING PLAN (LAB WING)	22-Apr-1992
43	0001	C45771-00011	TEMPERATURE CONTROL MODS., MECH., SECOND FLOOR COIL PIPING (LAB WING)	22-Apr-1992
43	0001	C45771-00012	TEMPERATURE CONTROL MODS., MECH., SECTIONS	22-Apr-1992
43	0001	C45771-00013	TEMPERATURE CONTROL MODS., MECH., PIPING ISOMETRIC DETAILS AND CHILLED WATER, IMU PRV DIAGRAMS, CONTROL SCHEMATIC	22-Apr-1992
43	0001	C45771-00014	TEMPERATURE CONTROL MODS., MECH., COOLING SYSTEM CONTROL DIAGRAM & LEGEND	22-Apr-1992
43	0001	C45771-00015	TEMPERATURE CONTROL MODS., MECH., WATER TREATMENT DIAGRAM AND DETAILS, WATER FLOW DIAGRAM, CHEMICAL FEED SYSTEM	22-Apr-1992
43	0001	C45771-00016	TEMPERATURE CONTROL MODS., MECH., POINT SCHEDULES	22-Apr-1992
43	0001	C45771-00017	TEMPERATURE CONTROL MODS., MECH., EQUIPMENT SCHEDULES AND CODE ASSIGNMENT	22-Apr-1992
43	0001	C45771-00018	TEMPERATURE CONTROL MODS., ELEC., ONE-LINE DIAGRAM AND "MCC-F" FRONT VIEW	22-Apr-1992

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43	0001	C45771-00019	TEMPERATURE CONTROL MODS., ELEC., CONTROL DIAGRAMS, CONDENSING, CHILLED WATER PUMP, COOLING TOWER FAN, CIRCUIT WIRING	22-Apr-1992
43	0001	C45771-00022	TEMPERATURE CONTROL MODS., ELEC., NOTES AND LIGHTNING PLAN, COOLING TOWER	22-Apr-1992
43	0001	C45771-00023	TEMPERATURE CONTROL MODS., ELEC., BILL OF MATERIAL & NAMEPLATE SCHEDULE	22-Apr-1992
43	0001	C45771-00024	TEMPERATURE CONTROL MODS., ELEC., HVAC MONITORING AND CONTROL SYSTEMS, BILL OF MATERIAL, COOLING TOWER FAN	22-Apr-1992
43	0001	C45770-00001	HVAC UPGRADE, TITLE SHEET AND INDEX TO DRAWINGS	23-Apr-1992
43	0001	C45770-00002	HVAC UPGRADE, ARCH; BASEMENT DEMOLITION PLAN (LAB WING) (ADDITIVE ALTERNATE NO. 1)	23-Apr-1992
43	0001	C45770-00003	HVAC UPGRADE, ARCH; FIRST FLOOR DEMOLITION PLAN (LAB WING)	23-Apr-1992
43	0001	C45770-00004	HVAC UPGRADE, ARCH; SECOND FLOOR DEMOLITION PLAN (LAB WING)	23-Apr-1992
43	0001	C45770-00005	HVAC UPGRADE, ARCH; BASEMENT FLOOR REFLECTED CEILING PLAN (LAB WING) (ADDITIVE ALTERNATE NO. 1	23-Apr-1992
43	0001	C45770-00006	HVAC UPGRADE, ARCH; FIRST FLOOR REFLECTED CEILING PLAN (LAB WING)	23-Apr-1992
43	0001	C45770-00007	HVAC UPGRADE, ARCH; SECOND FLOOR REFLECTED CEILING PLAN (LAB WING)	23-Apr-1992
43	0001	C45770-00008	HVAC UPGRADE, MECH; (ADDITIVE ALTERNATE #1) BASEMENT FLOOR REMOVAL PLAN AND LEGEND (LAB WING)	23-Apr-1992
43	0001	C45770-00009	HVAC UPGRADE, MECH; FIRST FLOOR REMOVAL PLAN (LAB WING)	23-Apr-1992
43	0001	C45770-00010	HVAC UPGRADE, MECH; SECOND FLOOR REMOVAL PLAN (LAB WING)	23-Apr-1992
43	0001	C45770-00011	HVAC UPGRADE, MECH; (ADDITIVE ALTERNATE #1) BASEMENT DUCTWORK PLAN (LAB WING)	23-Apr-1992
43	0001	C45770-00012	HVAC UPGRADE, MECH; FIRST FLOOR DUCTWORK PLAN (LAB WING)	23-Apr-1992
43	0001	C45770-00013	HVAC UPGRADE, MECH; SECOND FLOOR DUCTWORK PLAN (LAB WING)	23-Apr-1992
43	0001	C45770-00014	HVAC UPGRADE, MECH; HOT WATER HEATING-SUB-BASEMENT (LAB WING), SECTION AND DETAIL	23-Apr-1992
43	0001	C45770-00015	HVAC UPGRADE, MECH; HOT WATER HEATING-FIRST FLOOR (LAB WING)	23-Apr-1992
43	0001	C45770-00016	HVAC UPGRADE, MECH; HOT WATER HEATING-SECOND FLOOR (LAB WING)	23-Apr-1992
43	0001	C45770-00017	HVAC UPGRADE, MECH; DUCT DETAILS AND CONTROL SCHEMATIC	23-Apr-1992
43	0001	C45770-00018	HVAC UPGRADE, MECH; DUCT DETAIL	23-Apr-1992

Technical Area	Facility Number	Object Name	LANL Title	Date on Document
43	0001	C45770-00019	HVAC UPGRADE, MECH; DETAILS, PRV STATION, COIL PIPING, PUMP INSTALLATION, CONCRETE PAD DETAIL	23-Apr-1992
43	0001	C45770-00020	HVAC UPGRADE, MECH; AIR BALANCE SCHEDULE	23-Apr-1992
43	0001	C45770-00021	HVAC UPGRADE, MECH; TERMINAL HEATING COIL SCHEDULE	23-Apr-1992
43	0001	C45770-00022	HVAC UPGRADE, MECH; EQUIPMENT SCHEDULES	23-Apr-1992
43	0001	C45770-00023	HVAC UPGRADE, FP; (ADDITIVE ALTERNATE # 1) FIRE PROTECTION PLAN BASEMENT (LAB WING) & LEGEND	23-Apr-1992
43	0001	C45770-00024	HVAC UPGRADE, FP; FIRST FLOOR FIRE PROTECTION PLAN (LAB WING)	23-Apr-1992
43	0001	C45770-00025	HVAC UPGRADE, FP; SECOND FLOOR FIRE PROTECTION PLAN (LAB WING)	23-Apr-1992
43	0001	C45770-00026	HVAC UPGRADE, FP; PIPING DETAILS (LAB WING)	23-Apr-1992
43	0001	C45770-00027	HVAC UPGRADE, ELEC; (ADDITIVE ALTERNATE #1) BASEMENT LIGHTING PLAN (LAB WING) & LEGEND	23-Apr-1992
43	0001	C45770-00028	HVAC UPGRADE, ELEC; FIRST FLOOR LIGHTING PLAN (LAB WING) & NOTES	23-Apr-1992
43	0001	C45770-00029	HVAC UPGRADE, ELEC; SECOND FLOOR LIGHTING PLAN (LAB WING)	23-Apr-1992
43	0001	C45770-00030	HVAC UPGRADE, ELEC; NOTES, BILL OF MATERIAL, NAMEPLATE SCHEDULE, POWER PLAN AND ONE LINE DIAGRAM	23-Apr-1992
43	0001	C46335-00001	CESIUM SOURCE INTERLOCKS, ELEC; GENERAL NOTES, SEQUENCE OF OPERATION AND EQUIPMENT	20-May-1992
43	0001	C46335-00002	CESIUM SOURCE INTERLOCKS, ELEC; CONTROL PANEL WIRING & SCHEMATIC DIAGRAMS	20-May-1992
43	0001	C46335-00003	CESIUM SOURCE INTERLOCKS, ELEC; PANEL LAYOUT, WIRING SCHEMATIC DIAGRAM & DETAIL	20-May-1992
43	0001	C45632-00001	HRL BUILDING ADDITION, TITLE SHEET & INDEX TO DRAWINGS	1-Jun-1992
43	0001	C45632-00002	HRL BUILDING ADDITION, GEN; SYMBOLS & ABBREVIATIONS	1-Jun-1992
43	0001	C45632-00003	HRL BUILDING ADDITION, ARCH; SITE & BUILDING DEMOLITION PLAN	1-Jun-1992
43	0001	C45632-00004	HRL BUILDING ADDITION, CIVIL, SITE PLAN, GRADING, DRAINAGE & UTILITY PLAN	1-Jun-1992
43	0001	C45632-00005	HRL BUILDING ADDITION, CIVIL, DETAILS, SITE PLAN, CONCRETE CATCH BASIN, WATER LINE TRENCH, ENDWALL	1-Jun-1992
43	0001	C45632-00006	HRL BUILDING ADDITION, CIVIL, DETAILS, FIRE HYDRANT INSTALLATION, VALVE BOX, COPPER TRACER WIRE	1-Jun-1992
43	0001	C45632-00007	HRL BUILDING ADDITION, CIVIL, DETAILS, PRECAST CONCRETE MANHOLE, GUARD POST, CLEANOUT GRADE, STORM DRAIN PIPE TRENCH	1-Jun-1992

Technical Area	Facility Number	Object Name	LANL Title	Date on Document
43	0001	C45632-00008	HRL BUILDING ADDITION, CIVIL, DETAILS, STORM DRAIN PROFILE, PARKING LOT PAVEMENT, SIDEWALK DETAILS	1-Jun-1992
43	0001	C45632-00009	HRL BUILDING ADDITION, ADDITIVE ALTERNATE #4 (DELETED), PRESSURE GAS REGULATIONG STATION, GAS LINE TRENCH, SITE PLAN	1-Jun-1992
43	0001	C45632-00010	HRL BUILDING ADDITION, ARCH; FIRST FLOOR PLAN	1-Jun-1992
43	0001	C45632-00011	HRL BUILDING ADDITION, ARCH; SECOND FLOOR PLAN	1-Jun-1992
43	0001	C45632-00012	HRL BUILDING ADDITION, ARCH; FIRST FLOOR REFLECTED CEILING PLAN & LEGEND	1-Jun-1992
43	0001	C45632-00013	HRL BUILDING ADDITION, ARCH; SECOND FLOOR REFLECTED CEILING PLAN & LEGEND	1-Jun-1992
43	0001	C45632-00014	HRL BUILDING ADDITION, ARCH; BUILDING ELEVATIONS & ROOF PLAN	1-Jun-1992
43	0001	C45632-00015	HRL BUILDING ADDITION, ARCH; BUILDING SECTIONS	1-Jun-1992
43	0001	C45632-00016	HRL BUILDING ADDITION, ARCH; WALL SECTIONS	1-Jun-1992
43	0001	C45632-00017	HRL BUILDING ADDITION, ARCH; DETAILS, CONCRETE STEPS & HANDRAIL, CEILING, WALL, COLUMN	1-Jun-1992
43	0001	C45632-00018	HRL BUILDING ADDITION, ARCH; DETAILS, HEAD, JAMB, WALL, SILL, EXPANSION JOINT, COLUMN, ROOF HATCH	1-Jun-1992
43	0001	C45632-00019	HRL BUILDING ADDITION, ARCH; INTERIOR ELEVATIONS	1-Jun-1992
43	0001	C45632-00020	HRL BUILDING ADDITION, ARCH; DOOR & INTERIOR FINISH SCHEDULES DOOR & WINDOW TYPES	1-Jun-1992
43	0001	C45632-00021	HRL BUILDING ADDITION, STRUCT; FOUNDATION & FIRST FLOOR PLAN	1-Jun-1992
43	0001	C45632-00022	HRL BUILDING ADDITION, STRUCT; SECOND FLOOR FRAMING PLAN	1-Jun-1992
43	0001	C45632-00023	HRL BUILDING ADDITION, STRUCT; ROOF FRAMING PLAN	1-Jun-1992
43	0001	C45632-00024	HRL BUILDING ADDITION, STRUCT; FOUNDATION GRADE BEAM, RECTANGULAR PIER, DRILLED PIER, COLUMN & BASE PLATE SCHEDULES, SECTIONS & DETAILS	1-Jun-1992
43	0001	C45632-00025	HRL BUILDING ADDITION, STRUCT; FOUNDATION & SLAB SECTIONS & DETAILS	1-Jun-1992
43	0001	C45632-00026	HRL BUILDING ADDITION, STRUCT; FRAMING SECTIONS, DETAILS & ELEVATION	1-Jun-1992
43	0001	C45632-00027	HRL BUILDING ADDITION, STRUCT; FRAMING SECTIONS & DETAILS	1-Jun-1992
43	0001	C45632-00028	HRL BUILDING ADDITION, STRUCT; FRAMING SECTIONS & DETAILS	1-Jun-1992

Technical Area	Facility Number	Object Name	LANL Title	Date on Document
43	0001	C45632-00029	HRL BUILDING ADDITION, STRUCT; MISCELLANEOUS DETAILS, GROUNDING NOTES & SOIL BORING NOTES	1-Jun-1992
43	0001	C45632-00030	HRL BUILDING ADDITION, STRUCT; MISCELLANEOUS SECTIONS & DETAILS	1-Jun-1992
43	0001	C45632-00031	HRL BUILDING ADDITION, STRUCT; ADDITIVE ALTERNATE NO. 4 (DELETED)	1-Jun-1992
43	0001	C45632-00032	HRL BUILDING ADDITION, PLUMBING; FIRST FLOOR PLAN	1-Jun-1992
43	0001	C45632-00033	HRL BUILDING ADDITION, PLUMBING; SECOND FLOOR PLAN	1-Jun-1992
43	0001	C45632-00034	HRL BUILDING ADDITION, PLUMBING; WATER, VENT PIPING, UTILITY ROOM ISOMETRICS & ENLARGED UTILITY ROOM PLAN	1-Jun-1992
43	0001	C45632-00035	HRL BUILDING ADDITION, PLUMBING; SCHEDULES, BACKFLOW PREVENTER, WATER PRV PIPING, DEIONIZED WATER MAKE UP SYSTEM DETAILS & MISCELLANEOUS PLANS, LEGEND	1-Jun-1992
43	0001	C45632-00036	HRL BUILDING ADDITION, MECH; FIRST FLOOR PLAN	1-Jun-1992
43	0001	C45632-00037	HRL BUILDING ADDITION, MECH; SECOND FLOOR PLAN	1-Jun-1992
43	0001	C45632-00038	HRL BUILDING ADDITION, MECH; ROOF PLAN & SECTIONS	1-Jun-1992
43	0001	C45632-00039	HRL BUILDING ADDITION, MECH; AIRFLOW DIAGRAM & REHEAT COIL, DUCT SUPPORT, BASE PLATE DETAILS	1-Jun-1992
43	0001	C45632-00040	HRL BUILDING ADDITION, MECH; CONTROL DIAGRAMS & FAN SUPPORT, DUCT CONNECTION, DIFFUSER CONNECTION DETAILS	1-Jun-1992
43	0001	C45632-00041	HRL BUILDING ADDITION, MECH; EQUIPMENT LIST & INVENTORY CONTROL	1-Jun-1992
43	0001	C45632-00042	HRL BUILDING ADDITION, ELEC; LEGEND	1-Jun-1992
43	0001	C45632-00043	HRL BUILDING ADDITION, ELEC; FIRST FLOOR LIGHTING PLAN	1-Jun-1992
43	0001	C45632-00044	HRL BUILDING ADDITION, ELEC; SECOND FLOOR LIGHTING PLAN	1-Jun-1992
43	0001	C45632-00045	HRL BUILDING ADDITION, ELEC; FIRST FLOOR POWER & SPECIAL SYSTEMS PLAN, SKIRTED PANEL DETAIL	1-Jun-1992
43	0001	C45632-00046	HRL BUILDING ADDITION, ELEC; SECOND FLOOR POWER & SPECIAL SYSTEMS PLAN, CABLE TRAY CONDUIT TERMINATOIN	1-Jun-1992
43	0001	C45632-00047	HRL BUILDING ADDITION, ELEC; ROOF POWER PLAN, GROUND COUNTERPOISE & LIGHTNING PROTECTION ROOF PLAN, TRANSFORMER PAD DETAIL	1-Jun-1992

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43	0001	C45632-00048	HRL BUILDING ADDITION, ELEC; MISCELLANEOUS PARTIAL FLOOR PLANS & TELEPHONE, PAGING, FIRE ALARM, DOOR ACCESS RISER DIAGRAMS, CABLE TRAY TRANSITION	1-Jun-1992
43	0001	C45632-00049	HRL BUILDING ADDITION, ELEC; PANEL SCHEDULES, LOAD SUMMARY, AIR HANDLING UNIT & EXHAUST FAN	1-Jun-1992
43	0001	C45632-00050	HRL BUILDING ADDITION, ELEC; ONE LINE DIAGRAM & GROUNDING SYSTEM ONE LINE DIAGRAM	1-Jun-1992
43	0001	C45632-00051	HRL BUILDING ADDITION, ELEC; BILL OF MATERIAL	1-Jun-1992
43	0001	C46595-00001	LOS ALAMOS SCIENTIFIC LABORATORY, HEALTH RESEARCH LABORATORY, CIVIL, SITE PLAN	17-Aug-1992
43	0001	C46244-00001	COMPUTER TERMINAL ROOM MODIFICATIONS, TITLE SHEET, INDEX TO DRAWINGS AND SCOPE OF WORK	28-Sep-1992
43	0001	C46244-00002	COMPUTER TERMINAL ROOM MODIFICATIONS, GEN; TEST, INSPECTION AND SUBMITTAL PLANS	28-Sep-1992
43	0001	C46244-00003	COMPUTER TERMINAL ROOM MODIFICATIONS, ARCH; REMOVAL AND NEW WORK PLANS	28-Sep-1992
43	0001	C46244-00004	COMPUTER TERMINAL ROOM MODIFICATIONS, ARCH; SCHEDULES, SECTIONS & DETAILS	28-Sep-1992
43	0001	C46244-00005	COMPUTER TERMINAL ROOM MODIFICATIONS, ARCH; REFLECTED CEILING PLAN, ELEVATIONS & NOTES	28-Sep-1992
43	0001	C46244-00006	COMPUTER TERMINAL ROOM MODIFICATIONS, MECH; REMOVAL PLAN, DETAILS & CLASS "A" REMOVAL SCHEDULE	28-Sep-1992
43	0001	C46244-00007	COMPUTER TERMINAL ROOM MODIFICATIONS, MECH; GENERAL NOTES	28-Sep-1992
43	0001	C46244-00008	COMPUTER TERMINAL ROOM MODIFICATIONS, MECH; GENERAL NOTES	28-Sep-1992
43	0001	C46244-00009	COMPUTER TERMINAL ROOM MODIFICATIONS, MECH; HVAC PLANS, CHILLED WATER ISOMETRIC & SECTION	28-Sep-1992
43	0001	C46244-00010	COMPUTER TERMINAL ROOM MODIFICATIONS, MECH; HVAC SYSTEM ISOMETRIC & HVAC CONTROL DIAGRAM	28-Sep-1992
43	0001	C46244-00011	COMPUTER TERMINAL ROOM MODIFICATIONS, MECH; EQUIPMENT LIST	28-Sep-1992
43	0001	C46244-00012	COMPUTER TERMINAL ROOM MODIFICATIONS, FP; REMOVAL PLAN & LEGEND	28-Sep-1992
43	0001	C46244-00013	COMPUTER TERMINAL ROOM MODIFICATIONS, FP; GENERAL NOTES & EQUIPMENT LIST	28-Sep-1992
43	0001	C46244-00014	COMPUTER TERMINAL ROOM MODIFICATIONS, FP; BASEMENT PLAN, SPRINKLER PIPING ISOMETRIC & DETAILS	28-Sep-1992
43	0001	C46244-00015	COMPUTER TERMINAL ROOM MODIFICATIONS, ELEC; REMOVAL AND LIGHTING PLAN	28-Sep-1992

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43	0001	C46244-00016	COMPUTER TERMINAL ROOM MODIFICATIONS, ELEC; POWER PLAN & ONE-LINE DIAGRAM, GROUNDING SCHEMATIC	28-Sep-1992
43	0001	C46244-00017	COMPUTER TERMINAL ROOM MODIFICATIONS, ELEC; ALARM PLAN, WIRING DIAGRAMS, EMERGENCY POWER OFF SCHEMATICF	28-Sep-1992
43	0001	C46244-00018	COMPUTER TERMINAL ROOM MODIFICATIONS, ELEC; NAMEPLATE & PANELBOARD SCHEDULES AND BILL OF MATERIAL	28-Sep-1992
43	0001	C46244-00019	COMPUTER TERMINAL ROOM MODIFICATIONS, ELEC; LEGEND & GENERAL NOTES	28-Sep-1992
43	0001	AB95-00004	AS-BUILT RECORD FLOOR PLAN, HEALTH RESEARCH LABORATORY, ARCH., SECOND FLOOR PLAN	30-Oct-1992
43	0001	C40891-00003	PHYSICAL SECURITY IMPROVEMENTS, FIRST FLOOR PLAN	17-Jan-1993
43	0001	C40892-00004	PHYSICAL SECURITY IMPROVEMENTS, BASEMENT FLOOR PLAN	17-Jan-1993
43	0001	C40893-00005	PHYSICAL SECURITY IMPROVEMENTS, DOOR LOCK AND WINDOW DETAILS	17-Jan-1993
43	0001	C48768-00000	AUTOMATIC SPRINKLER SYSTEM (FY-64) TITLE SHEET & INDEX TO DRAWINGS	9-Feb-1993
43	0001	C48768-00001	AUTOMATIC SPRINKLER SYSTEM FY-64, FP; LOCATION PLAN	9-Feb-1993
43	0001	C48768-00069	AUTOMATIC SPRINKLER SYSTEM FY-64, FP; HRL BUILDING, FIRST FLOOR AREA PLAN ROOM 120, ACOUSTICAL TILE SUSPENSION SYSTEM DETAIL	9-Feb-1993
43	0001	C48768-00070	AUTOMATIC SPRINKLER SYSTEM FY-64, FP; HRL BUILDING, SECOND FLOOR AREA PLAN ROOM 216	9-Feb-1993
43	0001	C48768-00071	AUTOMATIC SPRINKLER SYSTEM FY-64, FP; HRL BUILDING, ELEVATIONS	9-Feb-1993
43	0001	C48768-00072	AUTOMATIC SPRINKLER SYSTEM FY-64, FP; HRL BUILDING, SUB BASEMENT FLOOR PLAN, WATER SUPPLY & SERVICES DIAGRAM	9-Feb-1993
43	0001	C45617-00001	ANIMAL CARE FACILITY UPGRADE, TITLE SHEET & INDEX TO DRAWINGS	19-Feb-1993
43	0001	C45617-00002	ANIMAL CARE FACILITY UPGRADE, GEN; SUBMITTAL SCHEDULE	19-Feb-1993
43	0001	C45617-00003	ANIMAL CARE FACILITY UPGRADE, ARCH; BASEMENT DEMOLITION PLAN & FLOOR PLAN	19-Feb-1993
43	0001	C45617-00004	ANIMAL CARE FACILITY UPGRADE, ARCH; BASEMENT REFLECTED CEILING PLAN & ROOF PLAN	19-Feb-1993
43	0001	C45617-00005	ANIMAL CARE FACILITY UPGRADE, ARCH; SCHEDULES, SECTIONS & DETAILS	19-Feb-1993
43	0001	C45617-00006	ANIMAL CARE FACILITY UPGRADE, ARCH; SPECIFICATIONS	19-Feb-1993
43	0001	C45617-00007	ANIMAL CARE FACILITY UPGRADE, STRUCT; DOCK PLAN, SECTIONS & DETAILS	19-Feb-1993

Technical Area	Facility Number	Object Name	LANL Title	Date on Document
43	0001	C45617-00008	ANIMAL CARE FACILITY UPGRADE, MECH; BASEMENT DEMOLITION PLAN REMOVAL SCHEDULE, LEGEND, NOTES	19-Feb-1993
43	0001	C45617-00009	ANIMAL CARE FACILITY UPGRADE, MECH; BASEMENT DUCTWORK PLAN & PIPING PLAN & DETAIL	19-Feb-1993
43	0001	C45617-00010	ANIMAL CARE FACILITY UPGRADE, MECH; SECTIONS, EQUIPMENT SCHEDULE & DETAILS	19-Feb-1993
43	0001	C45617-00011	ANIMAL CARE FACILITY UPGRADE, FP; FIRE PROTECTION PLAN, DETAILS & LEGEND	19-Feb-1993
43	0001	C45617-00012	ANIMAL CARE FACILITY UPGRADE, ELEC; BASEMENT REMOVAL PLAN	19-Feb-1993
43	0001	C45617-00013	ANIMAL CARE FACILITY UPGRADE, ELEC; BASEMENT POWER PLAN	19-Feb-1993
43	0001	C45617-00014	ANIMAL CARE FACILITY UPGRADE, ELEC; BASEMENT LIGHTING PLAN, BILL OF MATERIAL & NAMEPLATES	19-Feb-1993
43	0001	C49443-00001	"IN-VIVO" MODS., MECH; FIRE PROTECTION PLAN, DETAIL, NOTES AND LEGEND	12-Aug-1993
43	0001	C49543-00001	LABS CONSOLIDATION, MECH; FIRE PROTECTION PLAN, PIPING DETAIL, NOTES AND LEGEND	18-Mar-1994
43	0001	C49572-00001	LABS CONSOLIDATION 2ND PROJECT, MECH; FIRE PROTECTION PLAN, PIPING DETAIL, NOTES AND LEGEND	11-May-1994
43	0001	C49527-00001	CHILLED WATER COOL & EMERG POWER, MECH; GENERAL NOTES	9-Jun-1994
43	0001	C49527-00002	CHILLED WATER COOL & EMERG POWER, MECH; PARTIAL BASEMENT FLOOR PLAN & LEGEND	9-Jun-1994
43	0001	C49527-00003	CHILLED WATER COOL & EMERG POWER, MECH; SECTIONS	9-Jun-1994
43	0001	C49527-00004	CHILLED WATER COOL & EMERG POWER, MECH; PIPING ISOMETRIC AND EQUIPMENT LIST	9-Jun-1994
43	0001	C49527-00005	CHILLED WATER COOL & EMERG POWER, MECH; PIPE CHASE PLAN, DRAIN DETAILS AND SECTIONS	9-Jun-1994
43	0001	C49527-00006	CHILLED WATER COOL & EMERG POWER, ELEC; BASEMENT SECTION, TERMIAL BLOCK DETAIL & ONE-LINE DIAGRAM	9-Jun-1994
43	0001	C49527-00007	CHILLED WATER COOL & EMERG POWER, ELEC; STANDARD NOTES AND BILL OF MATERIAL	9-Jun-1994
43	0001	AB33-00002	AS-BUILT STRUCTURE LOCATION MAPS; TA-43; HEALTH RESEARCH LAB & DOE HDQRS; KEY MAP AND STRUCTURE LOCATION INDEX	22-Feb-1995
43	0001	C46461-00028	SCADA WATER PRODUCTION MONITORING & CONTROL SYSTEM INSTALLATION, ELEC; PARTIAL ESS SITE PLANS	1-Jan-1997
43	0001	C52055-00001	BIOPHYSICS LAB ADDITION, FP., FIRE SPRINKLER SYSTEM PLAN, GROUND FLOOR	6-Feb-1997
43	0001	C52055-00002	BIOPHYSICS LAB ADDITION, FP., FIRE SPRINKLER SYSTEM PLAN, FIRST FLOOR	6-Feb-1997

Technical Area	Facility Number	Object Name	LANL Title	Date on Document
43	0001	C49784-00001	BIOPHYSICS LAB ADDITION, TITLE SHEET AND LIST OF DRAWINGS AND LOCATION PLAN	1-Apr-1997
43	0001	C49784-00002	BIOPHYSICS LAB ADDITION, BORINGS LOG	1-Apr-1997
43	0001	C49784-00003	BIOPHYSICS LAB ADDITION, CIVIL. DEMOLITION PLAN	1-Apr-1997
43	0001	C49784-00004	BIOPHYSICS LAB ADDITION, CIVIL. SITE PLAN	1-Apr-1997
43	0001	C49784-00005	BIOPHYSICS LAB ADDITION, CIVIL. GRADING & DRAINAGE PLAN	1-Apr-1997
43	0001	C49784-00006	BIOPHYSICS LAB ADDITION, CIVIL. UTILITIES PLAN	1-Apr-1997
43	0001	C49784-00011	BIOPHYSICS LAB ADDITION, STRUCT. ROOF FRAMING PLAN	1-Apr-1997
43	0001	C49784-00012	BIOPHYSICS LAB ADDITION, STRUCT. DETAILS	1-Apr-1997
43	0001	C49784-00013	BIOPHYSICS LAB ADDITION, STRUCT. DETAILS	1-Apr-1997
43	0001	C49784-00014	BIOPHYSICS LAB ADDITION, STRUCT. DETAILS	1-Apr-1997
43	0001	C49784-00015	BIOPHYSICS LAB ADDITION, STRUCT. DETAILS	1-Apr-1997
43	0001	C49784-00016	BIOPHYSICS LAB ADDITION, STRUCT. DETAILS	1-Apr-1997
43	0001	C49784-00017	BIOPHYSICS LAB ADDITION, STRUCT. DETAILS	1-Apr-1997
43	0001	C49784-00018	BIOPHYSICS LAB ADDITION, STRUCT. GRADE BEAM SCHEDULE	1-Apr-1997
43	0001	C49784-00019	BIOPHYSICS LAB ADDITION, STRUCT. GENERAL NOTES	1-Apr-1997
43	0001	C49784-00020	BIOPHYSICS LAB ADDITION, ARCH. GROUND FLOOR DEMOLITION PLAN	1-Apr-1997
43	0001	C49784-00021	BIOPHYSICS LAB ADDITION, ARCH. FIRST FLOOR DEMOLITION PLAN	1-Apr-1997
43	0001	C49784-00022	BIOPHYSICS LAB ADDITION, ARCH. GROUND FLOOR CODE PLAN	1-Apr-1997
43	0001	C49784-00023	BIOPHYSICS LAB ADDITION, ARCH. FIRST FLOOR CODE PLAN, AREA A	1-Apr-1997
43	0001	C49784-00024	BIOPHYSICS LAB ADDITION, ARCH. FIRST FLOOR CODE PLAN, AREA B	1-Apr-1997
43	0001	C49784-00025	BIOPHYSICS LAB ADDITION, ARCH. GROUND FLOOR PLAN, AREA A	1-Apr-1997
43	0001	C49784-00026	BIOPHYSICS LAB ADDITION, ARCH. GROUND FLOOR PLAN, AREA B	1-Apr-1997
43	0001	C49784-00027	BIOPHYSICS LAB ADDITION, ARCH. FIRST FLOOR PLAN, AREA A	1-Apr-1997
43	0001	C49784-00028	BIOPHYSICS LAB ADDITION, ARCH. FIRST FLOOR PLAN, AREA B	1-Apr-1997
43	0001	C49784-00029	BIOPHYSICS LAB ADDITION, ARCH. ROOF PLAN	1-Apr-1997
43	0001	C49784-00030	BIOPHYSICS LAB ADDITION, ARCH. GROUND FLOOR REFLECTED CEILING PLAN, AREA A	1-Apr-1997
43	0001	C49784-00031	BIOPHYSICS LAB ADDITION, ARCH. GROUND FLOOR REFLECTED CEILING PLAN, AREA B	1-Apr-1997
43	0001	C49784-00032	BIOPHYSICS LAB ADDITION, ARCH. FIRST FLOOR REFLECTED CEILING PLAN, AREA A	1-Apr-1997
43	0001	C49784-00033	BIOPHYSICS LAB ADDITION, ARCH. FIRST FLOOR REFLECTED CEILING PLAN, AREA B	1-Apr-1997

Technical Area	Facility Number	Object Name	LANL Title	Date on Document
43	0001	C49784-00034	BIOPHYSICS LAB ADDITION, ARCH. BUILDING ELEVATIONS	1-Apr-1997
43	0001	C49784-00035	BIOPHYSICS LAB ADDITION, ARCH. BUILDING SECTIONS	1-Apr-1997
43	0001	C49784-00036	BIOPHYSICS LAB ADDITION, ARCH. BUILDING PARTITION TYPE	1-Apr-1997
43	0001	C49784-00037	BIOPHYSICS LAB ADDITION, ARCH. BUILDING WALL SECTION	1-Apr-1997
43	0001	C49784-00038	BIOPHYSICS LAB ADDITION, ARCH. BUILDING DETAILS	1-Apr-1997
43	0001	C49784-00039	BIOPHYSICS LAB ADDITION, ARCH. BUILDING DETAILS	1-Apr-1997
43	0001	C49784-00040	BIOPHYSICS LAB ADDITION, ARCH. PLAN DETAILS	1-Apr-1997
43	0001	C49784-00041	BIOPHYSICS LAB ADDITION, ARCH. SCHEDULES	1-Apr-1997
43	0001	C49784-00042	BIOPHYSICS LAB ADDITION, MECH. SYMBOL LEGEND	1-Apr-1997
43	0001	C49784-00043	BIOPHYSICS LAB ADDITION, MECH. HVAC GROUND FLOOR PLAN	1-Apr-1997
43	0001	C49784-00044	BIOPHYSICS LAB ADDITION, MECH. HVAC FIRST FLOOR PLAN	1-Apr-1997
43	0001	C49784-00045	BIOPHYSICS LAB ADDITION, MECH. PARTIAL SUB-BASEMENT FLOOR PLAN	1-Apr-1997
43	0001	C49784-00046	BIOPHYSICS LAB ADDITION, MECH. ENLARGED PLAN AND SECTIONS	1-Apr-1997
43	0001	C49784-00047	BIOPHYSICS LAB ADDITION, MECH. AIR FLOW DIAGRAM	1-Apr-1997
43	0001	C49784-00048	BIOPHYSICS LAB ADDITION, MECH. CHILLED WATER FLOW AND CONTROL DIAGRAMS	1-Apr-1997
43	0001	C49784-00049	BIOPHYSICS LAB ADDITION, MECH. HEATING WATER FLOW DIAGRAMS	1-Apr-1997
43	0001	C49784-00050	BIOPHYSICS LAB ADDITION, MECH. DETAILS	1-Apr-1997
43	0001	C49784-00051	BIOPHYSICS LAB ADDITION, MECH. DETAILS	1-Apr-1997
43	0001	C49784-00052	BIOPHYSICS LAB ADDITION, MECH. PLUMBING GROUND FLOOR PLAN	1-Apr-1997
43	0001	C49784-00053	BIOPHYSICS LAB ADDITION, MECH. PLUMBING FIRST FLOOR PLAN	1-Apr-1997
43	0001	C49784-00054	BIOPHYSICS LAB ADDITION, MECH. DETAILS	1-Apr-1997
43	0001	C49784-00055	BIOPHYSICS LAB ADDITION, MECH. EQUIIPMENT SCHEDULE	1-Apr-1997
43	0001	C49784-00056	BIOPHYSICS LAB ADDITION, ELEC. LEGEND	1-Apr-1997
43	0001	C49784-00057	BIOPHYSICS LAB ADDITION, ELEC. ONE-LINE DIAGRAM	1-Apr-1997
43	0001	C49784-00058	BIOPHYSICS LAB ADDITION, ELEC. GROUNDING SYSTEM DIAGRAM	1-Apr-1997
43	0001	C49784-00059	BIOPHYSICS LAB ADDITION, ELEC. ISOLATED GROUNDING SYSTEM DIAGRAM	1-Apr-1997
43	0001	C49784-00060	BIOPHYSICS LAB ADDITION, ELEC. SITE PLAN	1-Apr-1997

Technical Area	Facility Number	Object Name	LANL Title	Date on Document
43	0001	C49784-00061	BIOPHYSICS LAB ADDITION, ELEC. GROUND FLOOR POWER PLAN	1-Apr-1997
43	0001	C49784-00062	BIOPHYSICS LAB ADDITION, ELEC. FIRST FLOOR POWER PLAN	1-Apr-1997
43	0001	C49784-00063	BIOPHYSICS LAB ADDITION, ELEC. GROUND FLOOR LIGHTING PLAN	1-Apr-1997
43	0001	C49784-00064	BIOPHYSICS LAB ADDITION, ELEC. FIRST FLOOR LIGHTING PLAN	1-Apr-1997
43	0001	C49784-00065	BIOPHYSICS LAB ADDITION, ELEC. GROUND FLOOR SPECIAL SYSTEMS PLAN	1-Apr-1997
43	0001	C49784-00066	BIOPHYSICS LAB ADDITION, ELEC. FIRST FLOOR SPECIAL SYSTEMS PLAN	1-Apr-1997
43	0001	C49784-00067	BIOPHYSICS LAB ADDITION, ELEC. GROUNDING & LIGHTNING PROTECTION PLAN	1-Apr-1997
43	0001	C49784-00068	BIOPHYSICS LAB ADDITION, ELEC. SUB-BASEMENT POWER PLAN AND DIAGRAM	1-Apr-1997
43	0001	C49784-00069	BIOPHYSICS LAB ADDITION, ELEC. RISER DIAGRAMS	1-Apr-1997
43	0001	C49784-00070	BIOPHYSICS LAB ADDITION, ELEC. DETAILS	1-Apr-1997
43	0001	C49784-00071	BIOPHYSICS LAB ADDITION, ELEC. PANEL SCHEDULES	1-Apr-1997
43	0001	C49784-00072	BIOPHYSICS LAB ADDITION, ELEC. NAMEPLATE AND LIGHT FIXTURE SCHEDULES	1-Apr-1997
43	0001	C49853-00001	WASTE STREAM CORRECTIONS, FMU-72, TITILE SHEET, DRAWING LIST	15-May-1997
43	0001	C49853-00002	WASTE STREAM CORRECTIONS, FMU-72, GEN., SPECIFICATIONS	15-May-1997
43	0001	C49853-00003	WASTE STREAM CORRECTIONS, FMU-72, MECH., BASEMENT FLOOR PLAN	15-May-1997
43	0001	C49853-00004	WASTE STREAM CORRECTIONS, FMU-72, MECH., SUB-BASEMENT FLOOR PLAN	15-May-1997
43	0001	C49853-00005	WASTE STREAM CORRECTIONS, FMU-72, MECH., DETAIL PLAN	15-May-1997
43	0001	C49853-00006	WASTE STREAM CORRECTIONS, FMU-72, MECH., CORRECTIVE ACTION SUMMARY	15-May-1997
43	0001	C49784-00007	BIOPHYSICS LAB ADDITION, CIVIL, DETAILS	1-Jul-1997
43	0001	C49784-00008	BIOPHYSICS LAB ADDITION, CIVIL. DETAILS	1-Jul-1997
43	0001	C49784-00009	BIOPHYSICS LAB ADDITION, STRUCT. FOUNDATION PLAN	1-Jul-1997
43	0001	C49784-00010	BIOPHYSICS LAB ADDITION, STRUCT. FIRST FLOOR FRAMING PLAN	1-Jul-1997
43	0001	C51749-00001	RENOVATE ROOM B137 TO A LABORATORY, TITLE SHEET, INDEX TO DRAWINGS, LOCATION PLAN & SCOPE OF WORK	15-Oct-1997
43	0001	C51749-00002	RENOVATE ROOM B137 TO LABORATORY, ARCH; FLOOR PLAN, SECTIONS, DETAILS	15-Oct-1997
43	0001	C51749-00003	RENOVATE ROOM B137 TO A LABORATORY, ARCH; DETAIL, SECTION, & NOTES	15-Oct-1997

Technical Area	Facility Number	Object Name	LANL Title	Date on Document
43	0001	C51749-00004	RENOVATE ROOM B137 TO A LABORATORY, STRUCT; PIPE COLUMN & FRAMING PLAN, SECTIONS & DETAILS	15-Oct-1997
43	0001	C51749-00005	RENOVATE ROOM B137 TO A LABORATORY, STRUCT; ELEVATION, SECTIONS & DETAILS	15-Oct-1997
43	0001	C51749-00006	RENOVATE ROOM B137 TO A LABORATORY, STRUCT; GENERAL NOTES & SECTIONS	15-Oct-1997
43	0001	C51749-00007	RENOVATE ROOM B137 TO A LABORATORY, MECH; DUCT LAYOUT & EQUIPMENT LOCATION PLAN, FUME HOOD AIRFLOW INDICATOR	15-Oct-1997
43	0001	C51749-00008	RENOVATE ROOM B137 TO A LABORATORY, MECH; DUCT LAYOUT & EQUIPMENT SECTION & SEQUENCE OF CONTROL SCHEMATIC & DIAGRAM	15-Oct-1997
43	0001	C51749-00009	RENOVATE ROOM B137 TO A LABORATORY, MECH; PIPING LAYOUT PLAN, UTILITY STATION, PIPING ISOMETRIC, PIPECHASE & DETAILS	15-Oct-1997
43	0001	C51749-00010	RENOVATE ROOM B137 TO A LABORATORY, MECH; PENTHOUSE, SUB-BASEMENT, EQUIPMENT ROOM PIPING ISOMETRICS& DETAILS	15-Oct-1997
43	0001	C51749-00011	RENOVATE ROOM B137 TO A LABORATORY, MECH; STEAM COIL, CHILLED WATER COIL PIPING, HEAT EXCHANGER & PUMP DETAILS	15-Oct-1997
43	0001	C51749-00012	RENOVATE ROOM B137 TO A LABORATORY, MECH; FIRE PROTECTION SPRINKLER SYSTEM PLAN, ISOMETRIC DETAILS & SECTION	15-Oct-1997
43	0001	C51749-00013	RENOVATE ROOM B137 TO A LABORATORY, MECH; EQUIPMENT SCHEDULE & LIST	15-Oct-1997
43	0001	C51749-00014	RENOVATE ROOM B137 TO A LABORATORY, MECH; EQUIPMENT LIST, STEAM PRV STATION & EXHAUST FAN STACK TIE IN DETAIL	15-Oct-1997
43	0001	C51749-00015	RENOVATE ROOM B137 TO A LABORATORY, MECH; GENERAL NOTES	15-Oct-1997
43	0001	C51749-00016	RENOVATE ROOM B137 TO A LABORATORY, MECH; GENERAL NOTES	15-Oct-1997
43	0001	C51749-00017	RENOVATE ROOM B137 TO A LABORATORY, ELEC; SYMBOL LEGEND & NOTES	15-Oct-1997
43	0001	C51749-00018	RENOVATE ROOM B137 TO A LABORATORY, ELEC; REMOVAL PLAN	15-Oct-1997
43	0001	C51749-00019	RENOVATE ROOM B137 TO A LABORATORY, ELEC; POWER & LIGHTING PLANS	15-Oct-1997
43	0001	C51749-00020	RENOVATE ROOM B137 TO A LABORATORY, ELEC; PARTIAL ROOF PLAN	15-Oct-1997
43	0001	C51749-00021	RENOVATE ROOM B137 TO A LABORATORY, ELEC; PANEL SCHEDULES & BILL OF MATERIAL	15-Oct-1997
43	0001	C51749-00022	RENOVATE ROOM B137 TO A LABORATORY, ELEC; NAMEPLATE SCHEDULES	15-Oct-1997
43	0001	AB95-00001	AS-BUILT RECORD FLOOR PLAN, HEALTH RESEARCH LABORATORY, ELEC., SUB BASEMENT FLOOR PLAN, FLOW METER CONDUIT ROUTING	13-Nov-1997

Appendix G: TA-43-0001 List of All Drawings

Technical Area	Facility Number	Object Name	LANL Title	Date on Document
43	0001	AB95-00002	AS-BUILT RECORD FLOOR PLAN, HEALTH RESEARCH LABORATORY, ELEC., BASEMENT FLOOR PLAN, FLOW METER CONDUIT ROUTING	13-Nov-1997
43	0001	AB95-00003	AS-BUILT RECORD FLOOR PLAN, HEALTH RESEARCH LABORATORY, ELEC., PENTHOUSE #2, #3, AND FIRST FLOOR PLAN, FLOW METER CONDUIT ROUTING	13-Nov-1997
43	0001	AB95-00005	AS-BUILT RECORD FLOOR PLAN, HEALTH RESEARCH LABORATORY, ELEC., PENTHOUSE #1 FLOOR PLAN, FLOW METER CONDUIT ROUTING	13-Nov-1997
43	0001	C52044-00001	CHILLER PUMPS INSTALLATION SYSTEM UPGRADE, MECH., EXISTING NEW PUMPS & PIPING PLANS DETAILS & SECTION & LOCATION PLAN	6-Aug-1998
43	0001	C52044-00002	CHILLER PUMPS INSTALLATION SYSTEM UPGRADE, MECH., NEW PUMPS & PIPING PARTIAL PLAN, SECTION & ISOMETRIC, RM. SB30	6-Aug-1998
43	0001	C52044-00003	CHILLER PUMPS INSTALLATION SYSTEM UPGRADE, MECH., NEW PUMPS & PIPING PARTIAL PLAN, SECTION & ISOMETRIC, RM. SB10	6-Aug-1998
43	0001	C52044-00004	CHILLER PUMPS INSTALLATION SYSTEM UPGRADE, MECH., PUMPS AND PIPING - LAYOUT ISOMETRIC	6-Aug-1998
43	0001	C52044-00005	CHILLER PUMPS INSTALLATION SYSTEM UPGRADE, MECH., EQUIPMENT LIST, GENERAL NOTES	6-Aug-1998
43	0001	C52044-00006	CHILLER PUMPS INSTALLATION SYSTEM UPGRADE, ELEC., BILL OF MATERIAL, LEGEND & NOTES	6-Aug-1998
43	0001	C52044-00007	CHILLER PUMPS INSTALLATION SYSTEM UPGRADE, ELEC., PANEL & FLOWMETER LOCATION & MCC-F ONE LINE DIAGRAM	6-Aug-1998
43	0001	C52044-00008	CHILLER PUMPS INSTALLATION SYSTEM UPGRADE, ELEC., PANEL & FLOWMETER LOCATION & MCC-F ONE LINE DIAGRAM	6-Aug-1998
43	0001	C52044-00009	CHILLER PUMPS INSTALLATION SYSTEM UPGRADE, ELEC., CONTROL DIAGRAMS	6-Aug-1998
43	0001	C52044-00010	CHILLER PUMPS INSTALLATION SYSTEM UPGRADE, ELEC., CONTROL DIAGRAMS, CONDENSING, CHILLED WATER PUMP, COOLING TOWER FAN, HEATER	6-Aug-1998
43	0001	SK9030-00001	PROVIDE ADDITIONAL ELECTRIC POWER FOR ROOM B-199, PLAN, BILL OF MATERIAL, SCOPE AND GENERAL NOTES	1-Dec-1999
43	0001	C52605-00001	POTABLE WATER BACKFLOW PREVENTER REPLACEMENT, MECH: GENERAL NOTES	7-Dec-2000
43	0001	C52605-00002	POTABLE WATER BACKFLOW PREVENTER REPLACEMENT, MECH: EQUIPMENT LIST	7-Dec-2000

Technical Area	Facility Number	Object Name	LANL Title	Date on Document
43	0001	C52605-00003	POTABLE WATER BACKFLOW PREVENTER REPLACEMENT, MECH: PARTIAL FLOOR PLAN, ENLARGE PLAN, LEGEND, KEYED NOTES AND PIPING	7-Dec-2000
43	0001	C52605-00004	POTABLE WATER BACKFLOW PREVENTER REPLACEMENT, MECH: PARTIAL FLOOR PLAN, ENLARGED PLAN, KEYED NOTES AND PIPING ISOMETRIC DETAILS	7-Dec-2000
43	0001	C52605-00005	POTABLE WATER BACKFLOW PREVENTER REPLACEMENT, MECH: SUPPORTS	7-Dec-2000
43	0001	SK9077-00001	ROOM B116 REMODEL, NEW FLOOR PLAN, TITLE SHEET & INDEX TO DRAWINGS	8-Jan-2001
43	0001	SK9077-00002	ROOM B116 REMODEL, ELEC; DEMO FLOOR PLAN	8-Jan-2001
43	0001	SK9077-00003	ROOM B116 REMODEL, ELEC; NEW FLOOR PLAN	8-Jan-2001
43	0001	C52737-00001	UTILITY FLOWMETERS, ELEC; SITE LAYOUT CONDUIT ROUTING	22-Feb-2001
43	0001	C52737-00002	UTILITY FLOWMETERS, ELEC; PIPING & INSTRUMENT DRAWING	22-Feb-2001
43	0001	C52737-00003	UTILITY FLOWMETERS, ELEC; RTB & RTU PANEL LAYOUT & INTERCONNECTIONS	22-Feb-2001
43	0001	C52737-00005	UTILITY FLOWMETERS, ELEC; HRL FLOW METER CABLE SUMMARY, TERMINATIONS & PINNING	22-Feb-2001
43	0001	C53416-00001	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, TITLE SHEET & INDEX TO DRAWINGS	27-Jan-2003
43	0001	C53416-00002	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, STRUCT., LEGEND, SYMBOLS AND GENERAL NOTES	27-Jan-2003
43	0001	C53416-00003	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, STRUCT., PLAN	27-Jan-2003
43	0001	C53416-00004	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, STRUCT., SECTIONS	27-Jan-2003
43	0001	C53416-00005	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, STRUCT., DETAILS	27-Jan-2003
43	0001	C53416-00006	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, CIVIL, LEGEND, SYMBOLS AND GENERAL NOTES	27-Jan-2003
43	0001	C53416-00007	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, CIVIL, SITE PLAN	27-Jan-2003
43	0001	C53416-00008	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, CIVIL, DETAILS,, DUCT BANK, PVC TERMINATION	27-Jan-2003
43	0001	C53416-00009	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., LEGEND, SYMBOLS AND GENERAL NOTES	27-Jan-2003
43	0001	C53416-00010	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., PARTIAL SUB BASEMENT DEMOLITION PLAN	27-Jan-2003

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43	0001	C53416-00011	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., PARTIAL SUB BASEMENT DEMOLITION PLAN	27-Jan-2003
43	0001	C53416-00012	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., PARTIAL BASEMENT DEMOLITION PLAN	27-Jan-2003
43	0001	C53416-00013	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., PARTIAL BASEMENT DEMOLITION PLAN	27-Jan-2003
43	0001	C53416-00014	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., PARTIAL BASEMENT DEMOLITION PLAN	27-Jan-2003
43	0001	C53416-00015	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., PARTIAL FIRST FLOOR DEMOLITION PLAN	27-Jan-2003
43	0001	C53416-00016	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., PARTIAL PENTHOUSE DEMOLITION PLAN	27-Jan-2003
43	0001	C53416-00017	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., PARTIAL SUB BASEMENT POWER PLAN	27-Jan-2003
43	0001	C53416-00018	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., PARTIAL SUB BASEMENT POWER PLAN	27-Jan-2003
43	0001	C53416-00019	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., PARTIAL BASEMENT POWER PLAN	27-Jan-2003
43	0001	C53416-00020	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., PARTIAL BASEMENT POWER PLAN	27-Jan-2003
43	0001	C53416-00021	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., PARTIAL BASEMENT POWER PLAN	27-Jan-2003
43	0001	C53416-00022	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., PARTIAL FIRST FLOOR POWER PLAN	27-Jan-2003
43	0001	C53416-00023	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., PARTIAL PENTHOUSE POWER PLAN	27-Jan-2003
43	0001	C53416-00024	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., ENLARGED EQUIPMENT PLAN	27-Jan-2003
43	0001	C53416-00025	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., ENLARGED EQUIPMENT PLAN ROOM SB-10B	27-Jan-2003
43	0001	C53416-00026	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., ONE LINE DIAGRAM DEMOLITION	27-Jan-2003

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43	0001	C53416-00027	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., ONE LINE DIAGRAM DEMOLITION	27-Jan-2003
43	0001	C53416-00028	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., ONE LINE DIAGRAM DEMOLITION	27-Jan-2003
43	0001	C53416-00029	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., ONE LINE DIAGRAM DEMOLITION	27-Jan-2003
43	0001	C53416-00030	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., ONE LINE DIAGRAM DEMOLITION	27-Jan-2003
43	0001	C53416-00031	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., ONE LINE DIAGRAM DEMOLITION	27-Jan-2003
43	0001	C53416-00032	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., ONE LINE DIAGRAM	27-Jan-2003
43	0001	C53416-00033	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., ONE LINE DIAGRAM	27-Jan-2003
43	0001	C53416-00034	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., ONE LINE DIAGRAM	27-Jan-2003
43	0001	C53416-00035	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., ONE LINE DIAGRAM	27-Jan-2003
43	0001	C53416-00036	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., ONE LINE DIAGRAM	27-Jan-2003
43	0001	C53416-00037	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., ONE LINE DIAGRAM	27-Jan-2003
43	0001	C53416-00038	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., ONE LINE DIAGRAM	27-Jan-2003
43	0001	C53416-00039	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., ONE LINE DIAGRAM	27-Jan-2003
43	0001	C53416-00040	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., GROUNDING SYSTEM DIAGRAM	27-Jan-2003
43	0001	C53416-00041	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., WIRING DIAGRAMS	27-Jan-2003
43	0001	C53416-00042	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., WIRING DIAGRAMS	27-Jan-2003
43	0001	C53416-00043	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., WIRING DIAGRAMS	27-Jan-2003
43	0001	C53416-00044	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., PANEL SCHEDULES	27-Jan-2003
43	0001	C53416-00045	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., PANEL SCHEDULES	27-Jan-2003
43	0001	C53416-00046	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., BILL OF MATERIALS	27-Jan-2003
43	0001	C53416-00047	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., NAMEPLATE SCHEDULES	27-Jan-2003

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43	0001	C53416-00048	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., NAMEPLATE SCHEDULES	27-Jan-2003
43	0001	C53416-00049	ELECTRICAL INFRASTRUCTURE SAFETY UPGRADES PROJECT, ELEC., FEEDER BUSWAY ISOMETRIC	27-Jan-2003
43	0001	C53495-00001	EMERGENCY EVACUATION PLAN, ARCH., SUB-BASEMENT, LEGEND AND NOTES	11-Feb-2003
43	0001	C53495-00002	EMERGENCY EVACUATION PLAN, ARCH., SUB-BASEMENT, LEGEND AND NOTES	11-Feb-2003
43	0001	C53495-00003	EMERGENCY EVACUATION PLAN, ARCH., SUB-BASEMENT, LEGEND AND NOTES	11-Feb-2003
43	0001	C53495-00004	EMERGENCY EVACUATION PLAN, ARCH., BASEMENT, LEGEND AND NOTES	11-Feb-2003
43	0001	C53495-00005	EMERGENCY EVACUATION PLAN, ARCH., BASEMENT, LEGEND AND NOTES	11-Feb-2003
43	0001	C53495-00006	EMERGENCY EVACUATION PLAN, ARCH., BASEMENT, LEGEND AND NOTES	11-Feb-2003
43	0001	C53495-00007	EMERGENCY EVACUATION PLAN, ARCH., BASEMENT, LEGEND AND NOTES	11-Feb-2003
43	0001	C53495-00008	EMERGENCY EVACUATION PLAN, ARCH., BASEMENT, LEGEND AND NOTES	11-Feb-2003
43	0001	C53495-00009	EMERGENCY EVACUATION PLAN, ARCH., BASEMENT, LEGEND AND NOTES	11-Feb-2003
43	0001	C53495-00010	EMERGENCY EVACUATION PLAN, ARCH., BASEMENT, LEGEND AND NOTES	11-Feb-2003
43	0001	C53495-00011	EMERGENCY EVACUATION PLAN, ARCH., BASEMENT, LEGEND AND NOTES	11-Feb-2003
43	0001	C53495-00012	EMERGENCY EVACUATION PLAN, ARCH., BASEMENT, LEGEND AND NOTES	11-Feb-2003
43	0001	C53495-00013	EMERGENCY EVACUATION PLAN, ARCH., BASEMENT, LEGEND AND NOTES	11-Feb-2003
43	0001	C53495-00014	EMERGENCY EVACUATION PLAN, ARCH., FIRST FLOOR, LEGEND AND NOTES	11-Feb-2003
43	0001	C53495-00015	EMERGENCY EVACUATION PLAN, ARCH., FIRST FLOOR, LEGEND AND NOTES	11-Feb-2003
43	0001	C53495-00016	EMERGENCY EVACUATION PLAN, ARCH., FIRST FLOOR, LEGEND AND NOTES	11-Feb-2003
43	0001	C53495-00017	EMERGENCY EVACUATION PLAN, ARCH., FIRST FLOOR, LEGEND AND NOTES	11-Feb-2003
43	0001	C53495-00018	EMERGENCY EVACUATION PLAN, ARCH., SECOND FLOOR, LEGEND AND NOTES	11-Feb-2003
43	0001	C53495-00019	EMERGENCY EVACUATION PLAN, ARCH., SECOND FLOOR, LEGEND AND NOTES	11-Feb-2003
43	0001	C53495-00020	EMERGENCY EVACUATION PLAN, ARCH., SECOND FLOOR, LEGEND AND NOTES	11-Feb-2003
43	0001	C53495-00021	EMERGENCY EVACUATION PLAN, ARCH., SECOND FLOOR, LEGEND AND NOTES	11-Feb-2003

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43	0001	C53495-00022	EMERGENCY EVACUATION PLAN, ARCH., PENTHOUSE #2, LEGEND AND NOTES	11-Feb-2003
43	0001	C53495-00023	EMERGENCY EVACUATION PLAN, ARCH., PENTHOUSE #3, LEGEND AND NOTES	11-Feb-2003
43	0001	C53495-00024	EMERGENCY EVACUATION PLAN, ARCH., PENTHOUSE #1, LEGEND AND NOTES	11-Feb-2003
43	0001	SK9257-00001	EISU GROUNDING REVISION PROPOSAL, ELEC; SUB-BASEMENT FLOOR PLAN	15-Oct-2004
43	0001	SK9257-00002	EISU GROUNDING REVISION PROPOSAL, ELEC; BASEMENT FLOOR PLAN	15-Oct-2004
43	0001	SK9257-00003	EISU GROUNDING REVISION PROPOSAL, ELEC; FIRST FLOOR & PENTHOUSES 2 & 3 FLOOR PLANS	15-Oct-2004
43	0001	SK9257-00004	EISU GROUNDING REVISION PROPOSAL, ELEC; SECOND FLOOR PLAN	15-Oct-2004
43	0001	SK9257-00005	EISU GROUNDING REVISION PROPOSAL, ELEC; REVISED GROUNDING SYSTEM DIAGRAM	15-Oct-2004
43	0001	SK9306-00001	HRL BUILDING ELEVATOR SHAFT ANALYSIS, STRUCT; ELEVATION & SECTION, EAST WALL OF ELEVATOR SHAFT #2	14-Feb-2005
43	0001	HRL.Site.Plan. D&D.09272018F	FLOOR PLAN OF RECORD HEALTH RESEARCH LABORATORY, ARCH; FIRST FLOOR PLAN	20-Sep-2005
43	0001	HRL.Site.Plan. D&D.09272018F	FLOOR PLAN OF RECORD HEALTH RESEARCH LABORATORY, ARCH; SECOND FLOOR PLAN	20-Sep-2005
43	0001	HRL.Site.Plan. D&D.09272018F	FLOOR PLAN OF RECORD HEALTH RESEARCH LABORATORY, ARCH; BASEMENT PLAN	20-Sep-2005
43	0001	HRL.Site.Plan. D&D.09272018F	FLOOR PLAN OF RECORD HEALTH RESEARCH LABORATORY, ARCH; SUB-BASEMENT PLAN	20-Sep-2005
43	0001	HRL.Site.Plan. D&D.09272018F	FLOOR PLAN OF RECORD HEALTH RESEARCH LABORATORY, ARCH; PENTHOUSE FLOOR PLAN	20-Sep-2005
43	0001	C53271-00014	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; PARTIAL FIRST FLOOR PLAN & PENTHOUSE #2 & #3	11-Oct-2005
43	0001	C54000-00112	PARKING LOT INVENTORY PROGRAM FOR LOS ALAMOS NATIONAL LABORATORY, GEN; PARKING LOT DATA, TA43-01 & TA43-02	22-Mar-2006
43	0001	C53271-00003	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; SITE PLAN	6-Jul-2006
43	0001	C53271-00004	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP;; PARTIAL SUBBASEMENT FLOOR PLAN	6-Jul-2006
43	0001	C53271-00005	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP;; PARTIAL SUBBASEMENT FLOOR PLAN	6-Jul-2006

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43	0001	C53271-00006	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; PARTIAL SUBBASEMENT FLOOR PLAN	6-Jul-2006
43	0001	C53271-00007	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; PARTIAL BASEMENT FLOOR PLAN	6-Jul-2006
43	0001	C53271-00008	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; PARTIAL BASEMENT FLOOR PLAN	6-Jul-2006
43	0001	C53271-00009	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; PARTIAL BASEMENT FLOOR PLAN	6-Jul-2006
43	0001	C53271-00010	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; PARTIAL BASEMENT FLOOR PLAN	6-Jul-2006
43	0001	C53271-00012	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; PARTIAL FIRST FLOOR PLAN	6-Jul-2006
43	0001	C53271-00013	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; PARTIAL FIRST FLOOR PLAN	6-Jul-2006
43	0001	C53271-00015	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; PARTIAL SECOND FLOOR PLAN	6-Jul-2006
43	0001	C53271-00016	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; PARTIAL SECOND FLOOR PLAN	6-Jul-2006
43	0001	C53271-00017	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; PARTIAL SECOND FLOOR PLAN	6-Jul-2006
43	0001	C53271-00018	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; PENTHOUSE #1 FLOOR PLAN	6-Jul-2006
43	0001	C53271-00019	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; FLOOR PLANS	6-Jul-2006
43	0001	C53271-00020	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; FLOOR PLAN	6-Jul-2006
43	0001	C53271-00021	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; SECTION	6-Jul-2006
43	0001	C53271-00022	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; SECTION	6-Jul-2006
43	0001	C53271-00023	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; SECTION	6-Jul-2006
43	0001	C53271-00024	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; SECTION	6-Jul-2006
43	0001	C53271-00025	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; DETAILS	6-Jul-2006
43	0001	C53271-00026	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; DETAILS	6-Jul-2006

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43	0001	C53271-00027	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; DETAILS	6-Jul-2006
43	0001	C53271-00028	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; DETAILS	6-Jul-2006
43	0001	C53271-00029	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; FUNCTIONAL MATRIX	6-Jul-2006
43	0001	C53271-00030	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; FUNCTIONAL MATRIX	6-Jul-2006
43	0001	C53271-00031	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; WIRING DIAGRAM	6-Jul-2006
43	0001	C53271-00032	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; WIRING DIAGRAM	6-Jul-2006
43	0001	C53271-00033	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; WIRING DIAGRAM	6-Jul-2006
43	0001	C53271-00034	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; WIRING DIAGRAM	6-Jul-2006
43	0001	C53271-00035	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; WIRING DIAGRAM	6-Jul-2006
43	0001	C53271-00036	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; WIRING DIAGRAM	6-Jul-2006
43	0001	C53271-00037	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; WIRING DIAGRAM	6-Jul-2006
43	0001	C53271-00038	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; RISER DIAGRAM	6-Jul-2006
43	0001	C53271-00039	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; RISER DIAGRAM	6-Jul-2006
43	0001	C53271-00040	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; RISER DIAGRAM	6-Jul-2006
43	0001	C53271-00041	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; RISER DIAGRAM	6-Jul-2006
43	0001	C53271-00043	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; BATTERY CALCULATIONS	6-Jul-2006
43	0001	C53271-00044	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; BATTERY CALCULATIONS	6-Jul-2006
43	0001	C53271-00046	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; VOLTAGE DROP CALCULATIONS	6-Jul-2006
43	0001	C53271-00047	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; VOLTAGE DROP CALCULATIONS	6-Jul-2006
43	0001	C53271-00048	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; VOLTAGE DROP CALCULATIONS	6-Jul-2006

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43	0001	C53271-00001	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; TITLE SHEET & INDEX TO DRAWINGS, THESE B SIZE ARE STORED IN CLOSED RECORD FILE BOX	19-Apr-2007
43	0001	C53271-00002	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; SYMBOLS LEGEND & NOTES	19-Apr-2007
43	0001	C53271-00011	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; PARTIAL FIRST FLOOR PLAN	19-Apr-2007
43	0001	C53271-00042	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; BILL OF MATERIALS	19-Apr-2007
43	0001	C53271-00045	PARTIAL SITE WIDE FIRE ALARM SYSTEM REPLACEMENT PROJECT, FP; VOLTAGE DROP CALCULATIONS	19-Apr-2007
43	0001	SK9792-00001	INSTALLATION OF NEW STROBE LIGHT IN ROOM 127, ELEC; CONDUIT & JUNCTION BOXES	19-Apr-2007
43	0001	LS2-00001	TA-43 HRL I LANDSCAPE RENOVATION; LOS ALAMOS COUNTY LANDSCAPE DESIGN	25-Jul-2013
43	0001	C12796-00001	TEMP. CONTROL, RMS. B-158, 162, 166 & 170, BLDG. HRL-1 - MECHANICAL PLAN	1-Oct-2013
43	0001	C12797-00002	MECHANICAL - ELEV., SECTION, EQUIPMENT LIST & NOTES	1-Oct-2013
43	0001	C12798-00003	ELECTRICAL - PLAN	1-Oct-2013
43	0001	C12799-00004	ELECTRICAL - DETAILS	1-Oct-2013
43	0001	C15099-00001	DRESSING RM. & SHOWER FAC., SUB-BASEMENT, BLDG. HRL-1 - PLAN & DETAILS, ROOM B-1	1-Oct-2013
43	0001	C17361-00002	SEMINAR ROOM DETAILS	1-Oct-2013
43	0001	C17363-00004	DIMINERALIZER INSTALL. FOR AIR WASHER, WATER SUPPLY	1-Oct-2013
43	0001	C17364-00005	DIMINERALIZER DETAILS	1-Oct-2013
43	0001	C17365-00006	SUB-BASEMENT STEAM PIPING & TOILET ROOM VENTILATION	1-Oct-2013
43	0001	C19155-00001	AIR CONDITIONING, ROOMS B-150, 178 & 181, BLDG. HRL-1 - MECHANICAL - PLAN VIEWS	1-Oct-2013
43	0001	C19156-00002	MECHANICAL SECTIONS	1-Oct-2013
43	0001	C19157-00003	ELECTRICAL	1-Oct-2013
43	0001	C19523-00001	PENTHOUSE VENT. ADD. ANIMAL QUARTERS, BLDG. HRL-1 -MECH-ELEC PLAN, SECTION, EQUI	1-Oct-2013
43	0001	C20658-00001	MODIFICATION OCCUPANCY, ROOMS 197 & 199	1-Oct-2013
43	0001	C21483-00001	RELOCATE LABORATORY BENCH, ROOM 146, BLDG. HRL-1 - ARCHITECTURAL & MECHANICAL -	1-Oct-2013
43	0001	C21520-00001	EXP. CELL, ROOM 234 BLDG. HRL-1 -ARCH., PLAN, LOCATION PL., NOTES & ARCH. DETS.	1-Oct-2013
43	0001	C21843-00001	DUST CONTROL - AIR SUPPLY SYSTEM, BLDG. HRL-1 - MECHANICAL	1-Oct-2013
43	0001	C22004-00001	RAT CAGE RACK - HEALTH RESEARCH LABORATORY	1-Oct-2013

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43	0001	C22005-00001	SINGLE WIDTH, HEALTH RESEARCH LABORATORY	1-Oct-2013
43	0001	C22006-00001	DOUBLE WIDTH, HEALTH RESEARCH LABORATORY	1-Oct-2013
43	0001	C22033-00001	PAINT SPRAY BOOTH INSTAL. ROOM B-117, BLDG. HRL-1 - PLAN, SECTION, AND NOTES	1-Oct-2013
43	0001	C25732-00001	CONSTANT TEMPERATURE ROOM INSTALL., BLDG. HRL-1, MECH. & ELECT. - PLANS & NOTES	1-Oct-2013
43	0001	C26232-00001	NEW DUMPSTER LOADING RAMP, BLDG. HRL-1, CIVIL - LOCATION PLAN, PLAN, SECTIONS &	1-Oct-2013
43	0001	C26371-00001	DISTILLED WATER SUPPLY SYSTEM MODIFICATIONS, BLDG. HRL-1, MECHANICAL	1-Oct-2013
43	0001	C26648-00001	MODIFICATIONS, TEMPERATURE CONTROL, RM. 244 & 245, BLDG. HLR-1, MECHANICAL	1-Oct-2013
43	0001	C26649-00002	MODIFICATIONS, TEMPERATURE CONTROL, RM. 244 & 245, BLDG. HRL-1, MECHANICAL	1-Oct-2013
43	0001	C26650-00003	MODIFICATIONS, TEMPERATURE CONTROL, RM. 244 & 245, BLDG. HRL-1, ELECTRICAL	1-Oct-2013
43	0001	C27277-00001	VENTILATION MODIFICATIONS, FALLOUT SHELTER, BLDG. HRL-1, PLAN	1-Oct-2013
43	0001	C27278-00002	FAN INSTALLATION & AIR SUPPLY DUCT DETAILS	1-Oct-2013
43	0001	C27279-00003	AIR SUPPLY DUCT DETAILS	1-Oct-2013
43	0001	C29074-00001	MODIFICATIONS, RM. 226, BLDG. HRL-1 - MECHANICAL - ELECTRICAL & CIVIL - PLAN & D	1-Oct-2013
43	0001	C29199-00001	STEEL LADDER INSTALLATION, PENTHOUSE, BLDG. HRL-1 - STRUCTURAL - PLANS & DETAILS	1-Oct-2013
43	0001	C29201-00001	HOOD INSTALLATION, ROOM B-117, BLDG. HRL-1 - MECHANICAL - PLAN, SECTIONS, DETAIL	1-Oct-2013
43	0001	C3223-00001	UTILITY ACCESS DOORS PENTHOUSE DOOR DETAILS, ELEVATOR MAINTENANCE SHAFT DOORS, B	1-Oct-2013
43	0001	C32387-00001	SPACE ALTERATIONS, BLDG. HRL-1 - MECHANICAL - FIRST FLOOR PLAN	1-Oct-2013
43	0001	C32388-00002	MECHANICAL - DETAILS & SECTIONS	1-Oct-2013
43	0001	C32389-00003	ELECTRICAL - PLANS, SCOPE OF WORK, NOTES & BILL OF MATERIAL	1-Oct-2013
43	0001	C34161-00001	HRL WATER SUPPLY BLDG. HRL-1 - INSTALL REDUCED PRESSURE BACKFLOW PREVENTER & WAT	1-Oct-2013
43	0001	C35585-00001	UTILITIES RELOCATION HRL-1, BLDG. HRL-1, MECH. PLOT PLAN	1-Oct-2013
43	0001	C35586-00002	MECH. SECTIONS & DETAILS	1-Oct-2013
43	0001	C35587-00003	ELEC. - PLAN	1-Oct-2013
43	0001	C35597-00001	SPECTROPHOTOMETER INST. STRUCTURAL & ELECTRICAL RM. B-158, HRL BLDG.	1-Oct-2013
43	0001	C35598-00002	SPECTROPHOTOMETER INST. MECHANICAL & ELECTRICAL RM. B-158, HRL BLDG.	1-Oct-2013
43	0001	C35747-00001	GLASSWARE WASHER, RM. B-110, BLDG. HLR-1	1-Oct-2013

Technical Area	Facility Number	Object Name	LANL Title	Date on Document
43	0001	C35760-00001	ANIMAL BEDDING DISPOSAL SYSTEM; MECHANICAL - ELECTRICAL	1-Oct-2013
43	0001	C35764-00001	SEMINAR ROOM MODS, BLDG. HRL-1, TA-43, ARCHITECTURAL - PLANS - DETAILS, AS BUILT	1-Oct-2013
43	0001	C35765-00002	ARCHITECTURAL DETAILS	1-Oct-2013
43	0001	C35766-00003	MECHANICAL FLOOR PLAN, SECTION & EQUIPMENT LIST	1-Oct-2013
43	0001	C35767-00004	ELECTRICAL	1-Oct-2013
43	0001	C36001-00001	LIBRARY EXPANSION, ARCHITECTURAL, ROOM B-101 - C BLDG. HRL-1	1-Oct-2013
43	0001	C36002-00002	LIBRARY EXPANSION, ELECTRICAL, ROOM B-101 - C BLDG. HRL-1	1-Oct-2013
43	0001	C37386-00001	FACILITY IMPROVEMENTS, HRL-1, CRITERIA DRAWING - ARCH. PLANS, ELEVATIONS & NOTES	1-Oct-2013
43	0001	C37387-00002	FACILITY IMPROVEMENTS, BLDG. HRL-1; CRITERIA DRAWING MECHANICAL	1-Oct-2013
43	0001	C37388-00003	FACILITY IMPROVEMENTS, BLDG. HRL-1; CRITERIA DRAWING ELECTRICAL	1-Oct-2013
43	0001	C38182-00001	ELECTRON MICROSCOPE INSTALLATION HRL-1 - PLANS, SECTION & DETAILS	1-Oct-2013
43	0001	C38183-00002	MECHANICAL; VENTILATION PLAN & DETAILS	1-Oct-2013
43	0001	C38184-00003	MECHANICAL; PIPING PLAN & DETAILS	1-Oct-2013
43	0001	C38185-00004	MECHANICAL; EQUIPMENT LIST & NOTES	1-Oct-2013
43	0001	C38186-00005	ELECTRON MICROSCOPE INSTALLATION, ELEC; PARTIAL BASEMENT FLOOR PLAN, BILL OF MATERIAL, SCOPE OF WORK	1-Oct-2013
43	0001	C38187-00006	ELECTRON MICROSCOPE INSTALLATION, ELEC; DUCT HEATER WIRING DIAGRAM, LIGHT CONTROL CIRCUITS, NAMEPLATES SCHEDULE, PANEL XB-27	1-Oct-2013
43	0001	C40776-00001	STEAM SYSTEM MODS., BUILDING HRL-1	1-Oct-2013
43	0001	C40777-00002	STEAM SYSTEM MODS., BUILDING HRL-1	1-Oct-2013
43	0001	C40901-00001	EXHAUST SYSTEM ROOM B-199, B-102 PLAN & SECTIONS, BLDG. HRL-1	1-Oct-2013
43	0001	C40902-00002	ELECTRICAL PLAN - NOTES, BLDG. HRL-1	1-Oct-2013
43	0001	C41714-00001	HEALTH RESEARCH LABORATORY CABLE TRAY INSTALLATION, BLDG. HRL-1	1-Oct-2013
43	0001	C41719-00001	HEALTH RESEARCH LAB. VACUUM PUMP & AIR COMPRESSOR INSTALL. HRL-1	1-Oct-2013
43	0001	C41719-00002	HEALTH RESEARCH LAB. VACUUM PUMP & AIR COMPRESSOR INSTALL. HRL-1	1-Oct-2013
43	0001	C41734-00001	PEDESTRIAN RAMP AND STORAGE AREA, BLDG. HRL-1, CIVIL; PLAN, SECTION & NOTES	1-Oct-2013
43	0001	C42115-00001	RADIANT HEATING SYSTEM SECTIONS, AND DETAILS, HRL-1, TA-43	1-Oct-2013
43	0001	C42116-00002	RADIANT HEATING SYSTEM MECH. & CIVIL; NOTES HLR-1, TA-43	1-Oct-2013
43	0001	C42657-00001	TUNNEL CAGE WASHER ADDITION, BLDG. HRL-1, TA-43 CIVIL; PLANS AND SECTION	1-Oct-2013

Technical Area	Facility Number	Object Name	LANL Title	Date on Document
43	0001	C42657-00002	CIVIL; PLANS, ELEVATIONS, DETAILS	1-Oct-2013
43	0001	C42657-00003	CIVIL; PLANS, SECTIONS, ELEVATIONS	1-Oct-2013
43	0001	C42657-00004	CIVIL; PLANS, SECTIONS, DETAILS	1-Oct-2013
43	0001	C42657-00005	MECH; PLAN AND DETAILS	1-Oct-2013
43	0001	C42657-00006	MECH; PLAN AND DETAILS	1-Oct-2013
43	0001	C42657-00007	MECH; DETAILS	1-Oct-2013
43	0001	C42657-00008	MECH; NOTES AND EQUIPMENT LIST	1-Oct-2013
43	0001	C42657-00009	ELECTRICAL	1-Oct-2013
43	0001	C42657-00010	ELECTRICAL	1-Oct-2013
43	0001	C42747-00001	SPACE MODIFICATIONS, AREA I, HRL-1, TA-43. CIVIL; PLANS-SECTIONS-DETAILS-NOTES	1-Oct-2013
43	0001	C42747-00002	MECH - PLANS - SECTION - DETAIL	1-Oct-2013
43	0001	C42747-00003	MECH - NOTES - EQUIP. LIST - DETAIL	1-Oct-2013
43	0001	C42747-00004	ELECTRICAL	1-Oct-2013
43	0001	C42763-00001	HEPA FILTER INSTALLATION, BLDG. HRL-1, TA-43. MECH. PLAN, SECTIONS AND DETAILS	1-Oct-2013
43	0001	C42793-00001	INCINERATOR MOD., BLDG. HRL-1, TA-43. CIVIL; PLANS - SECTIONS - DETAILS	1-Oct-2013
43	0001	C42858-00001	REST ROOM FACILITY REMODELING, HRL-1, TA-43. CIVIL, MECH, ELEC. PLANS AND NOTES	1-Oct-2013
43	0001	C42858-00002	MECH; ISOMETRICS AND DETAIL	1-Oct-2013
43	0001	C42858-00003	MECH; EQUIPMENT LIST AND ISOMETRIC	1-Oct-2013
43	0001	C42876-00001	BASEMENT VENTILATION, BLDG. HRL-1. PLAN - SECTION AND NOTES	1-Oct-2013
43	0001	C42876-00002	MECH. - ELECT. - SECT. - DETL. - NOTES	1-Oct-2013
43	0001	C43722-00001	AIR CONDITIONING FOR COMPUTER ROOM B-101A, CIVIL; NOTES, ELEVATION AND LOCATION	1-Oct-2013
43	0001	C43722-00002	MECH; PLAN AND DETAILS BLDG.	1-Oct-2013
43	0001	C43722-00003	MECH; NOTES, EQUIPMENT LISTS AND PIPING DIAGRAM	1-Oct-2013
43	0001	C43722-00004	ELEC; PLANS, ELEV. AND ONE LINE	1-Oct-2013
43	0001	C43722-00005	ELEC; NOTES, BILL OF MATERIAL AND NAMEPLATE SCHEDULE	1-Oct-2013
43	0001	C46522-00001	ERDA-LOS ALAMOS SCIENTIF LABORATORY SITE, TA-43, SCALE 1 IN.=50 FT.	1-Oct-2013
43	0001	C48508-00001	TECH AREA RE-ROOFING, FY-81, PHASE A, TITLE SHEET AND SITE LOCATION PLAN	1-Oct-2013
43	0001	C48508-00002	ROOF PLAN EXISTING FEATURES, SITE PLAN, ELEVATIONS	1-Oct-2013
43	0001	C48604-00001	TA-43 HRL REVISION OF SPRINKLER SYSTEM	1-Oct-2013
43	0001	C48755-00020	HR-LABORATORY BLDG. HRL-1	1-Oct-2013
43	0001	C49022-00001	4" PUMPED CONDENSATE RETURN CONDENSATE RETURN LAMC TO HRL REPLACE 825 L.F.	1-Oct-2013
43	0001	C51206-00001	LOADING DOCK EXTENSION BLDG. HRL-1, TA-43 STRUCT; PLANS, SECT. DETAILS	1-Oct-2013
43	0001	SK7802-00001	SPRINKLER MODS. 1ST & 2ND FLOOR, BLDG. 1	1-Oct-2013
43	0001	UE C011329	Electrical Stairway Lighting	none

Appendix H: TA-43-0001 List of Potential Artifacts to Salvage

The following items, located in TA-43-0001, were identified as potentially significant or those with a future interpretive value. These items may be documented and removed before the building's demolition and accessioned to the Bradbury Science Museum's collection.

- Electronic warning sign at a controlled entry (California Avionics Labs, Inc.)
- Diagram on velum of a flow cytometer
- Metal cabinet with glass door and two drawers
- Radiation alert light (A. S. Aloe Company)
- Phosphor sandwich scintillator detector arms (General Electric)
- Hydra 96 pipette machine (Robbins Scientific)
- Chair used during *in vivo* measurements
- Levered light switch (Crouse-Hinds)
- Electronic warning sign controller (California Avionics Labs, Inc.)
- Speaker box
- Disinfecting air vent
- Electronic warning light panel
- Plunging light switch (Crouse-Hinds)
- Standing scale (Detecto Scales, Inc.)
- Directional signs (two) for the *In Vivo* measurements Laboratory

Appendix I: Oral Histories

Seven oral histories contributed to this eligibility assessment and documentation effort. The U.S. Department of Energy conducted six of these oral history interviews, among many others, in the mid-1990s as part of their Openness Initiative concerning human radiation experiments. The transcripts are available online: https://ehss.energy.gov/ohre/roadmap/histories/index.html. The following interviewees worked in the Health Division at the Health Research Laboratory complex in TA-43:

- Julie Langham Grilly
- Clarence Lushbaugh, M.D., Pathologist
  - served as Pathology Section Leader in the H-4 Group (Radiobiology), Radiopathology Section Leader in the H-4 Group (Biomedical Research → Biological and Medical Research), and Clinical Investigations Section Leader in the H-4 Group (Biological and Medical Research)
- William D. Moss, Biochemist
- Don Francis Petersen, PhD, Cell Biologist
  - served as Cellular Radiobiology Section Leader in the H-4 Group (Biological and Medical Research), Group Leader of H-9 (Cellular and Molecular Radiobiology), Alternate Health Division Leader; and Life Sciences Division Leader
- Chet Richmond, PhD, Radiobiologist
  - served as Mammalian Metabolism Section Leader in the H-4 Group (Biological and Medical Research), Group Leader of H-4 (Biological and Medical Research → Mammalian Radiobiology), and Alternate Health Division Leader
- George Voelz, M.D.
  - served as Health Division Leader, Acting Group Leader of H-14 (Epidemiology), and Assistant Health Division Leader

The seventh oral history, of Louis Hempelmann, is on file with the the Laboratory's National Security Research Center. Hempelmann served as the Laboratory's first Safety Committee chair and A Division's first and only Health group leader. Health became its own group, and Hempelmann served as its third group leader. When Health finally became its own division, Hempelmann served as its first division leader.

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October 2022

From Protection and Prevention to Research and Discovery: Eligibility Assessment of the Health Research Laboratory (TA-43) and Historic Documentation for TA-43-0001

Volume 2

Los Alamos National Laboratory

LANL Fiscal Year 2027 Footprint Reduction

Historic Building Survey Report No. 400

Survey No. 1226

NMCRIS Activity No. 151144

Prepared for: U.S. Department of Energy/National Nuclear Security Administration, Los Alamos Field Office

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Los Alamos NATIONAL LABORATORY

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Introduction

The Health Research Laboratory (HRL) at Los Alamos National Laboratory (LANL or the Laboratory) is located atop a mesa along the northern edge of Los Alamos Canyon within the Los Alamos townsite. The facility is situated in Technical Area (TA) 43, which was established specifically for it in 1952. W. C. Kruger and Associates finalized drawings for the HRL building (TA-43-0001) in August 1951, and by August 1953, the HRL campus was in use. Notably, it was purposefully sited adjacent to the existing Los Alamos Hospital, also designed by W. C. Kruger and Associates.

The HRL building is historically significant under the themes of (1) Bioscience–Health Physics and (2) Biomedical Research and Development and is evocative of those histories. It is also important for its association with Wright H. Langham, PhD, who is a significant figure of the Laboratory's Health Division. He facilitated the design, funding, and development of the HRL campus; guided much of its research; served as a principal investigator in numerous significant scientific investigations; and pioneered whole-body, radiation-counting equipment within its walls.

As part of the LANL Footprint Reduction Program's Decommissioning and Demolition (D&D) process, all facilities of the HRL complex are scheduled for characterization and future demolition. Volume 1 of this report is an evaluation of the HRL complex for inclusion in the National Register of Historic Places and determines TA-43-0001 as eligible for inclusion.

In addition to this determination of eligibility, Volumes 1 and 2 of this report meet the level of standard historic documentation that will be required to mitigate future adverse effects to TA-43-0001. This two-volume report reflects an effort to document past and present functions and to characterize the complex while it is still in use and funding is available. It includes a comprehensive historic context, appendices with detailed information about associated people and activities, and exterior and interior archival photographs. The latter comprises Volume 2.

Rob Van Winkle, UAV Pilot, IFPROGDATA, LANL

- October 14, 2021
  - Selected photos from the following sequences are presented in this volume: 20211014F01_RANGER_SR5189507_DTH_0001 through 20211018F07_RANGER_SR5189507_DTH_0002

Carlos Genaro, Photographer, CEA-PRO, LANL

- March 31, 2022
  - Selected photos from the following sequences are presented in this volume: UI-55-2022-79-1 through UI-55-2022-79-106
- April 14, 2022
  - Selected photos from the following sequences are presented in this volume: UI-55-2022-111-1 through UI-55-2022-111-481
- April 26, 2022
  - Selected photos from the following sequences are presented in this volume: UI-55-2022-112-1 through UI-55-2022-112-359

Introduction

When the HRL building was constructed in 1953, the building was shaped like a “T”, with one wing extending north from the junction, one wing extending south, and one wing extending east (Figure 1; also included as Appendix F in Volume 1 of *From Protection and Prevention to Research and Discovery: Eligibility Assessment of the Health Research Laboratory (TA-43) and Historic Documentation for TA-43-0001*). The photo descriptions refer to these wings as “1953 north wing”, “1953 south wing”, and “1953 east wing”. Subsequent additions are referred to by the date of their construction; for example, “1991 addition” and “1969 addition”. Photograph locations are provided in Figure 2 through Figure 6.

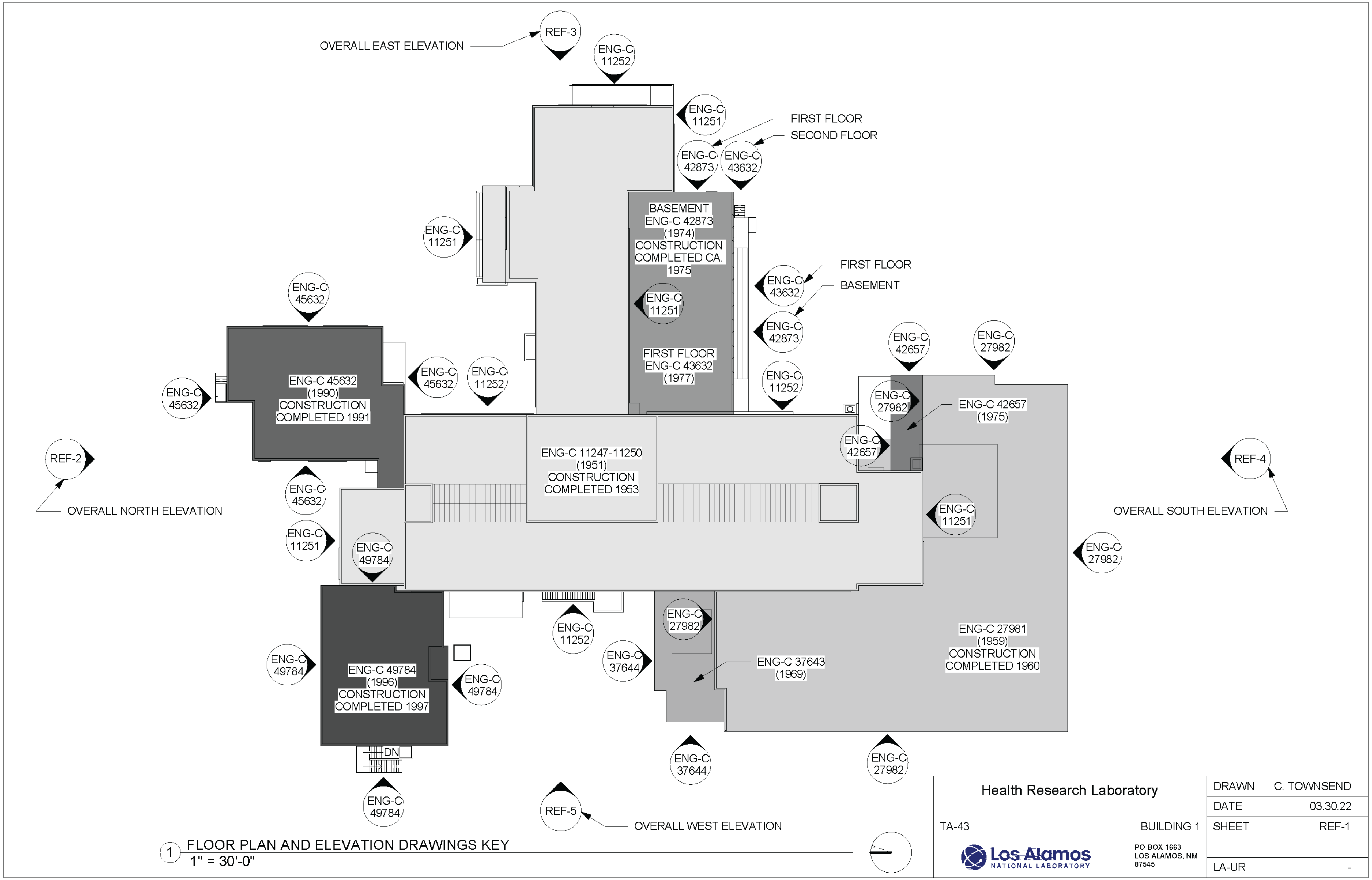

Figure 1. Health Research Laboratory, TA-43-0001, Floor Plan and Elevation Drawings Key.

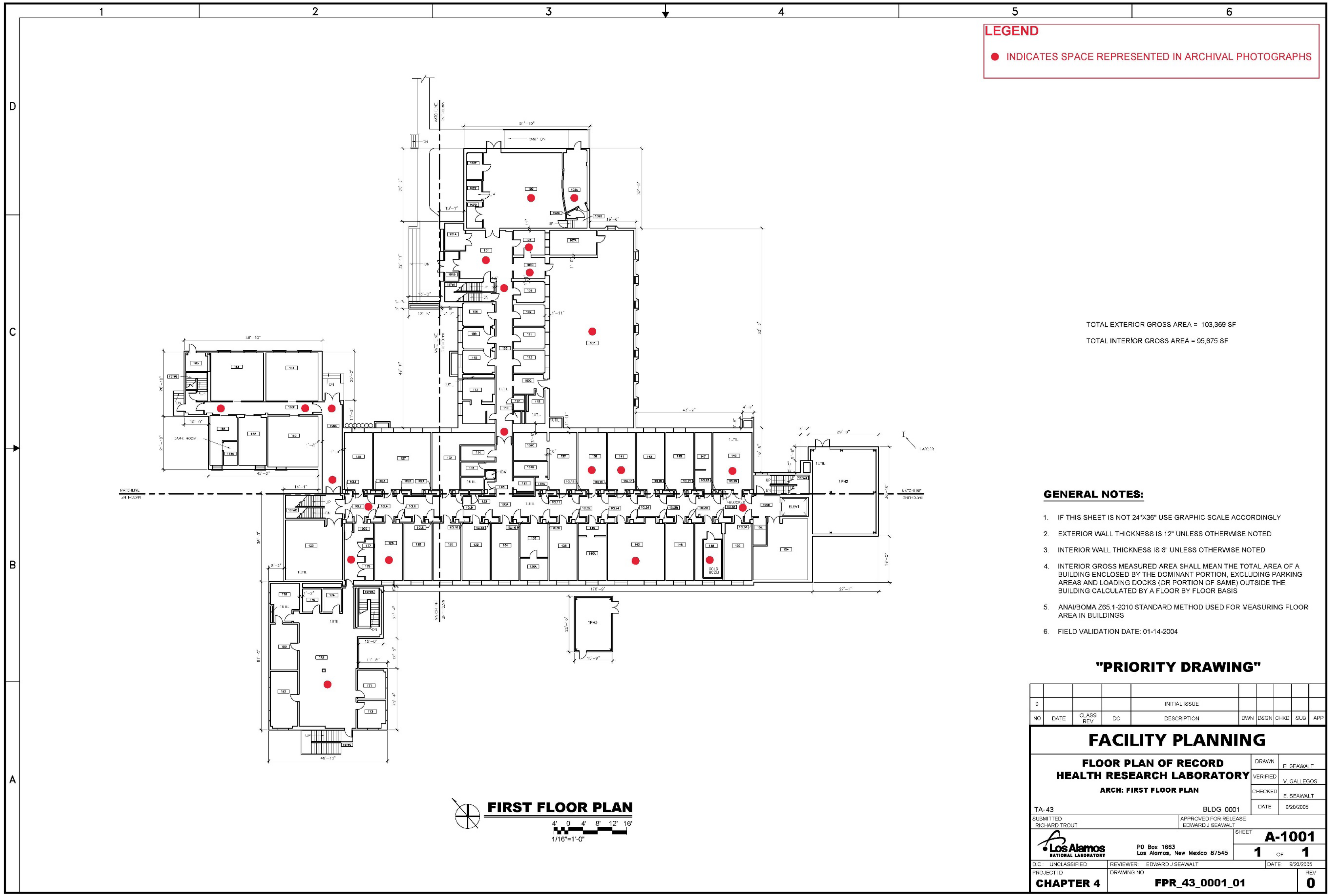

Figure 2. Health Research Laboratory, TA-43-0001, Photograph Location Key, First Floor.

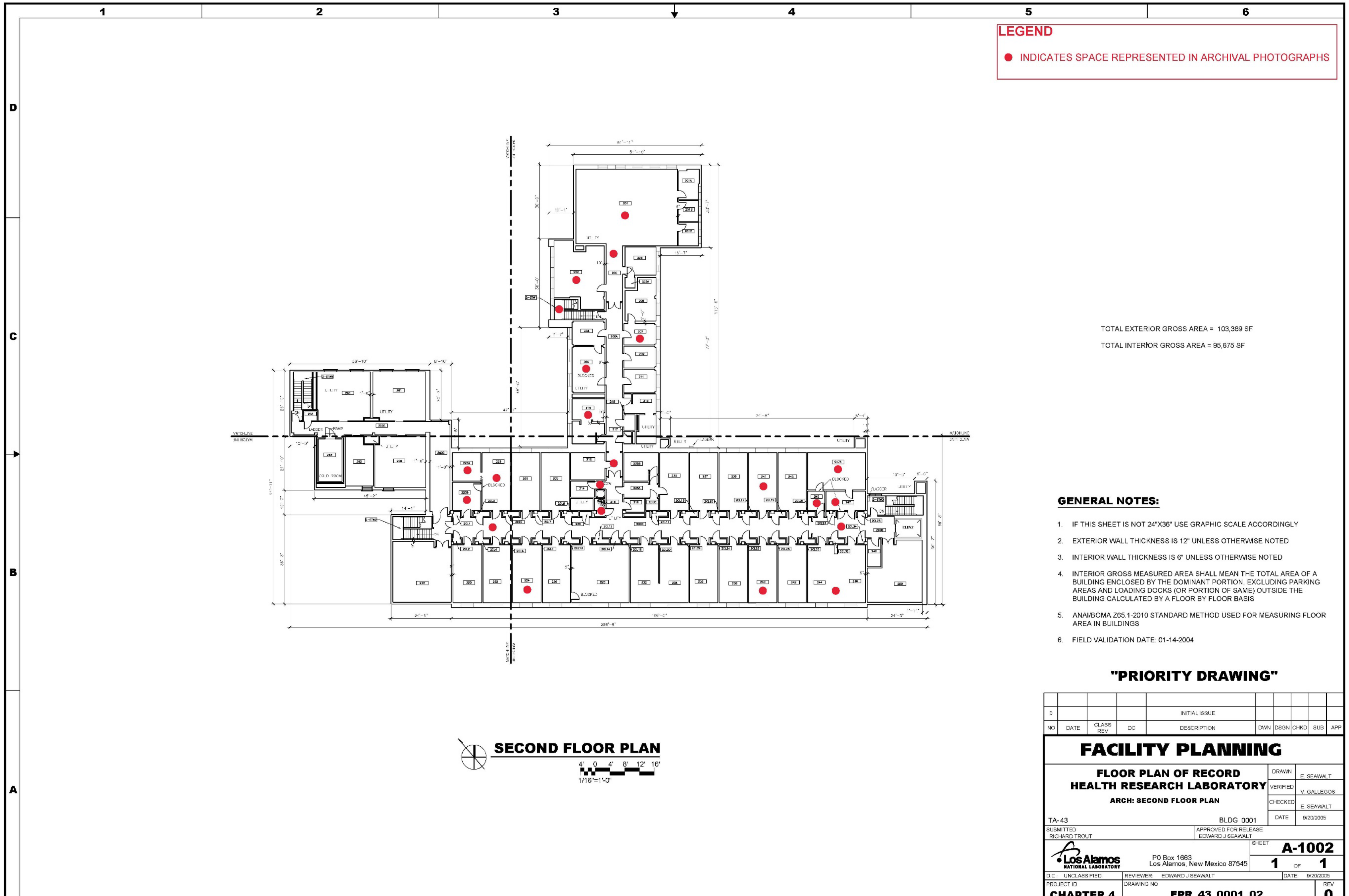

Figure 3. Health Research Laboratory, TA-43-0001, Photograph Location Key, Second Floor.

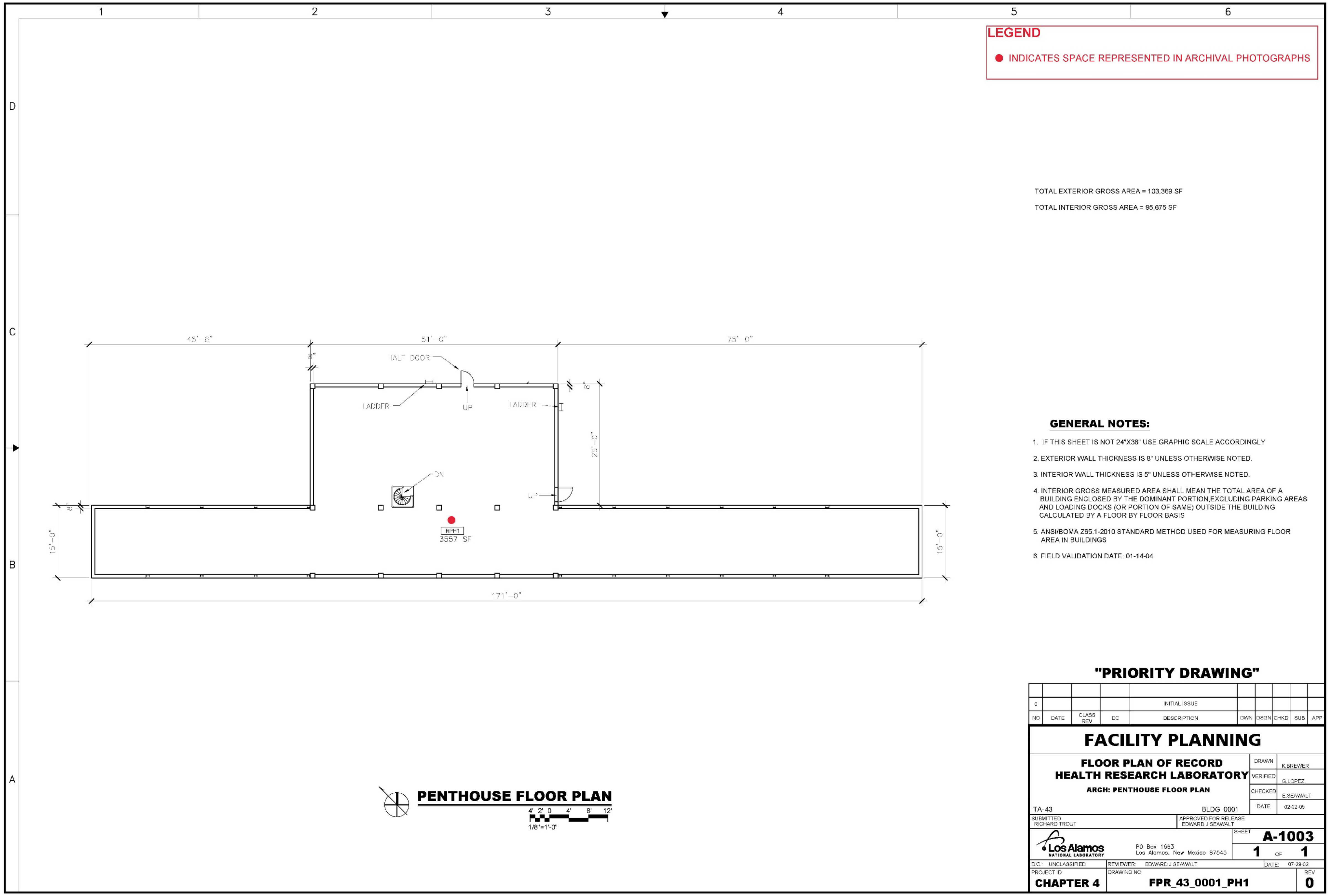

Figure 4. Health Research Laboratory, TA-43-0001, Photograph Location Key, Penthouse.

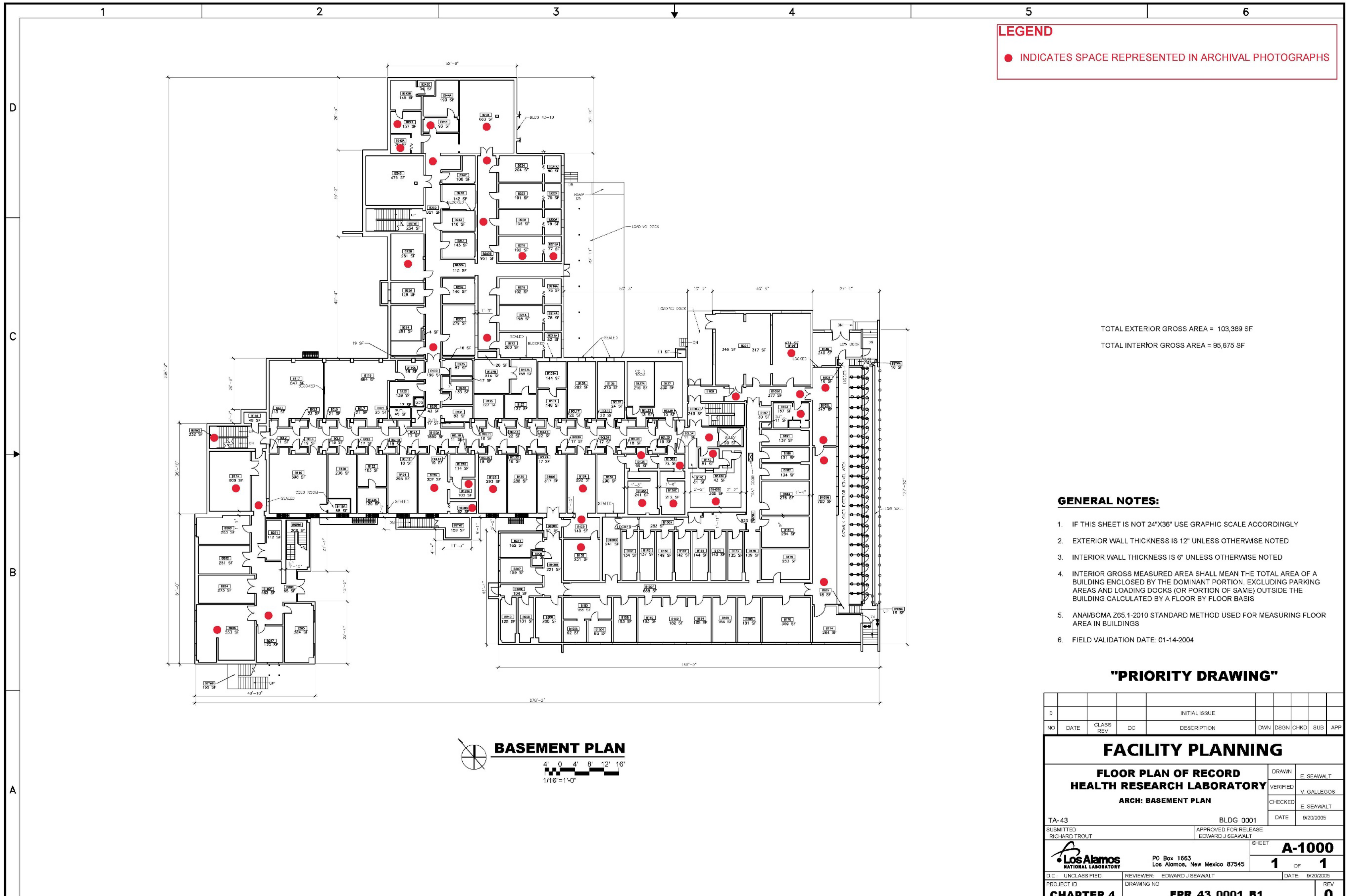

Figure 5. Health Research Laboratory, TA-43-0001, Photograph Location Key, Basement.

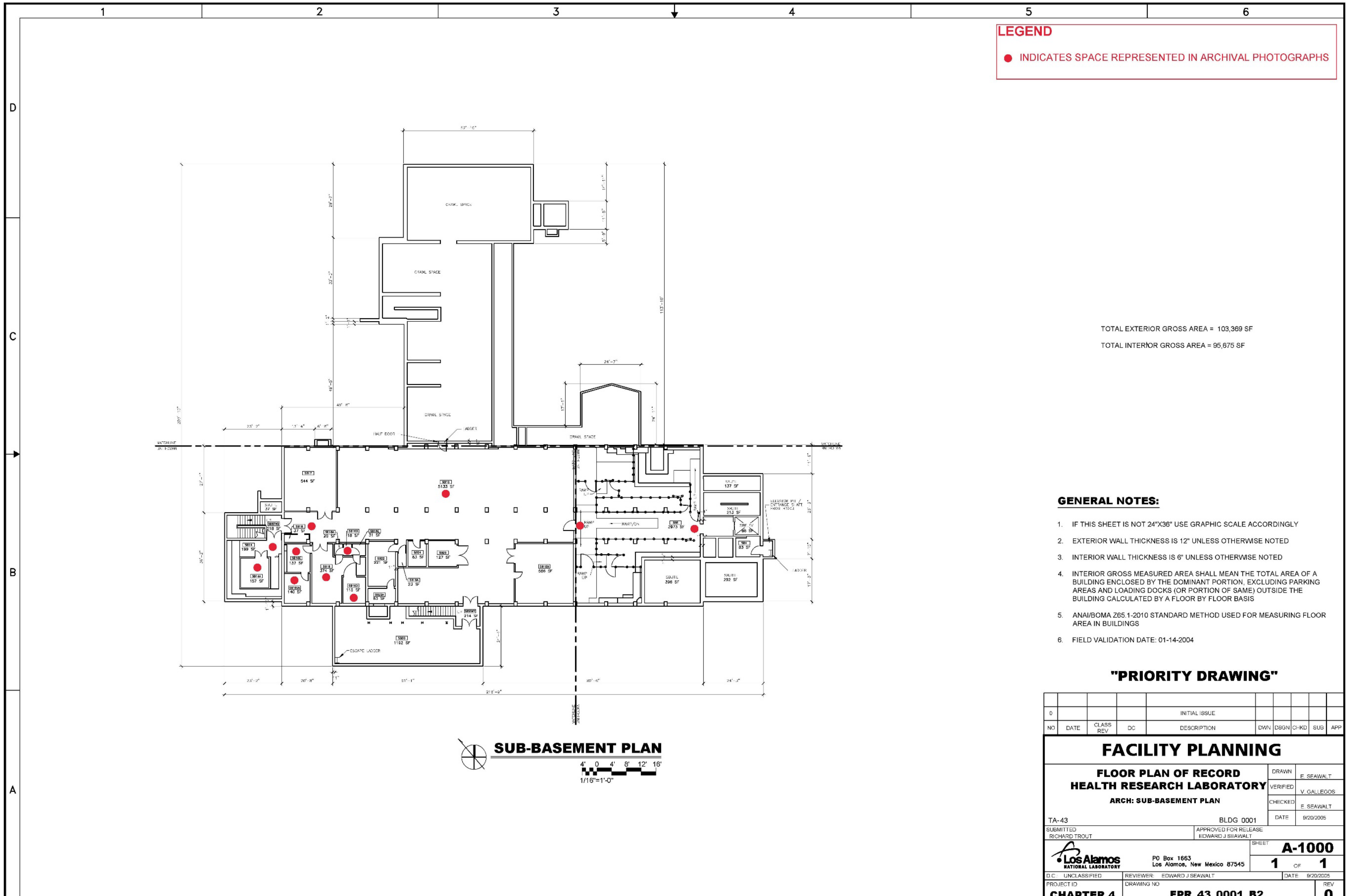

Figure 6. Health Research Laboratory, TA-43-0001, Photograph Location Key, Subbasement.

Photograph Index

Technical Area (TA) 43
Facility 1 (TA-43-0001)
Los Alamos National Laboratory (LANL)
Los Alamos
Los Alamos County
New Mexico

The rooms featured in photographs are marked with a red circle in the Photo Location Diagrams attached to this index.

Photograph Number	Description
EXTERIOR	
20211014F01_RANGER_SR5189507_DTH_0008	Oblique aerial of TA-43-0001, view to the southwest.
20211014F02_RANGER_SR5189507_DTH_0026	Oblique aerial of TA-43-0001, view to the northeast.
20211014F01_RANGER_SR5189507_DTH_0013	Oblique aerial of TA-43-0001, view to the north-northwest.
20211014F01_RANGER_SR5189507_DTH_0005	Oblique aerial of TA-43-0001, view to the west-southwest
UI-55-2022-79-1	TA-43-0001, north elevation of 1953 east wing, facing south. Main entrance.
UI-55-2022-79-2	TA-43-0001, north elevation of 1953 east wing, facing south, from east to west, segment 1 of 3.
UI-55-2022-79-5	TA-43-0001, north elevation of 1953 east wing, facing south, from east to west, segment 2 of 3.
UI-55-2022-79-4	TA-43-0001, north elevation of 1953 east wing, facing south, from east to west, segment 3 of 3.
UI-55-2022-79-6	TA-43-0001, north elevation of 1953 east wing, facing southwest. Detail of main entrance wing wall.
UI-55-2022-79-8	TA-43-0001, north elevation of 1953 east wing, facing southeast. Detail of main entrance wing wall.
UI-55-2022-79-10	TA-43-0001, north elevation of 1953 east wing, facing south. Close-up of west segment.
UI-55-2022-79-11	TA-43-0001, corner between north elevation of 1953 east wing and east elevation of 1953 north wing, facing southwest.
UI-55-2022-79-12	TA-43-0001, corner between east elevation of 1953 north wing and 1991 addition, facing northwest.
UI-55-2022-79-13	TA-43-0001, entrance on east elevation of 1991 addition facing west.
UI-55-2022-79-16	TA-43-0001, east elevation of 1953 north wing and 1991 addition, facing west.
UI-55-2022-79-15	TA-43-0001, east elevation of 1991 addition, facing west.
UI-55-2022-79-19	TA-43-0001, east elevation of 1991 addition, facing northwest.
UI-55-2022-79-20	TA-43-0001, northeast corner of 1991 addition, facing southwest.

Photograph Number	Description
UI-55-2022-79-21	TA-43-0001, northeast corner of 1991 addition, facing southwest. Main entrance visible in background.
UI-55-2022-79-22	TA-43-0001, north elevation of 1991 addition, facing south.
UI-55-2022-79-24	TA-43-0001, northwest corner of 1991 addition, facing southeast.
UI-55-2022-79-25	TA-43-0001, north elevation of 1991 addition, 1953 north wing, and 1997 addition, facing south.
UI-55-2022-79-26	TA-43-0001, west elevation of 1991 addition, facing east.
UI-55-2022-79-27	TA-43-0001, north elevation of 1991 addition and 1953 north wing, facing south.
UI-55-2022-79-28	TA-43-0001, north elevation of 1953 north wing, facing south.
UI-55-2022-79-29	TA-43-0001, north elevation of 1997 addition, facing south.
UI-55-2022-79-30	TA-43-0001, northwest corner of 1997 addition, facing southeast.
UI-55-2022-79-31	TA-43-0001, northwest corner of 1997 addition, facing southeast. West elevation of 1991 addition visible in background.
UI-55-2022-79-33	TA-43-0001, west elevation of 1997 addition, facing southeast.
UI-55-2022-79-34	TA-43-0001, west elevation of 1997 addition, facing east.
UI-55-2022-79-36	TA-43-0001, southwest of 1997 addition, facing northeast.
UI-55-2022-79-37	TA-43-0001, south elevation of 1997 addition, facing north.
UI-55-2022-79-39	TA-43-0001, corner between south elevation of 1997 addition and west elevation of 1953 north wing, facing northeast.
UI-55-2022-79-38	TA-43-0001, west elevation of 1953 north and south wings, facing east.
UI-55-2022-79-45	TA-43-0001, west elevation of 1953 north wing, facing east. Close-up of glass block windows.
UI-55-2022-79-46	TA-43-0001, west elevation of 1953 north wing, facing east. Close-up of glass block window.
UI-55-2022-79-47	TA-43-0001, stair on west elevation of 1953 north wing, facing south.
UI-55-2022-79-48	TA-43-0001, north elevation of 1969 addition, facing south.
UI-55-2022-79-49	TA-43-0001, north elevation of 1969 addition, facing south.
UI-55-2022-79-50	TA-43-0001, northwest corner of 1969 addition, facing southeast.
UI-55-2022-79-51	TA-43-0001, northwest corner of 1969 addition, facing southeast.
UI-55-2022-79-42	TA-43-0001, northwest corner of 1969 addition, facing southeast.
UI-55-2022-79-43	TA-43-0001, west elevation of 1960 addition, facing southeast.
UI-55-2022-79-44	TA-43-0001, west elevation of 1960 addition, facing southeast.
UI-55-2022-79-52	TA-43-0001, corner between south elevation of 1997 addition and west elevation of 1953 north wing, facing northeast.
UI-55-2022-79-53	TA-43-0001, west elevation of 1960 addition, facing east.
UI-55-2022-79-55	TA-43-0001, west elevation of 1960 addition, facing southeast.
UI-55-2022-79-53	TA-43-0001, west elevation of 1960 addition, facing east.
UI-55-2022-79-56	TA-43-0001, west elevation of 1960 addition, facing east. Close-up of security gate.
UI-55-2022-79-58	TA-43-0001, southwest corner of 1960 addition, facing northeast.

Photograph Number	Description
UI-55-2022-79-59	TA-43-0001, south elevation of 1960 addition, facing north, from west to east, segment 1 of 5.
UI-55-2022-79-61	TA-43-0001, south elevation of 1960 addition, facing north, from west to east, segment 2 of 5.
UI-55-2022-79-64	TA-43-0001, south elevation of 1960 addition, facing north, from west to east, segment 3 of 5.
UI-55-2022-79-65	TA-43-0001, south elevation of 1960 addition, facing north, from west to east, segment 4 of 5.
UI-55-2022-79-67	TA-43-0001, south elevation of 1960 addition, facing north, from west to east, segment 5 of 5.
UI-55-2022-79-69	TA-43-0001, southeast corner of 1960 addition, facing northwest.
UI-55-2022-79-70	TA-43-0001, east elevation of 1960 addition, facing west. Close-up of security gate.
UI-55-2022-79-72	TA-43-0001, east elevation of 1960 addition, facing southwest.
UI-55-2022-79-73	TA-43-0001, east elevation of 1960 addition, facing west.
UI-55-2022-79-75	TA-43-0001, east elevation of 1975 Tunnel Cage Washer Addition and 1953 south wing, facing west.
UI-55-2022-79-78	TA-43-0001, corner between east elevation of 1975 Tunnel Cage Washer Addition and south elevation of 1975 (bottom)/1977 (top) additions, facing northwest.
UI-55-2022-79-75	TA-43-0001, east elevation of 1953 south wing, facing west. Close-up of entrance. 1975 Tunnel Cage Washer Addition north entrance visible to left.
UI-55-2022-79-80	TA-43-0001, east elevation of 1953 south wing, facing northwest.
UI-55-2022-79-81	TA-43-0001, south elevation of 1975 (bottom)/1977 (top) additions, facing north.
UI-55-2022-79-82	TA-43-0001, south elevation of 1975 (bottom)/1977 (top) additions, facing northeast. South elevation of 1953 east wing visible in background.
UI-55-2022-79-80	TA-43-0001, east elevation of 1953 south wing, facing west, as seen from top of east retaining wall.
UI-55-2022-79-82	TA-43-0001, south elevation of 1953 east wing, facing northeast.
UI-55-2022-79-84	TA-43-0001, east elevation of 1953 south wing and south elevation of 1953 east wing, facing northwest.
UI-55-2022-79-85	TA-43-0001, east elevation of 1960 addition, 1975 Tunnel Cage Washer Addition, and 1953 south wing, facing west.
UI-55-2022-79-87	TA-43-0001, southeast corner of overall building, facing northwest.
UI-55-2022-79-88	TA-43-0001, southeast corner of 1953 east wing, facing northwest.
UI-55-2022-79-97	TA-43-0001, southeast corner of 1975 (bottom)/1977 (top) additions, facing northwest. Detail of windows.
UI-55-2022-79-98	TA-43-0001, east elevation of 1977 addition, facing west. Close-up of window.
UI-55-2022-79-89	TA-43-0001, south elevation of 1953 east wing, facing north.
UI-55-2022-79-101	TA-43-0001, southeast corner of 1953 east wing, facing northwest.
UI-55-2022-79-102	TA-43-0001, east elevation of 1953 east wing, facing west.
UI-55-2022-79-103	TA-43-0001, northwest corner of 1953 east wing, facing southeast.
UI-55-2022-79-105	TA-43-0001, northwest corner of 1953 east wing, facing southeast.

Photograph Number	Description
UI-55-2022-79-106	TA-43-0001, corner between north elevation of 1953 east wing and east elevation of 1953 north wing, facing southeast.
INTERIOR - FIRST FLOOR	
UI-55-2022-112-273	TA-43-0001, first floor, 1953 east wing, room 102, facing east.
UI-55-2022-112-274	TA-43-0001, first floor, 1953 east wing, room 102, facing south.
UI-55-2022-112-275	TA-43-0001, first floor, 1953 east wing, room 102, facing south.
UI-55-2022-112-276	TA-43-0001, first floor, 1953 east wing, room 102, facing southeast.
UI-55-2022-112-278	TA-43-0001, first floor, 1953 east wing, room 102, facing south.
UI-55-2022-112-279	TA-43-0001, first floor, 1953 east wing, room 102, facing west.
UI-55-2022-112-280	TA-43-0001, first floor, 1953 east wing, room 102, facing northwest.
UI-55-2022-112-281	TA-43-0001, first floor, 1953 east wing, room 102, facing north.
UI-55-2022-112-282	TA-43-0001, first floor, 1953 east wing, room 102, facing south.
UI-55-2022-112-283	TA-43-0001, first floor, 1953 east wing, room 102, facing northeast.
UI-55-2022-112-284	TA-43-0001, first floor, 1953 east wing, room 102, facing east.
UI-55-2022-112-285	TA-43-0001, first floor, 1953 east wing, room 102, facing north.
UI-55-2022-112-286	TA-43-0001, first floor, 1953 east wing, room 102, facing north. Close-up of audio-visual room.
UI-55-2022-112-287	TA-43-0001, first floor, 1953 east wing, room 102, south end facing south into room 102B.
UI-55-2022-112-290	TA-43-0001, first floor, 1953 east wing, room 102B, facing east into room 102A.
UI-55-2022-112-289	TA-43-0001, first floor, 1953 east wing, room 102B, facing north into room 102.
UI-55-2022-112-291	TA-43-0001, first floor, 1953 east wing, room 102A, facing east.
UI-55-2022-112-294	TA-43-0001, first floor, 1953 east wing, room 102A, facing west.
UI-55-2022-112-267	TA-43-0001, first floor, 1953 east wing, room 103, facing southwest.
UI-55-2022-112-268	TA-43-0001, first floor, 1953 east wing, room 103, facing north.
UI-55-2022-112-301	TA-43-0001, first floor, 1953 east wing, room 100D, facing north.
UI-55-2022-112-302	TA-43-0001, first floor, 1953 east wing, room 100D, facing north.
UI-55-2022-112-248	TA-43-0001, first floor, 1977 addition, room 107, facing south.
UI-55-2022-112-249	TA-43-0001, first floor, 1977 addition, room 107, facing south. Detail of skylight.
UI-55-2022-112-251	TA-43-0001, first floor, 1953 east wing, room 107, facing east.
UI-55-2022-112-255	TA-43-0001, first floor, 1977 addition, room 107, facing north into room 100C.
UI-55-2022-112-259	TA-43-0001, first floor, 1977 addition, room 107, facing east.
UI-55-2022-112-260	TA-43-0001, first floor, 1977 addition, room 107, facing west.
UI-55-2022-112-261	TA-43-0001, first floor, 1977 addition, room 107, facing north into room 100D.
UI-55-2022-112-262	TA-43-0001, first floor, 1977 addition, room 107, facing west.
UI-55-2022-112-263	TA-43-0001, first floor, 1977 addition, room 107, facing south.
UI-55-2022-112-325	TA-43-0001, first floor, 1953 east wing, corridor 100, facing west.
UI-55-2022-112-322	TA-43-0001, first floor, 1953 east wing, corridor, facing west.
UI-55-2022-112-312	TA-43-0001, first floor, 1953 south wing, corridor 100A, facing north.

Photograph Number	Description
UI-55-2022-112-175	TA-43-0001, first floor, 1953 south wing, room 151, facing east.
UI-55-2022-112-176	TA-43-0001, first floor, 1953 south wing, room 151, facing northeast.
UI-55-2022-112-177	TA-43-0001, first floor, 1953 south wing, room 151, facing northwest.
UI-55-2022-112-178	TA-43-0001, first floor, 1953 south wing, room 151, facing north.
UI-55-2022-112-179	TA-43-0001, first floor, 1953 south wing, room 151, facing east.
UI-55-2022-112-180	TA-43-0001, first floor, 1953 south wing, room 151, facing southeast.
UI-55-2022-112-181	TA-43-0001, first floor, 1953 south wing, room 151, facing southwest.
UI-55-2022-112-182	TA-43-0001, first floor, 1953 south wing, room 151, facing south.
UI-55-2022-112-183	TA-43-0001, first floor, 1953 south wing, room 151, facing east.
UI-55-2022-112-184	TA-43-0001, first floor, 1953 south wing, room 151, facing southeast.
UI-55-2022-112-186	TA-43-0001, first floor, 1953 south wing, room 148, facing west.
UI-55-2022-112-187	TA-43-0001, first floor, 1953 south wing, room 148, facing southwest.
UI-55-2022-112-188	TA-43-0001, first floor, 1953 south wing, room 148, facing west into cold room.
UI-55-2022-112-189	TA-43-0001, first floor, 1953 south wing, room 148, facing northwest.
UI-55-2022-112-190	TA-43-0001, first floor, 1953 south wing, room 148, facing north. Close-up of cabinet.
UI-55-2022-112-191	TA-43-0001, first floor, 1953 south wing, room 148, facing south.
UI-55-2022-112-192	TA-43-0001, first floor, 1953 south wing, room 148, facing west north of cold room.
UI-55-2022-112-193	TA-43-0001, first floor, 1953 south wing, room 148, facing west south of cold room.
UI-55-2022-112-194	TA-43-0001, first floor, 1953 south wing, room 148, facing west inside cold room.
UI-55-2022-112-195	TA-43-0001, first floor, 1953 south wing, room 148, facing east inside cold room.
UI-55-2022-112-204	TA-43-0001, first floor, 1953 south wing, room 142, facing west.
UI-55-2022-112-205	TA-43-0001, first floor, 1953 south wing, room 142, facing southwest.
UI-55-2022-112-206	TA-43-0001, first floor, 1953 south wing, room 142, facing southeast.
UI-55-2022-112-207	TA-43-0001, first floor, 1953 south wing, room 142, facing south.
UI-55-2022-112-208	TA-43-0001, first floor, 1953 south wing, room 142, facing southeast.
UI-55-2022-112-215	TA-43-0001, first floor, 1953 south wing, room 142, facing north.
UI-55-2022-112-216	TA-43-0001, first floor, 1953 south wing, room 142, facing west.
UI-55-2022-112-217	TA-43-0001, first floor, 1953 south wing, room 142, facing northwest.
UI-55-2022-112-212	TA-43-0001, first floor, 1953 south wing, room 142, facing northeast.
UI-55-2022-112-213	TA-43-0001, first floor, 1953 south wing, room 142, facing north.
UI-55-2022-112-210	TA-43-0001, first floor, 1953 south wing, room 142, facing northeast.
UI-55-2022-112-211	TA-43-0001, first floor, 1953 south wing, room 142, facing east.
UI-55-2022-112-209	TA-43-0001, first floor, 1953 south wing, room 142, facing east. Close-up of Labconco fume hood.
UI-55-2022-112-214	TA-43-0001, first floor, 1953 south wing, room 142, facing east. Labconco fume hood and VWR laboratory refrigerator.
UI-55-2022-112-198	TA-43-0001, first floor, 1953 south wing, room 141, facing northeast.

Photograph Number	Description
UI-55-2022-112-197	TA-43-0001, first floor, 1953 south wing, room 141, facing east.
UI-55-2022-112-199	TA-43-0001, first floor, 1953 south wing, room 141, facing southeast.
UI-55-2022-112-201	TA-43-0001, first floor, 1953 south wing, room 141, facing southwest.
UI-55-2022-112-200	TA-43-0001, first floor, 1953 south wing, room 141, facing west.
UI-55-2022-112-202	TA-43-0001, first floor, 1953 south wing, room 141, facing northwest.
UI-55-2022-112-220	TA-43-0001, first floor, 1953 south wing, room 139, facing northeast.
UI-55-2022-112-219	TA-43-0001, first floor, 1953 south wing, room 139, facing east.
UI-55-2022-112-221	TA-43-0001, first floor, 1953 south wing, room 139, facing southeast.
UI-55-2022-112-222	TA-43-0001, first floor, 1953 south wing, room 139, facing southeast. Close-up of algae and bacterial culture experiments.
UI-55-2022-112-224	TA-43-0001, first floor, 1953 south wing, room 139, facing southwest.
UI-55-2022-112-223	TA-43-0001, first floor, 1953 south wing, room 139, facing west.
UI-55-2022-112-225	TA-43-0001, first floor, 1953 south wing, room 139, facing northwest.
UI-55-2022-112-228	TA-43-0001, first floor, 1953 north wing, room 126, facing southwest.
UI-55-2022-112-227	TA-43-0001, first floor, 1953 north wing, room 126, facing west.
UI-55-2022-112-229	TA-43-0001, first floor, 1953 north wing, room 126, facing northwest.
UI-55-2022-112-231	TA-43-0001, first floor, 1953 north wing, room 126, facing northeast.
UI-55-2022-112-230	TA-43-0001, first floor, 1953 north wing, room 126, facing east.
UI-55-2022-112-232	TA-43-0001, first floor, 1953 north wing, room 126, facing southeast.
UI-55-2022-112-311	TA-43-0001, first floor, 1953 north wing, corridor 100A, facing south.
UI-55-2022-112-305	TA-43-0001, first floor, 1953 north wing, room 100D, facing west.
UI-55-2022-112-309	TA-43-0001, first floor, 1953 north wing, room 100D, facing east.
UI-55-2022-112-305	TA-43-0001, first floor, 1953 north wing, room 100D, facing west.
UI-55-2022-112-234	TA-43-0001, first floor, 1997 addition, room 172, facing west.
UI-55-2022-112-233	TA-43-0001, first floor, 1997 addition, room 172, facing northwest.
UI-55-2022-112-236	TA-43-0001, first floor, 1997 addition, room 172, facing east.
UI-55-2022-112-238	TA-43-0001, first floor, 1997 addition, west end of room 172, facing south.
UI-55-2022-112-240	TA-43-0001, first floor, 1997 addition, west end of room 172, facing east.
UI-55-2022-112-242	TA-43-0001, first floor, 1997 addition, east end of room 172, facing west.
UI-55-2022-112-244	TA-43-0001, first floor, 1997 addition, east end of room 172, facing south.
UI-55-2022-112-245	TA-43-0001, first floor, 1997 addition, east end of room 172, facing northeast into room 174.
UI-55-2022-112-314	TA-43-0001, first floor, 1991 addition, corridor 100E, facing east.
UI-55-2022-112-317	TA-43-0001, first floor, 1991 addition, corridor 100E, facing west.
UI-55-2022-112-320	TA-43-0001, first floor, 1991 addition, corridor 100F, facing north.
UI-55-2022-112-321	TA-43-0001, first floor, 1991 addition, corridor 100F, facing south.
INTERIOR - SECOND FLOOR	
UI-55-2022-112-145	TA-43-0001, second floor, 1953 east wing, room 201, facing southeast.
UI-55-2022-112-146	TA-43-0001, second floor, 1953 east wing, room 201, facing southwest.

Photograph Number	Description
UI-55-2022-112-148	TA-43-0001, second floor, 1953 east wing, room 201, facing northwest.
UI-55-2022-112-354	TA-43-0001, second floor, 1953 east wing, corridor 200, facing west.
UI-55-2022-112-351	TA-43-0001, second floor, 1953 east wing, room 202, facing northwest.
UI-55-2022-112-345	TA-43-0001, second floor, 1953 east wing, room 202, facing northeast.
UI-55-2022-112-346	TA-43-0001, second floor, 1953 east wing, room 202, facing southeast.
UI-55-2022-112-347	TA-43-0001, second floor, 1953 east wing, room 202, facing southeast.
UI-55-2022-112-350	TA-43-0001, second floor, 1953 east wing, room 202, facing southwest.
UI-55-2022-112-352	TA-43-0001, second floor, 1953 east wing, room 202, facing west.
UI-55-2022-112-346	TA-43-0001, second floor, 1953 east wing, room 202, facing southeast.
UI-55-2022-112-337	TA-43-0001, 1953 east wing, stairwell 1, first floor landing, facing north.
UI-55-2022-112-340	TA-43-0001, 1953 east wing, stairwell 1, middle landing, facing southwest.
UI-55-2022-112-342	TA-43-0001, 1953 east wing, stairwell 1, middle landing, facing south.
UI-55-2022-112-343	TA-43-0001, 1953 east wing, stairwell 1, second floor landing, facing north.
UI-55-2022-112-140	TA-43-0001, second floor, 1953 east wing, room 207, facing southeast.
UI-55-2022-112-139	TA-43-0001, second floor, 1953 east wing, room 207, facing south.
UI-55-2022-112-142	TA-43-0001, second floor, 1953 east wing, room 207, facing north.
UI-55-2022-112-144	TA-43-0001, second floor, 1953 east wing, room 207, facing northeast.
UI-55-2022-112-134	TA-43-0001, second floor, 1953 east wing, room 206, facing northeast.
UI-55-2022-112-133	TA-43-0001, second floor, 1953 east wing, room 206, facing east.
UI-55-2022-112-135	TA-43-0001, second floor, 1953 east wing, room 206, facing southeast.
UI-55-2022-112-136	TA-43-0001, second floor, 1953 east wing, room 206, facing southwest.
UI-55-2022-112-137	TA-43-0001, second floor, 1953 east wing, room 206, facing west.
UI-55-2022-112-120	TA-43-0001, second floor, 1953 east wing, room 210, west half, facing southwest.
UI-55-2022-112-119	TA-43-0001, second floor, 1953 east wing, room 210, west half, facing west.
UI-55-2022-112-114	TA-43-0001, second floor, 1953 east wing, room 210, west half, facing northwest.
UI-55-2022-112-116	TA-43-0001, second floor, 1953 east wing, room 210, west half, facing northeast.
UI-55-2022-112-127	TA-43-0001, second floor, 1953 east wing, room 210, east half, facing north.
UI-55-2022-112-126	TA-43-0001, second floor, 1953 east wing, room 210, east half, facing northeast.
UI-55-2022-112-125	TA-43-0001, second floor, 1953 east wing, room 210, east half, facing east.
UI-55-2022-112-126	TA-43-0001, second floor, 1953 east wing, room 210, east half, facing east.
UI-55-2022-112-118	TA-43-0001, second floor, 1953 east wing, room 210, west half, facing southeast.
UI-55-2022-112-122	TA-43-0001, second floor, 1953 east wing, room 210, east half, facing south.
UI-55-2022-112-123	TA-43-0001, second floor, 1953 east wing, room 210, east half, facing southwest.
UI-55-2022-112-130	TA-43-0001, second floor, 1953 east wing, room 210, east half, facing southwest.
UI-55-2022-112-128	TA-43-0001, second floor, 1953 east wing, room 210, east half, detail of light fixture.
UI-55-2022-112-357	TA-43-0001, second floor, 1953 east wing, corridor 200A, facing east.
UI-55-2022-112-52	TA-43-0001, second floor, 1953 south wing, corridor 200B, facing north down corridor 200C.
UI-55-2022-112-73	TA-43-0001, second floor, 1953 east wing, room 247, facing northeast.

Photograph Number	Description
UI-55-2022-112-76	TA-43-0001, second floor, 1953 south wing, room 247, facing north.
UI-55-2022-112-75	TA-43-0001, second floor, 1953 south wing, room 247, facing south.
UI-55-2022-112-74	TA-43-0001, second floor, 1953 south wing, room 247, facing southeast.
UI-55-2022-112-80	TA-43-0001, second floor, 1953 south wing, room 247A, facing northwest.
UI-55-2022-112-79	TA-43-0001, second floor, 1953 south wing, room 247A, facing north.
UI-55-2022-112-78	TA-43-0001, second floor, 1953 south wing, room 247A, facing northeast.
UI-55-2022-112-85	TA-43-0001, second floor, 1953 south wing, room 247A, facing east.
UI-55-2022-112-74	TA-43-0001, second floor, 1953 south wing, room 247A, facing southeast.
UI-55-2022-112-83	TA-43-0001, second floor, 1953 south wing, room 247A, facing south.
UI-55-2022-112-82	TA-43-0001, second floor, 1953 south wing, room 247A, facing southwest.
UI-55-2022-112-81	TA-43-0001, second floor, 1953 south wing, room 247A, facing west.
UI-55-2022-112-86	TA-43-0001, second floor, 1953 south wing, room 247A, facing east into room 245.
UI-55-2022-112-87	TA-43-0001, second floor, 1953 south wing, room 245, facing west.
UI-55-2022-112-88	TA-43-0001, second floor, 1953 south wing, room 245, facing west. Close-up of New Brunswick incubator shaker.
UI-55-2022-112-91	TA-43-0001, second floor, 1953 south wing, room 245, facing east into room 247A.
UI-55-2022-112-57	TA-43-0001, second floor, 1953 south wing, room 244/246, facing west.
UI-55-2022-112-55	TA-43-0001, second floor, 1953 south wing, room 244/246, facing northwest.
UI-55-2022-112-62	TA-43-0001, second floor, 1953 south wing, room 244/246, facing north.
UI-55-2022-112-61	TA-43-0001, second floor, 1953 south wing, room 244/246, facing north.
UI-55-2022-112-58	TA-43-0001, second floor, 1953 south wing, room 244/246, facing east.
UI-55-2022-112-63	TA-43-0001, second floor, 1953 south wing, room 244/246, facing south.
UI-55-2022-112-67	TA-43-0001, second floor, 1953 south wing, room 244/246, facing north.
UI-55-2022-112-65	TA-43-0001, second floor, 1953 south wing, room 244/246, facing south.
UI-55-2022-112-70	TA-43-0001, second floor, 1953 south wing, room 244/246, facing west.
UI-55-2022-112-71	TA-43-0001, second floor, 1953 south wing, room 244/246, facing south.
UI-55-2022-112-69	TA-43-0001, second floor, 1953 south wing, room 244/246, facing north.
UI-55-2022-112-68	TA-43-0001, second floor, 1953 south wing, room 244/246, facing northeast.
UI-55-2022-112-94	TA-43-0001, second floor, 1953 south wing, room 241, facing northeast.
UI-55-2022-112-93	TA-43-0001, second floor, 1953 south wing, room 241, facing east.
UI-55-2022-112-95	TA-43-0001, second floor, 1953 south wing, room 241, facing southeast.
UI-55-2022-112-96	TA-43-0001, second floor, 1953 south wing, room 241, facing southwest.
UI-55-2022-112-93	TA-43-0001, second floor, 1953 south wing, room 241, facing west.
UI-55-2022-112-98	TA-43-0001, second floor, 1953 south wing, room 241, facing northwest.
UI-55-2022-112-100	TA-43-0001, second floor, 1953 south wing, room 240, facing southwest.
UI-55-2022-112-101	TA-43-0001, second floor, 1953 south wing, room 240, facing west.
UI-55-2022-112-102	TA-43-0001, second floor, 1953 south wing, room 240, facing northwest.
UI-55-2022-112-104	TA-43-0001, second floor, 1953 south wing, room 240, facing northeast.

Photograph Number	Description
UI-55-2022-112-103	TA-43-0001, second floor, 1953 south wing, room 240, facing east.
UI-55-2022-112-105	TA-43-0001, second floor, 1953 south wing, room 240, facing southeast.
UI-55-2022-112-172	TA-43-0001, second floor, 1953 north wing, corridor C, dumbwaiter outside room 214, facing northwest.
UI-55-2022-112-173	TA-43-0001, second floor, 1953 north wing, corridor C, dumbwaiter outside room 214, facing northwest. Detail of dumbwaiter controls.
UI-55-2022-112-108	TA-43-0001, second floor, 1953 north wing, room 224, facing southwest.
UI-55-2022-112-107	TA-43-0001, second floor, 1953 north wing, room 224, facing west.
UI-55-2022-112-109	TA-43-0001, second floor, 1953 north wing, room 224, facing northwest.
UI-55-2022-112-112	TA-43-0001, second floor, 1953 north wing, room 224, facing northeast.
UI-55-2022-112-110	TA-43-0001, second floor, 1953 north wing, room 224, facing east.
UI-55-2022-112-111	TA-43-0001, second floor, 1953 north wing, room 224, facing southeast.
UI-55-2022-112-150	TA-43-0001, second floor, 1953 north wing, room 223, facing northeast.
UI-55-2022-112-152	TA-43-0001, second floor, 1953 north wing, room 223, facing east.
UI-55-2022-112-151	TA-43-0001, second floor, 1953 north wing, room 223, facing southeast.
UI-55-2022-112-153	TA-43-0001, second floor, 1953 north wing, room 223, facing southwest.
UI-55-2022-112-154	TA-43-0001, second floor, 1953 north wing, room 223, facing northwest.
UI-55-2022-112-157	TA-43-0001, second floor, 1953 north wing, room 223A, facing north.
UI-55-2022-112-158	TA-43-0001, second floor, 1953 north wing, room 223A, facing northwest.
UI-55-2022-112-161	TA-43-0001, second floor, 1953 north wing, room 223A, facing southwest.
UI-55-2022-112-162	TA-43-0001, second floor, 1953 north wing, room 223A, facing southeast.
UI-55-2022-112-159	TA-43-0001, second floor, 1953 north wing, room 223A, facing northeast.
UI-55-2022-112-164	TA-43-0001, second floor, 1953 north wing, room 223A, facing north into room 223B.
UI-55-2022-112-166	TA-43-0001, second floor, 1953 north wing, room 223B, facing west.
UI-55-2022-112-167	TA-43-0001, second floor, 1953 north wing, room 223A, facing northwest.
UI-55-2022-112-170	TA-43-0001, second floor, 1953 north wing, room 223A, facing northeast.
UI-55-2022-112-168	TA-43-0001, second floor, 1953 north wing, room 223A, facing southeast.
UI-55-2022-112-53	TA-43-0001, second floor, 1953 north wing, corridor 200C, facing south.
UI-55-2022-112-28	TA-43-0001, second floor, 1953 north wing, room 218, facing east. Spiral staircase leading to penthouse.
UI-55-2022-112-29	TA-43-0001, second floor, 1953 north wing, room 218, facing east. Spiral staircase leading to penthouse.
UI-55-2022-112-30	TA-43-0001, second floor, 1953 north wing, room 218, facing east. Spiral staircase leading to penthouse.
INTERIOR - PENTHOUSE	
UI-55-2022-112-31	TA-43-0001, penthouse, 1953 north wing, room RPH1 (penthouse), looking down spiral staircase to second floor.
UI-55-2022-112-32	TA-43-0001, penthouse, 1953 north wing, room RPH1 (penthouse), looking down spiral staircase to second floor.

Photograph Number	Description
UI-55-2022-112-33	TA-43-0001, penthouse, 1953 north wing, room RPH1 (penthouse), facing southeast.
UI-55-2022-112-44	TA-43-0001, penthouse, 1953 north wing, room RPH1 (penthouse), facing east. Detail of door.
UI-55-2022-112-40	TA-43-0001, penthouse, 1953 north wing, room RPH1 (penthouse), facing southeast.
UI-55-2022-112-39	TA-43-0001, penthouse, 1953 north wing, room RPH1 (penthouse), facing south.
UI-55-2022-112-35	TA-43-0001, penthouse, 1953 north wing, room RPH1 (penthouse), facing west.
UI-55-2022-112-38	TA-43-0001, penthouse, 1953 north wing, room RPH1 (penthouse), facing west.
UI-55-2022-112-37	TA-43-0001, penthouse, 1953 north wing, room RPH1 (penthouse), facing north.
UI-55-2022-112-34	TA-43-0001, penthouse, 1953 north wing, room RPH1 (penthouse), facing northwest.
UI-55-2022-112-36	TA-43-0001, penthouse, 1953 north wing, room RPH1 (penthouse), facing north.
UI-55-2022-112-43	TA-43-0001, penthouse, 1953 north wing, room RPH1 (penthouse), facing northeast.
UI-55-2022-112-45	TA-43-0001, penthouse, 1953 north wing, room RPH1 (penthouse), facing north.
UI-55-2022-112-48	TA-43-0001, penthouse, 1953 north wing, room RPH1 (penthouse), facing south.
UI-55-2022-112-46	TA-43-0001, penthouse, 1953 north wing, room RPH1 (penthouse), facing east.
UI-55-2022-112-51	TA-43-0001, penthouse, 1953 north wing, room RPH1 (penthouse), facing east. Detail of exhaust blower fan housings and motors.
UI-55-2022-112-47	TA-43-0001, penthouse, 1953 north wing, room RPH1 (penthouse), facing east. Detail of air compressor and exhaust blowers.
INTERIOR - BASEMENT	
UI-55-2022-111-316	TA-43-0001, basement, 1953 east wing, room B242A entry, facing south.
UI-55-2022-111-317	TA-43-0001, basement, 1953 east wing, room B242A entry, facing south.
UI-55-2022-111-321	TA-43-0001, basement, 1953 east wing, room B244, facing south.
UI-55-2022-111-323	TA-43-0001, basement, 1953 east wing, room B244, facing northwest.
UI-55-2022-111-326	TA-43-0001, basement, 1953 east wing, room B244, facing northeast.
UI-55-2022-111-328	TA-43-0001, basement, 1953 east wing, room B244A, facing east.
UI-55-2022-111-336	TA-43-0001, basement, 1953 east wing, room B244A, facing north.
UI-55-2022-111-329	TA-43-0001, basement, 1953 east wing, room B244A, facing northeast.
UI-55-2022-111-330	TA-43-0001, basement, 1953 east wing, room B244A, facing northeast.
UI-55-2022-111-340	TA-43-0001, basement, 1953 east wing, room B244A, facing east. Close-up of Thermo Fischer Scientific laboratory refrigerator and freezer.
UI-55-2022-111-334	TA-43-0001, basement, 1953 east wing, room B244A, facing northeast. Close-up of Safeaire class II biological safety cabinet.
UI-55-2022-111-332	TA-43-0001, basement, 1953 east wing, room B244A, facing west.
UI-55-2022-111-339	TA-43-0001, basement, 1953 east wing, room B244A, facing south.
UI-55-2022-111-335	TA-43-0001, basement, 1953 east wing, room B244A, facing southeast. Close-up of Thermo Fischer Scientific carbon dioxide incubator and Market Force Sterilmatic autoclave.

Photograph Number	Description
UI-55-2022-111-351	TA-43-0001, basement, 1953 east wing, room B225, facing east.
UI-55-2022-111-355	TA-43-0001, basement, 1953 east wing, room B225, facing east.
UI-55-2022-111-359	TA-43-0001, basement, 1953 east wing, room B225, facing northwest.
UI-55-2022-111-342	TA-43-0001, basement, 1975 addition, corridor B200B, facing west.
UI-55-2022-111-349	TA-43-0001, basement, 1975 addition, corridor B200B, facing north. Detail of window.
UI-55-2022-111-361	TA-43-0001, basement, 1975 addition, room B218, facing south.
UI-55-2022-111-362	TA-43-0001, basement, 1975 addition, room B218, facing north.
UI-55-2022-111-365	TA-43-0001, basement, 1975 addition, room B218, facing west. Detail of laboratory glassware for column chromatography (dropping funnel), solid extraction (Soxhlet extractor), and liquid-liquid extraction (separating funnel).
UI-55-2022-111-366	TA-43-0001, basement, 1975 addition, room B218, facing west. Detail of laboratory glassware for distillation (Liebig condenser).
UI-55-2022-111-367	TA-43-0001, basement, 1975 addition, room B218, facing east. Detail of hotplate and laboratory glassware for reflux reactions (dropping funnel, 3 neck boiling flask, and Liebig condenser).
UI-55-2022-111-380	TA-43-0001, basement, 1975 addition, room B218, facing south toward B218A.
UI-55-2022-111-369	TA-43-0001, basement, 1975 addition, room B218, facing south into B218A.
UI-55-2022-111-379	TA-43-0001, basement, 1975 addition, room B218, facing southwest into B218A.
UI-55-2022-111-378	TA-43-0001, basement, 1975 addition, room B218, facing west.
UI-55-2022-111-370	TA-43-0001, basement, 1975 addition, room B218, facing south into B218A.
UI-55-2022-111-370	TA-43-0001, basement, 1975 addition, room B218A, facing west.
UI-55-2022-111-372	TA-43-0001, basement, 1975 addition, room B218A, facing west.
UI-55-2022-111-345	TA-43-0001, basement, 1975 addition, corridor B200B, facing east.
UI-55-2022-111-346	TA-43-0001, basement, 1975 addition, corridor B200B, facing east.
UI-55-2022-111-275	TA-43-0001, basement, 1953 east wing, room B238, facing east.
UI-55-2022-111-278	TA-43-0001, basement, 1953 east wing, room B238, facing west.
UI-55-2022-111-282	TA-43-0001, basement, 1953 east wing, room B238, detail of overhead transparency projector.
UI-55-2022-111-270	TA-43-0001, basement, 1953 east wing, corridor B200, facing southwest.
UI-55-2022-111-269	TA-43-0001, basement, 1953 east wing, corridor B200, facing west.
UI-55-2022-111-271	TA-43-0001, basement, 1953 east wing, corridor B200, facing northwest.
UI-55-2022-111-283	TA-43-0001, basement, 1953 south wing, corridor B100A, facing north.
UI-55-2022-112-6	TA-43-0001, basement, 1953 south wing, room B142, facing southwest.
UI-55-2022-112-4	TA-43-0001, basement, 1953 south wing, room B142, facing west.
UI-55-2022-112-9	TA-43-0001, basement, 1953 south wing, room B142, facing north.
UI-55-2022-112-11	TA-43-0001, basement, 1953 south wing, room B142B, facing east into room 142A.
UI-55-2022-112-14	TA-43-0001, basement, 1953 south wing, room B142B, facing west.
UI-55-2022-112-13	TA-43-0001, basement, 1953 south wing, room B142B, facing northwest.
UI-55-2022-112-22	TA-43-0001, basement, 1953 south wing, room B142B, facing north.

Photograph Number	Description
UI-55-2022-112-17	TA-43-0001, basement, 1953 south wing, room B142B, facing southeast.
UI-55-2022-112-20	TA-43-0001, basement, 1953 south wing, room B142B, facing east. Detail of window.
UI-55-2022-112-15	TA-43-0001, basement, 1953 south wing, room B142B, facing south.
UI-55-2022-112-25	TA-43-0001, basement, 1953 south wing, room B142B, facing southwest.
UI-55-2022-112-27	TA-43-0001, basement, 1953 south wing, room B142, facing east. Detail of power supply for wall clock.
UI-55-2022-111-187	TA-43-0001, basement, 1953 south wing, room B138B, facing north into room B138.
UI-55-2022-111-190	TA-43-0001, basement, 1953 south wing, room B138B, facing west.
UI-55-2022-111-194	TA-43-0001, basement, 1953 south wing, room B138B, facing northwest. Detail of J.L. Shepherd & Associates Model 8I Irradiator control panel and CCTV display.
UI-55-2022-111-193	TA-43-0001, basement, 1953 south wing, room B138B, facing northwest. Detail of overhead RCA CCTV monitor.
UI-55-2022-111-191	TA-43-0001, basement, 1953 south wing, room B138B, facing east toward corridor B100A.
UI-55-2022-111-188	TA-43-0001, basement, 1953 south wing, room B138B, facing south.
UI-55-2022-111-196	TA-43-0001, basement, 1953 south wing, room B138B, facing west into room B138C.
UI-55-2022-111-197	TA-43-0001, basement, 1953 south wing, room B138C, facing north.
UI-55-2022-111-199	TA-43-0001, basement, 1953 south wing, room B138C, facing southeast toward door to room B138B.
UI-55-2022-111-209	TA-43-0001, basement, 1953 south wing, room B138C, facing southeast. Detail of door to room B138B.
UI-55-2022-111-213	TA-43-0001, basement, 1953 south wing, room B138C, facing southeast. Detail of door to room B138B.
UI-55-2022-111-200	TA-43-0001, basement, 1953 south wing, room B138C, facing east.
UI-55-2022-111-202	TA-43-0001, basement, 1953 south wing, room B138C, facing southwest.
UI-55-2022-111-207	TA-43-0001, basement, 1953 south wing, room B138C, facing west.
UI-55-2022-111-205	TA-43-0001, basement, 1953 south wing, room B138C, facing up. Detail of overhead supports for radiological source experiments.
UI-55-2022-111-208	TA-43-0001, basement, 1953 south wing, room B138C, facing up. Detail of overhead supports for radiological source experiments.
UI-55-2022-111-224	TA-43-0001, basement, 1953 south wing, room B138, facing north.
UI-55-2022-111-224	TA-43-0001, basement, 1953 south wing, room B138, facing northwest.
UI-55-2022-111-215	TA-43-0001, basement, 1953 south wing, room B138, facing north.
UI-55-2022-111-216	TA-43-0001, basement, 1953 south wing, room B138, facing northwest.
UI-55-2022-111-219	TA-43-0001, basement, 1953 south wing, room B138, facing southeast.
UI-55-2022-111-218	TA-43-0001, basement, 1953 south wing, room B138, facing south.
UI-55-2022-111-223	TA-43-0001, basement, 1953 south wing, room B138, facing northwest into room B138A.

Photograph Number	Description
UI-55-2022-111-226	TA-43-0001, basement, 1953 south wing, room B138, facing west into room B138A.
UI-55-2022-111-227	TA-43-0001, basement, 1953 south wing, room B138A, facing south.
UI-55-2022-111-228	TA-43-0001, basement, 1953 south wing, room B138A, facing north. Door to room B138.
UI-55-2022-111-229	TA-43-0001, basement, 1953 south wing, room B138A, facing north. Detail of door to room B138.
UI-55-2022-111-236	TA-43-0001, basement, 1953 south wing, room B138A, facing northeast.
UI-55-2022-111-237	TA-43-0001, basement, 1953 south wing, room B138A, facing northeast.
UI-55-2022-111-238	TA-43-0001, basement, 1953 south wing, room B138A, facing east.
UI-55-2022-111-242	TA-43-0001, basement, 1953 south wing, room B138A, facing northwest.
UI-55-2022-111-239	TA-43-0001, basement, 1953 south wing, room B138A, facing northwest. Detail of shielding bricks.
UI-55-2022-111-240	TA-43-0001, basement, 1953 south wing, room B138A, facing northwest. Detail of overhead crane for radiological source experiments.
UI-55-2022-111-247	TA-43-0001, basement, 1953 south wing, room B138A, facing north.
UI-55-2022-111-245	TA-43-0001, basement, 1953 south wing, room B138A, facing north.
UI-55-2022-111-248	TA-43-0001, basement, 1953 south wing, room B138A, facing southwest.
UI-55-2022-111-251	TA-43-0001, basement, 1953 south wing, room B138A, facing southwest.
UI-55-2022-111-255	TA-43-0001, basement, 1953 south wing, room B138A, facing southwest. Detail of overhead crane for radiological source experiments and shielding bricks.
UI-55-2022-111-254	TA-43-0001, basement, 1953 south wing, room B138A, facing west. Detail of shielding bricks and tank storage mounts.
UI-55-2022-111-252	TA-43-0001, basement, 1953 south wing, room B138A, facing west north of equipment.
UI-55-2022-111-257	TA-43-0001, basement, 1953 south wing, room B138A, facing west south of equipment.
UI-55-2022-111-259	TA-43-0001, basement, 1953 south wing, room B138A, facing east south of equipment.
UI-55-2022-111-260	TA-43-0001, basement, 1953 south wing, room B138A, facing east south of equipment.
UI-55-2022-111-261	TA-43-0001, basement, 1953 south wing, room B138A, facing west south of equipment.
UI-55-2022-111-262	TA-43-0001, basement, 1953 south wing, room B138A, facing east. Detail of panic button and radiological alarm system
UI-55-2022-111-257	TA-43-0001, basement, 1953 south wing, room B138A, facing west south of equipment.
UI-55-2022-111-263	TA-43-0001, basement, 1953 south wing, door to room B128. Hand-painted numbering on door.
UI-55-2022-111-264	TA-43-0001, basement, 1953 south wing, door to room B128. Detail of a Disenfectaire brand UV germicidal vent, built by The Art Metal Company, Cleveland, OH, above door.
UI-55-2022-111-415	TA-43-0001, basement, 1953 south wing, room B126, facing south.

Photograph Number	Description
UI-55-2022-111-416	TA-43-0001, basement, 1953 south wing, room B126, facing southwest.
UI-55-2022-111-417	TA-43-0001, basement, 1953 south wing, room B126, facing west.
UI-55-2022-111-418	TA-43-0001, basement, 1953 south wing, room B126, facing northwest.
UI-55-2022-111-422	TA-43-0001, basement, 1953 south wing, room B126, facing northeast.
UI-55-2022-111-421	TA-43-0001, basement, 1953 south wing, room B126, facing east.
UI-55-2022-111-423	TA-43-0001, basement, 1953 south wing, room B126, facing southeast.
UI-55-2022-111-424	TA-43-0001, basement, 1953 south wing, room B126, facing south.
UI-55-2022-111-426	TA-43-0001, basement, 1953 south wing, room B126, facing east.
UI-55-2022-111-425	TA-43-0001, basement, 1953 south wing, room B126, facing southeast.
UI-55-2022-111-431	TA-43-0001, basement, 1953 south wing, room B126, facing southeast. Close-up of fume hood.
UI-55-2022-111-429	TA-43-0001, basement, 1953 south wing, room B126, facing west.
UI-55-2022-111-428	TA-43-0001, basement, 1953 south wing, room B126, facing north.
UI-55-2022-111-427	TA-43-0001, basement, 1953 south wing, room B126, facing northeast.
UI-55-2022-111-435	TA-43-0001, basement, 1953 south wing, room B126A, facing south.
UI-55-2022-111-440	TA-43-0001, basement, 1953 south wing, room B126A, facing east.
UI-55-2022-111-433	TA-43-0001, basement, 1953 south wing, room B126A, facing south.
UI-55-2022-111-439	TA-43-0001, basement, 1953 south wing, room B126A, facing southwest.
UI-55-2022-111-436	TA-43-0001, basement, 1953 south wing, room B126A, facing southwest.
UI-55-2022-111-435	TA-43-0001, basement, 1953 south wing, room B126A, facing south.
UI-55-2022-111-437	TA-43-0001, basement, 1953 south wing, room B126A, facing north.
UI-55-2022-111-442	TA-43-0001, basement, 1953 south wing, room B126C, facing south.
UI-55-2022-111-443	TA-43-0001, basement, 1953 south wing, room B126C, facing north.
UI-55-2022-111-446	TA-43-0001, basement, 1953 south wing, room B126C, facing north. Detail of cabinets.
UI-55-2022-111-447	TA-43-0001, basement, 1953 south wing, room B126C, facing southwest. Detail of cabinets.
UI-55-2022-111-383	TA-43-0001, basement, 1953 north wing, stairwell 2, second floor landing, facing north.
UI-55-2022-111-385	TA-43-0001, basement, 1953 north wing, stairwell 2, middle landing, facing south.
UI-55-2022-111-387	TA-43-0001, basement, 1953 north wing, corridor B100P, facing west.
UI-55-2022-111-394	TA-43-0001, basement, 1953 north wing, room B114, facing northwest.
UI-55-2022-111-390	TA-43-0001, basement, 1997 addition, corridor B100P, facing east.
UI-55-2022-111-396	TA-43-0001, basement, 1997 addition, room B266, facing northwest.
UI-55-2022-111-400	TA-43-0001, basement, 1997 addition, room B266, facing west.
UI-55-2022-111-401	TA-43-0001, basement, 1997 addition, room B266, facing northwest.
UI-55-2022-111-404	TA-43-0001, basement, 1997 addition, room B266, facing north.
UI-55-2022-111-406	TA-43-0001, basement, 1997 addition, room B266, facing north.
UI-55-2022-111-405	TA-43-0001, basement, 1997 addition, room B266, facing northeast.
UI-55-2022-111-407	TA-43-0001, basement, 1997 addition, room B266, facing south.

Photograph Number	Description
UI-55-2022-111-398	TA-43-0001, basement, 1997 addition, room B266, facing southeast.
UI-55-2022-111-408	TA-43-0001, basement, 1997 addition, room B266, facing west.
UI-55-2022-111-409	TA-43-0001, basement, 1997 addition, room B266, facing west.
UI-55-2022-111-408	TA-43-0001, basement, 1997 addition, room B266, facing west. Close-up of cabinets.
UI-55-2022-111-412	TA-43-0001, basement, 1997 addition, room B266, facing east.
UI-55-2022-111-111	TA-43-0001, basement, 1960 addition, corridor B100I, facing south.
UI-55-2022-111-120	TA-43-0001, basement, 1960 addition, room B193, facing southwest.
UI-55-2022-111-120	TA-43-0001, basement, 1960 addition, room B193, facing west into shower changing area.
UI-55-2022-111-124	TA-43-0001, basement, 1960 addition, room B193, facing north into shower.
UI-55-2022-111-126	TA-43-0001, basement, 1960 addition, room B193, facing north.
UI-55-2022-111-121	TA-43-0001, basement, 1960 addition, room B193, facing east into corridor B100I.
UI-55-2022-111-127	TA-43-0001, basement, 1960 addition, room B193, facing northwest.
UI-55-2022-111-130	TA-43-0001, basement, 1960 addition, room B193, facing southeast.
UI-55-2022-111-131	TA-43-0001, basement, 1960 addition, room B193, facing east.
UI-55-2022-111-134	TA-43-0001, basement, 1960 addition, room B193, facing south.
UI-55-2022-111-141	TA-43-0001, basement, 1960 addition, room B199, facing east.
UI-55-2022-111-136	TA-43-0001, basement, 1960 addition, room B199, facing southeast.
UI-55-2022-111-138	TA-43-0001, basement, 1960 addition, room B199, facing southeast.
UI-55-2022-111-142	TA-43-0001, basement, 1960 addition, room B199, facing east.
UI-55-2022-111-143	TA-43-0001, basement, 1960 addition, room B199, facing northeast.
UI-55-2022-111-146	TA-43-0001, basement, 1960 addition, room B199, facing east.
UI-55-2022-111-149	TA-43-0001, basement, 1960 addition, room B199, facing south.
UI-55-2022-111-152	TA-43-0001, basement, 1960 addition, room B199, facing north.
UI-55-2022-111-145	TA-43-0001, basement, 1960 addition, room B199, facing southeast.
UI-55-2022-111-155	TA-43-0001, basement, 1960 addition, room B199, facing south.
UI-55-2022-111-154	TA-43-0001, basement, 1960 addition, room B199, facing west.
UI-55-2022-111-139	TA-43-0001, basement, 1960 addition, room B199, facing southwest.
UI-55-2022-111-153	TA-43-0001, basement, 1960 addition, room B199, facing northwest.
UI-55-2022-111-157	TA-43-0001, basement, 1960 addition, room B199, facing northwest.
UI-55-2022-111-140	TA-43-0001, basement, 1960 addition, room B199, facing north.
UI-55-2022-111-116	TA-43-0001, basement, 1960 addition, corridor B100K, facing north.
UI-55-2022-111-161	TA-43-0001, basement, 1960 addition, corridor B100L, facing southwest.
UI-55-2022-111-160	TA-43-0001, basement, 1960 addition, corridor B100L, facing west.
UI-55-2022-111-166	TA-43-0001, basement, 1960 addition, corridor B100L, facing south. Detail of dog kennel.
UI-55-2022-111-167	TA-43-0001, basement, 1960 addition, corridor B100L, facing south. Detail of dog kennel.

Photograph Number	Description
UI-55-2022-111-172	TA-43-0001, basement, 1960 addition, corridor B100L, facing south. Detail of dog kennel.
UI-55-2022-111-169	TA-43-0001, basement, 1960 addition, corridor B100L, facing southwest. Detail of dog kennel.
UI-55-2022-111-171	TA-43-0001, basement, 1960 addition, corridor B100L, facing southeast. Detail of dog kennel.
UI-55-2022-111-173	TA-43-0001, basement, 1960 addition, corridor B100L, facing southwest. Detail of dog kennel.
UI-55-2022-111-169	TA-43-0001, basement, 1960 addition, corridor B100L, facing east.
UI-55-2022-111-164	TA-43-0001, basement, 1960 addition, corridor B100L, facing southeast.
UI-55-2022-111-176	TA-43-0001, basement, 1960 addition, corridor B100M, facing southwest.
UI-55-2022-111-175	TA-43-0001, basement, 1960 addition, corridor B100M, facing west.
UI-55-2022-111-177	TA-43-0001, basement, 1960 addition, corridor B100M, facing northwest.
UI-55-2022-111-181	TA-43-0001, basement, 1960 addition, corridor B100M, facing northeast. Detail of speaker.
UI-55-2022-111-182	TA-43-0001, basement, 1960 addition, corridor B100M, facing north. Detail of speaker.
UI-55-2022-111-180	TA-43-0001, basement, 1960 addition, corridor B100M, facing east.
UI-55-2022-111-179	TA-43-0001, basement, 1960 addition, corridor B100M, facing southeast.
UI-55-2022-111-459	TA-43-0001, basement, 1960 addition, room B159, facing south.
UI-55-2022-111-466	TA-43-0001, basement, 1960 addition, room B159, facing northeast.
UI-55-2022-111-469	TA-43-0001, basement, 1960 addition, room B155, facing west.
UI-55-2022-111-470	TA-43-0001, basement, 1960 addition, room B155, facing northwest.
UI-55-2022-111-472	TA-43-0001, basement, 1960 addition, room B155, facing northeast.
UI-55-2022-111-475	TA-43-0001, basement, 1960 addition, room B155, facing southeast.
UI-55-2022-111-480	TA-43-0001, basement, 1960 addition, room B155, facing south.
UI-55-2022-111-479	TA-43-0001, basement, 1960 addition, room B155, facing southwest.
UI-55-2022-111-478	TA-43-0001, basement, 1960 addition, room B155, facing southwest.
INTERIOR - SUBBASEMENT	
UI-55-2022-111-1	TA-43-0001, subbasement, room SB5, facing north.
UI-55-2022-111-2	TA-43-0001, subbasement, room SB5, facing northwest.
UI-55-2022-111-3	TA-43-0001, subbasement, room SB5, facing northeast.
UI-55-2022-111-4	TA-43-0001, subbasement, room SB5, facing west.
UI-55-2022-111-8	TA-43-0001, subbasement, room SB5, facing south.
UI-55-2022-111-6	TA-43-0001, subbasement, room SB5, facing southeast.
UI-55-2022-111-5	TA-43-0001, subbasement, room SB5, facing south.
UI-55-2022-111-7	TA-43-0001, subbasement, room SB5, facing southwest.
UI-55-2022-111-10	TA-43-0001, subbasement, room SB10, facing northwest.
UI-55-2022-111-9	TA-43-0001, subbasement, room SB5, facing north.
UI-55-2022-111-11	TA-43-0001, subbasement, room SB5, facing northeast.

Photograph Number	Description
UI-55-2022-111-109	TA-43-0001, subbasement, room SB5, facing west. Detail of Trane boiler equipment.
UI-55-2022-111-110	TA-43-0001, subbasement, room SB5, facing west. Detail of Trane boiler equipment.
UI-55-2022-111-108	TA-43-0001, subbasement, room SB5, facing west. Detail of hand-painted lettering on door.
UI-55-2022-111-106	TA-43-0001, subbasement, room SB5, facing east. Close-up of boiler water and steam piping.
UI-55-2022-111-13	TA-43-0001, subbasement, room SB5, facing southeast.
UI-55-2022-111-12	TA-43-0001, subbasement, room SB5, facing south.
UI-55-2022-111-14	TA-43-0001, subbasement, room SB5, facing southwest.
UI-55-2022-111-96	TA-43-0001, subbasement, room SB16A, facing west into room SB16.
UI-55-2022-111-97	TA-43-0001, subbasement, room SB16A, facing west into room SB16.
UI-55-2022-111-71	TA-43-0001, subbasement, room SB16, facing west.
UI-55-2022-111-73	TA-43-0001, subbasement, room SB16, facing northeast.
UI-55-2022-111-72	TA-43-0001, subbasement, room SB16, facing east.
UI-55-2022-111-78	TA-43-0001, subbasement, room SB16, facing southeast.
UI-55-2022-111-79	TA-43-0001, subbasement, room SB16, facing south.
UI-55-2022-111-81	TA-43-0001, subbasement, room SB16, facing northeast.
UI-55-2022-111-82	TA-43-0001, subbasement, room SB16, facing northwest.
UI-55-2022-111-104	TA-43-0001, subbasement, room SB16, facing southwest into room SB16D.
UI-55-2022-111-85	TA-43-0001, subbasement, room SB16D, facing southwest.
UI-55-2022-111-87	TA-43-0001, subbasement, room SB16D, facing west.
UI-55-2022-111-92	TA-43-0001, subbasement, room SB16D, facing southwest. Detail of HUMCO scintillator detector control arms.
UI-55-2022-111-91	TA-43-0001, subbasement, room SB16D, facing northwest. Detail of HUMCO scintillator detector control arms.
UI-55-2022-111-88	TA-43-0001, subbasement, room SB16D, facing northeast.
UI-55-2022-111-89	TA-43-0001, subbasement, room SB16D, facing east.
UI-55-2022-111-90	TA-43-0001, subbasement, room SB16D, facing east.
UI-55-2022-111-98	TA-43-0001, subbasement, room SB16A, facing southwest toward room SB16B.
UI-55-2022-111-95	TA-43-0001, subbasement, room SB16B, facing east.
UI-55-2022-111-57	TA-43-0001, subbasement, room SB16E, facing west.
UI-55-2022-111-59	TA-43-0001, subbasement, room SB16E, facing southeast.
UI-55-2022-111-58	TA-43-0001, subbasement, room SB16E, facing southwest.
UI-55-2022-111-60	TA-43-0001, subbasement, room SB16, facing northeast.
UI-55-2022-111-65	TA-43-0001, subbasement, room SB16E, facing west.
UI-55-2022-111-68	TA-43-0001, subbasement, room SB16E. Detail of light fixture.
UI-55-2022-111-105	TA-43-0001, subbasement, room SB10, facing south.
UI-55-2022-111-15	TA-43-0001, subbasement, room SB14, facing north.

Photograph Number	Description
UI-55-2022-111-15	TA-43-0001, subbasement, room SB14, facing north.
UI-55-2022-111-21	TA-43-0001, subbasement, room SB14, facing northeast.
UI-55-2022-111-22	TA-43-0001, subbasement, room SB14, facing northeast. Detail of doorstop.
UI-55-2022-111-24	TA-43-0001, subbasement, room SB14, facing south.
UI-55-2022-111-29	TA-43-0001, subbasement, room SB14, facing southwest.
UI-55-2022-111-28	TA-43-0001, subbasement, room SB14, facing south.
UI-55-2022-111-26	TA-43-0001, subbasement, room SB14, facing southeast.
UI-55-2022-111-38	TA-43-0001, subbasement, room SB14, facing northwest.
UI-55-2022-111-37	TA-43-0001, subbasement, room SB14, facing west.
UI-55-2022-111-31	TA-43-0001, subbasement, room SB14A, facing west.
UI-55-2022-111-32	TA-43-0001, subbasement, room SB14A, facing southeast.
UI-55-2022-111-33	TA-43-0001, subbasement, room SB14A, facing south.
UI-55-2022-111-34	TA-43-0001, subbasement, room SB14A, facing southwest. Detail of overhead rails and coaxial cables.
UI-55-2022-111-35	TA-43-0001, subbasement, room SB14A, facing south. Detail of whole body counter control panel for gamma ray spectroscopy.
UI-55-2022-111-36	TA-43-0001, subbasement, room SB14A, facing southwest. Detail of floor.
UI-55-2022-111-39	TA-43-0001, subbasement, room SB14, facing west to south of room SB14A.
UI-55-2022-111-40	TA-43-0001, subbasement, room SB14, facing west to south of room SB14A.
UI-55-2022-111-41	TA-43-0001, subbasement, room SB14, facing east to south of room SB14A.
UI-55-2022-111-43	TA-43-0001, subbasement, room SB14, facing east to south of room SB14A.
UI-55-2022-111-42	TA-43-0001, subbasement, room SB14, facing north behind room SB14A.
UI-55-2022-111-44	TA-43-0001, subbasement, room SB14, facing north behind room SB14A.
UI-55-2022-111-45	TA-43-0001, subbasement, room SB14, facing south behind room SB14A.
UI-55-2022-111-46	TA-43-0001, subbasement, room SB14, facing south behind room SB14A.
UI-55-2022-111-47	TA-43-0001, subbasement, room SB14, facing east behind room SB14A.
UI-55-2022-111-48	TA-43-0001, subbasement, room SB14, facing east behind room SB14A.
UI-55-2022-111-49	TA-43-0001, subbasement, room SB14, facing west behind room SB14A.
UI-55-2022-111-50	TA-43-0001, subbasement, room SB14, facing west behind room SB14A.
UI-55-2022-111-51	TA-43-0001, subbasement, room SB14, facing east. Detail of light fixture.
UI-55-2022-111-52	TA-43-0001, subbasement, room SB14. Detail of painted steel walls of room SB14A.
UI-55-2022-111-53	TA-43-0001, subbasement, room SB14. Detail of painted steel walls of room SB14A.
UI-55-2022-111-54	TA-43-0001, subbasement, room SB14. Detail of painted steel walls of room SB14A.
UI-55-2022-111-55	TA-43-0001, subbasement, room SB14. Detail of painted steel walls of room SB14A.

Exterior and Interior Archival Photographs

20211014F01_RANGER_SR5189507_DTH_0008

20211014F02_RANGER_SR5189507_DTH_0026

20211014F02_RANGER_SR5189507_DTH_0013

20211014F02_RANGER_SR5189507_DTH_0005

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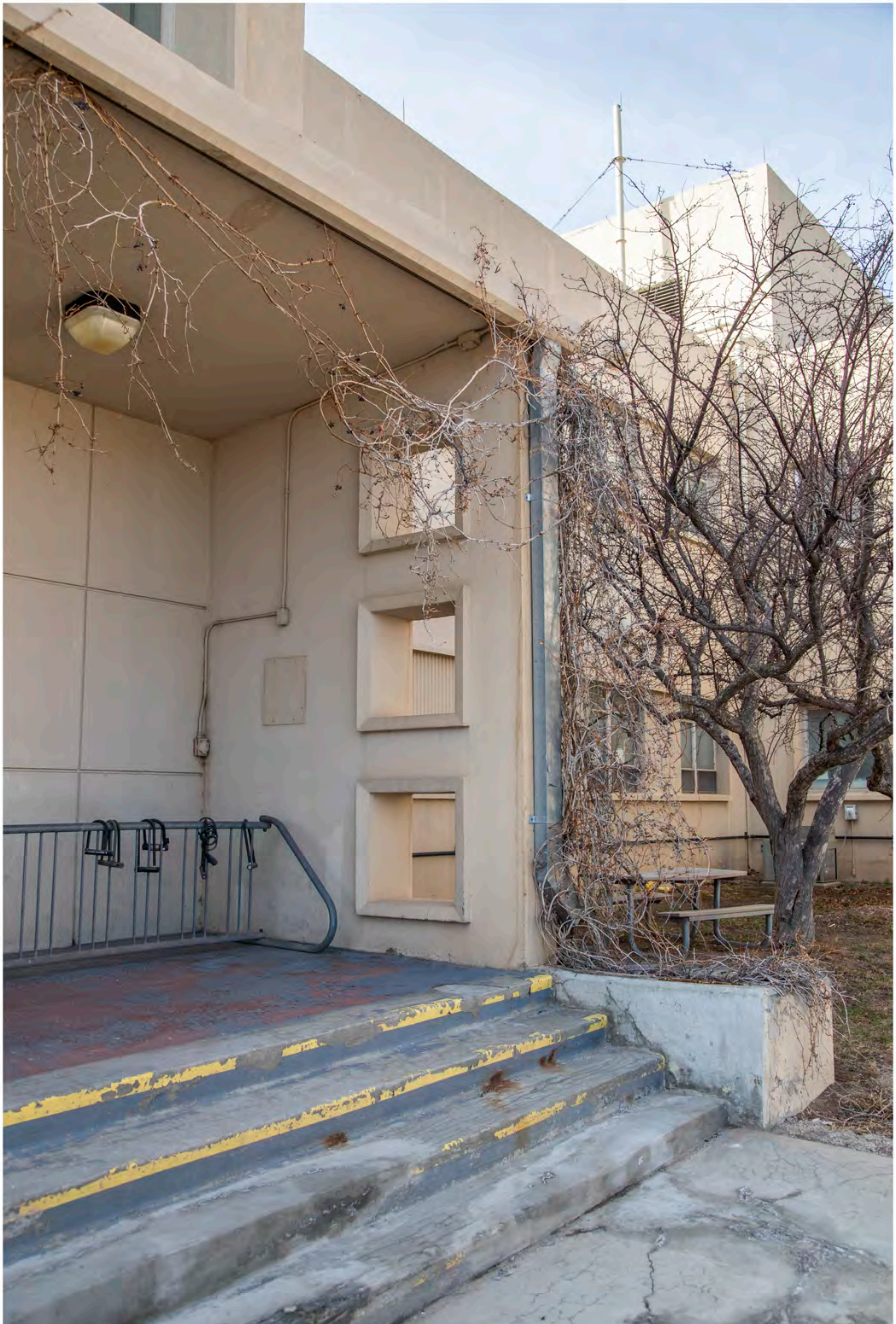
UI-55-2022-79-2

UI-55-2022-79-5

UI-55-2022-79-4



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UI-55-2022-79-16

UI-55-2022-79-15

UI-55-2022-79-19

UI-55-2022-79-20

UI-55-2022-79-21

UI-55-2022-79-22

UI-55-2022-79-24

UI-55-2022-79-25

UI-55-2022-79-26

UI-55-2022-79-27

UI-55-2022-79-28

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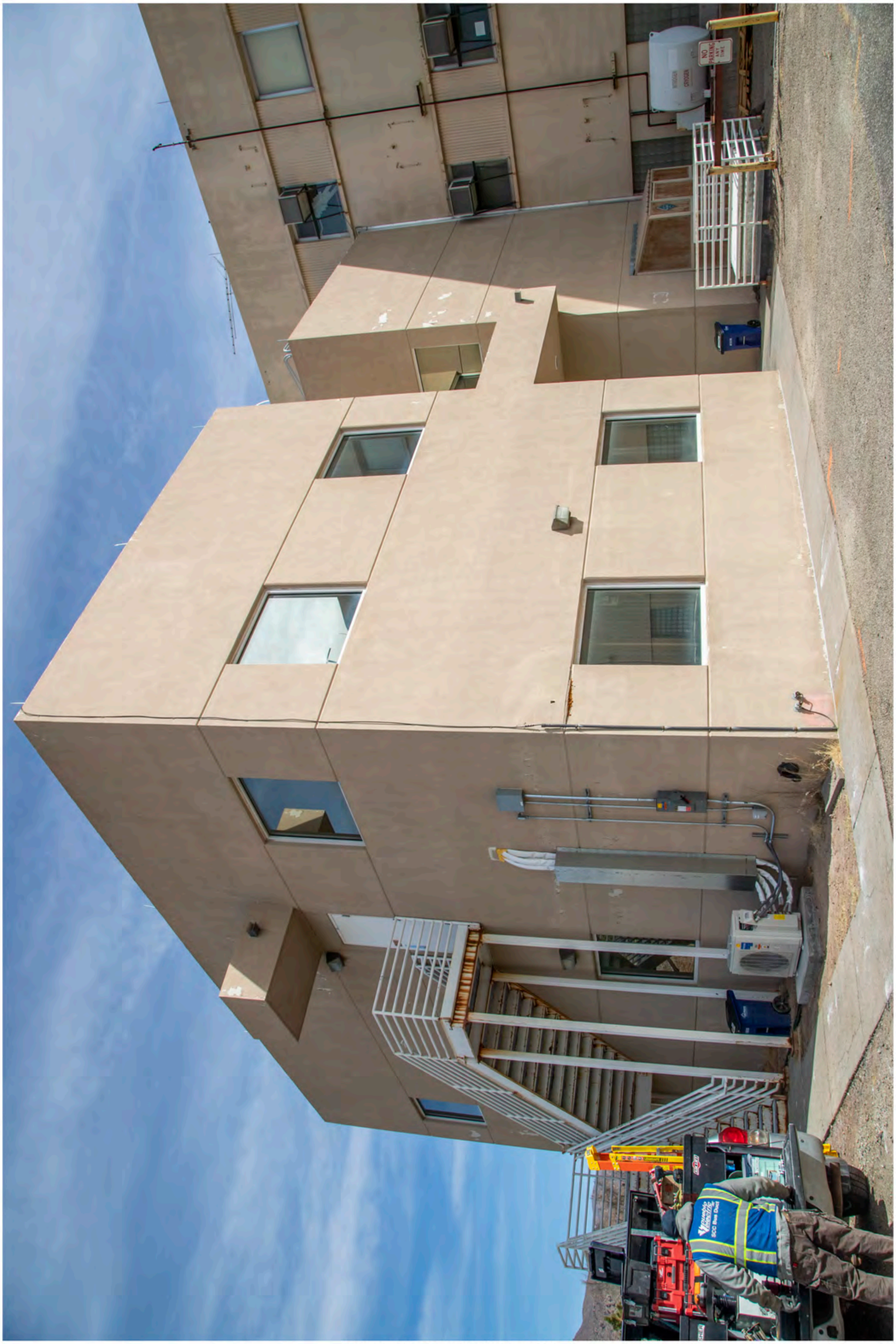

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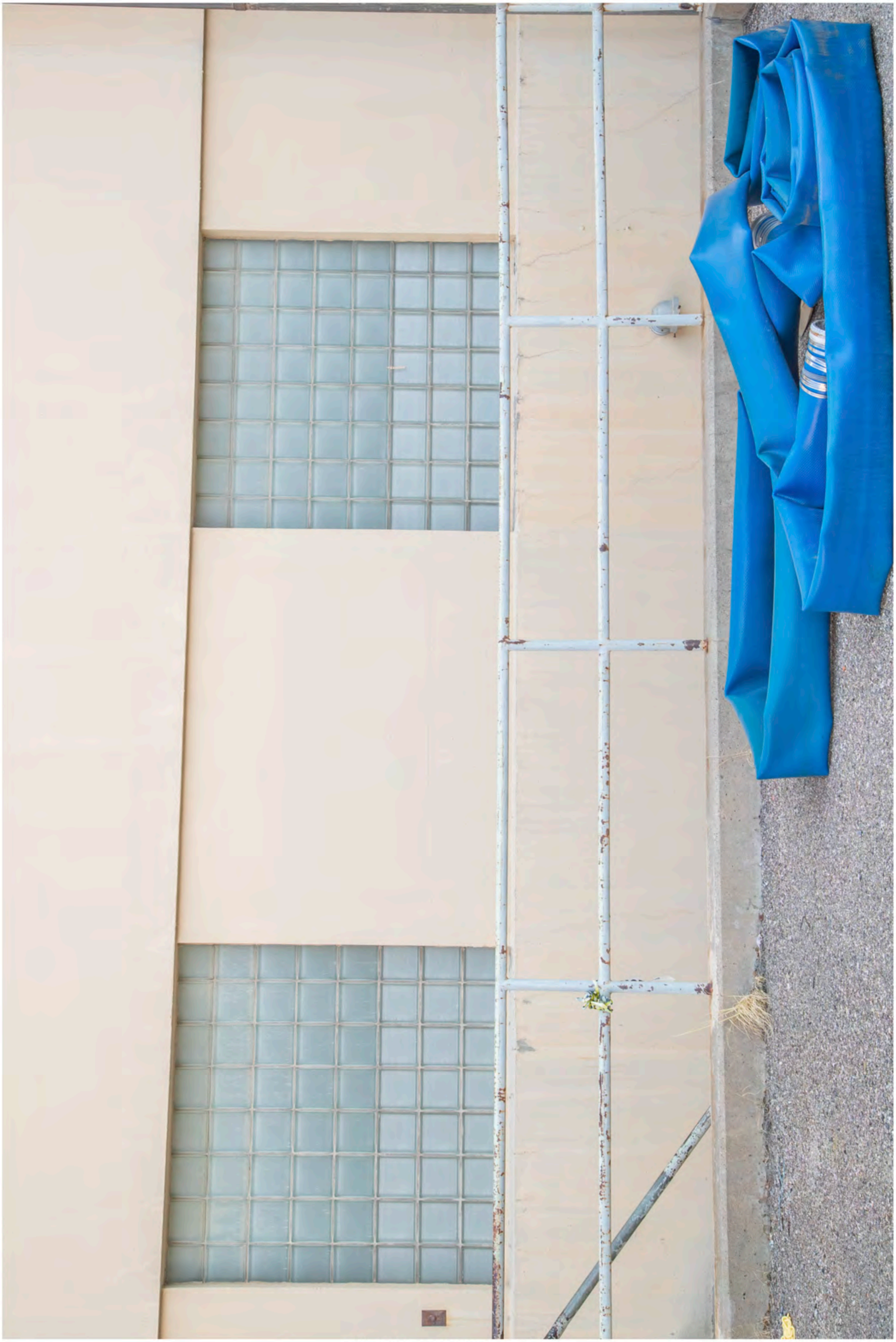

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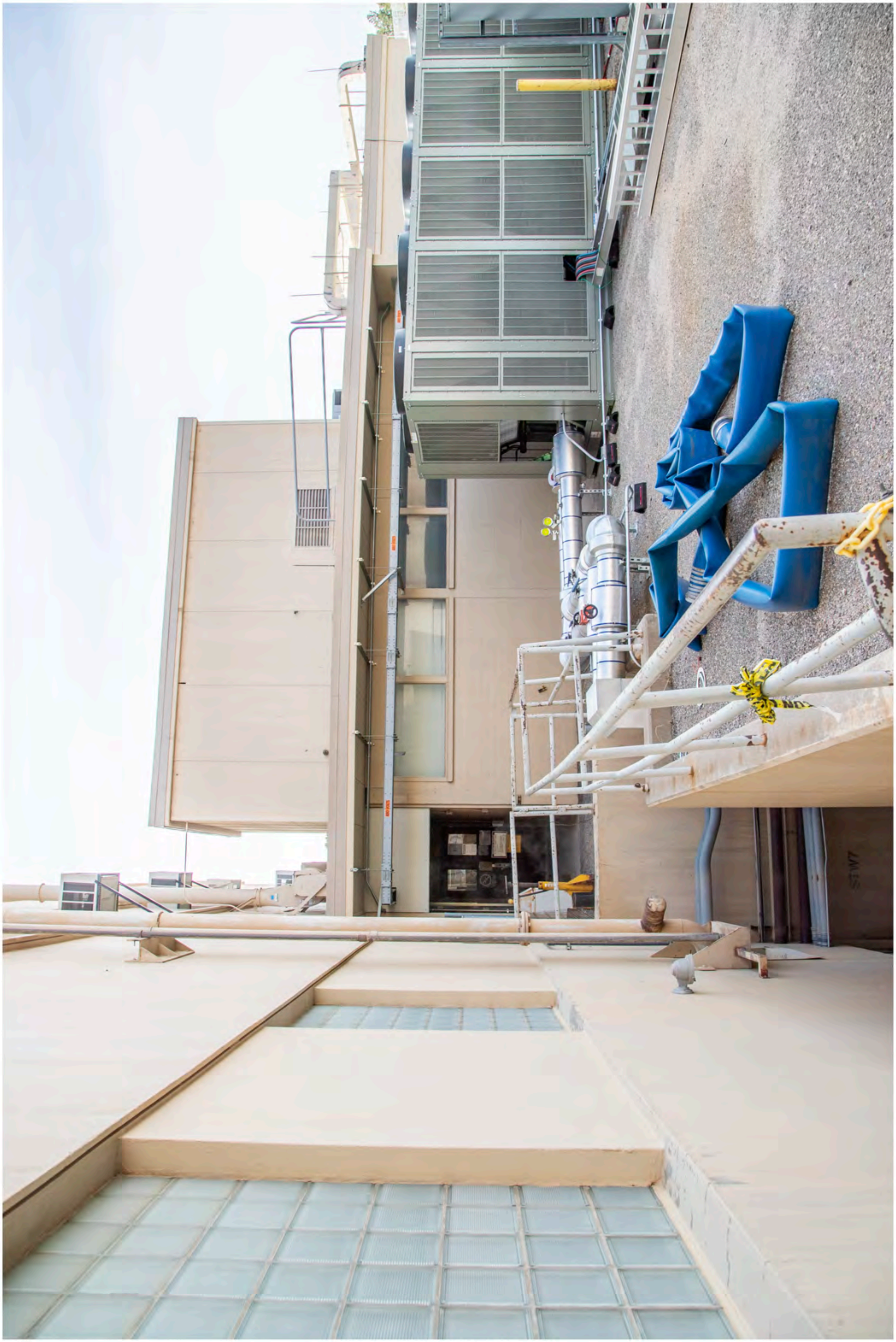

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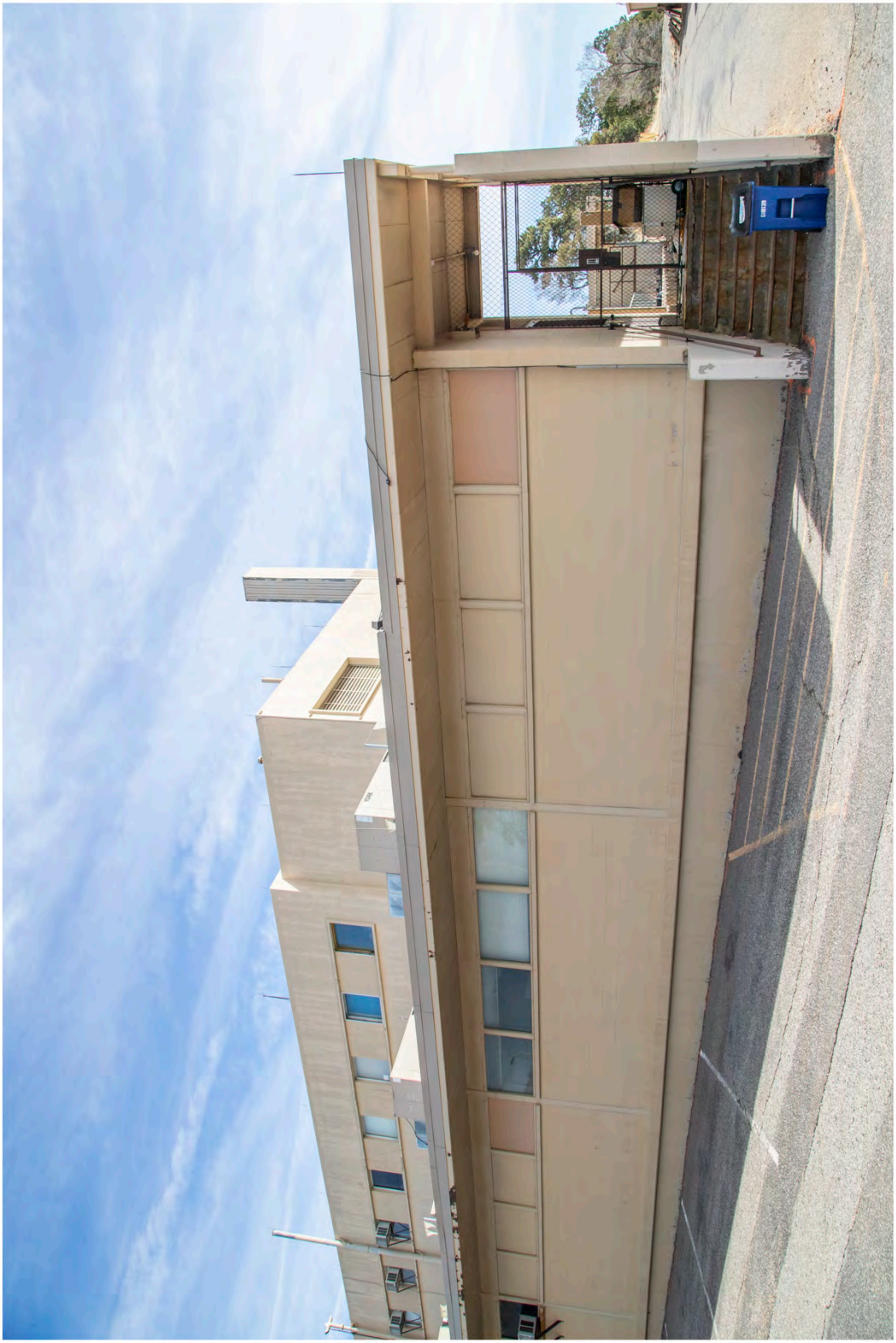
UI-55-2022-79-55



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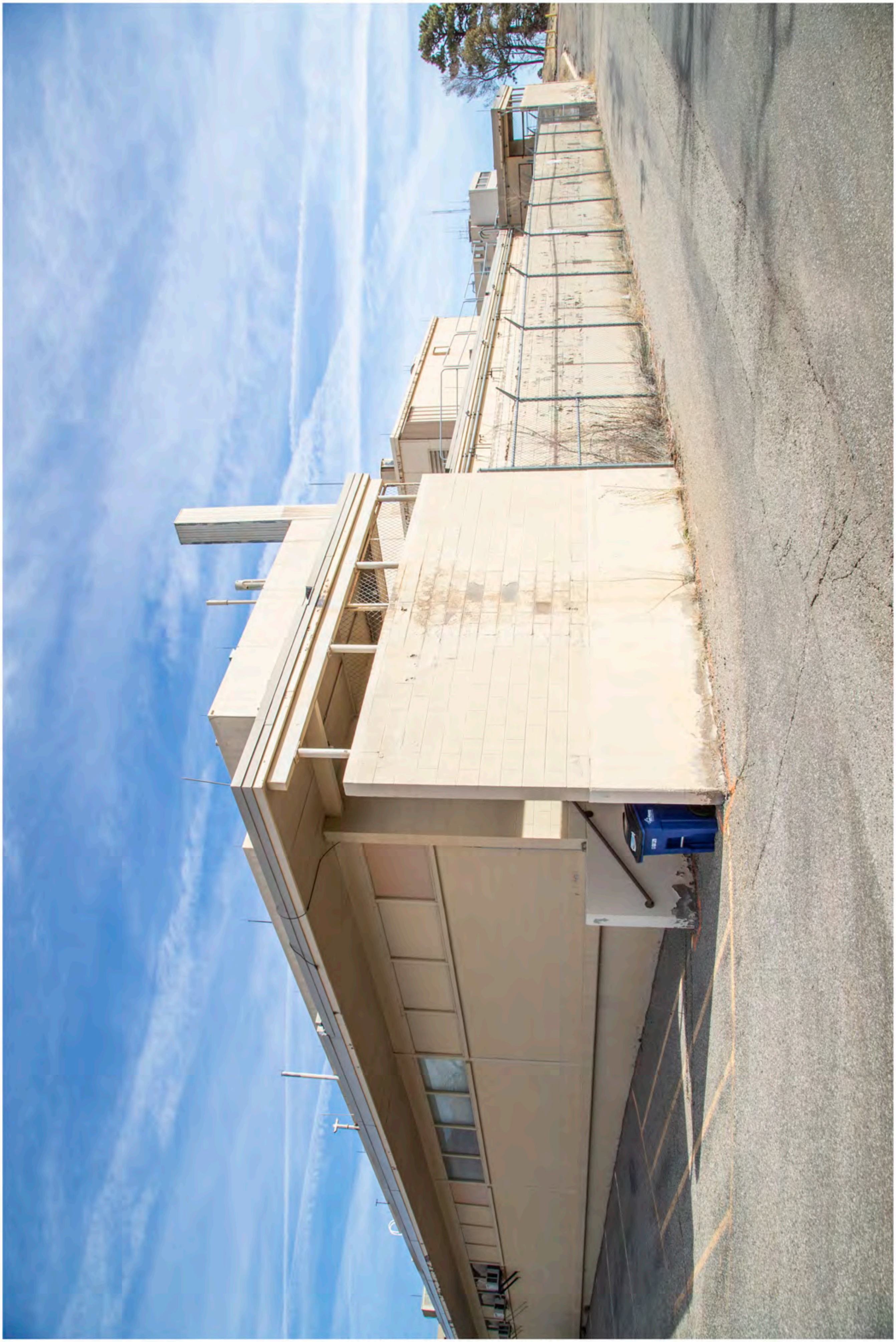

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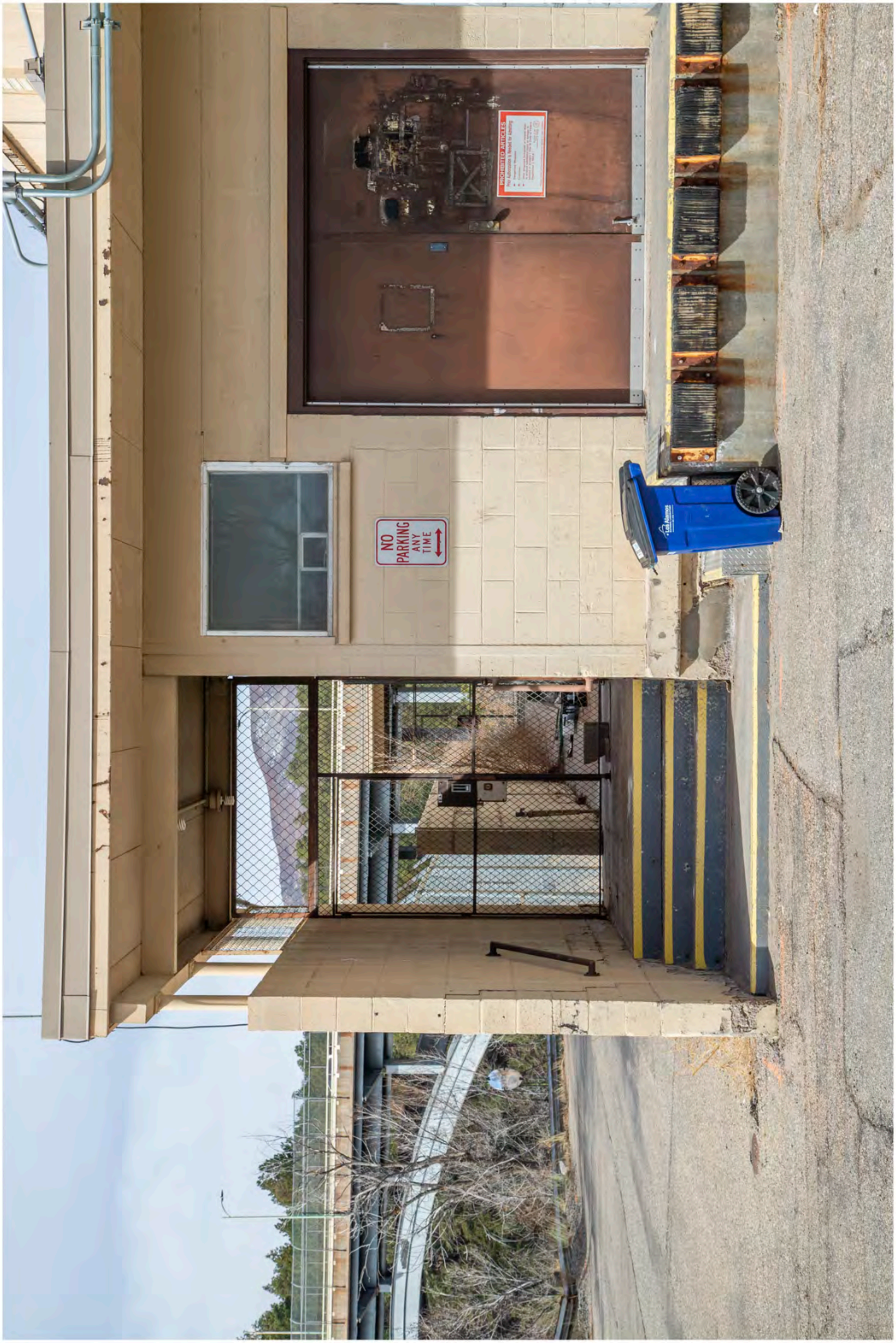

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UI-55-2022-79-75


T052
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C044

UI-55-2022-79-79

UI-55-2022-79-80

UI-55-2022-79-81

UI-55-2022-79-82

UI-55-2022-79-95

UI-55-2022-79-83

UI-55-2022-79-84

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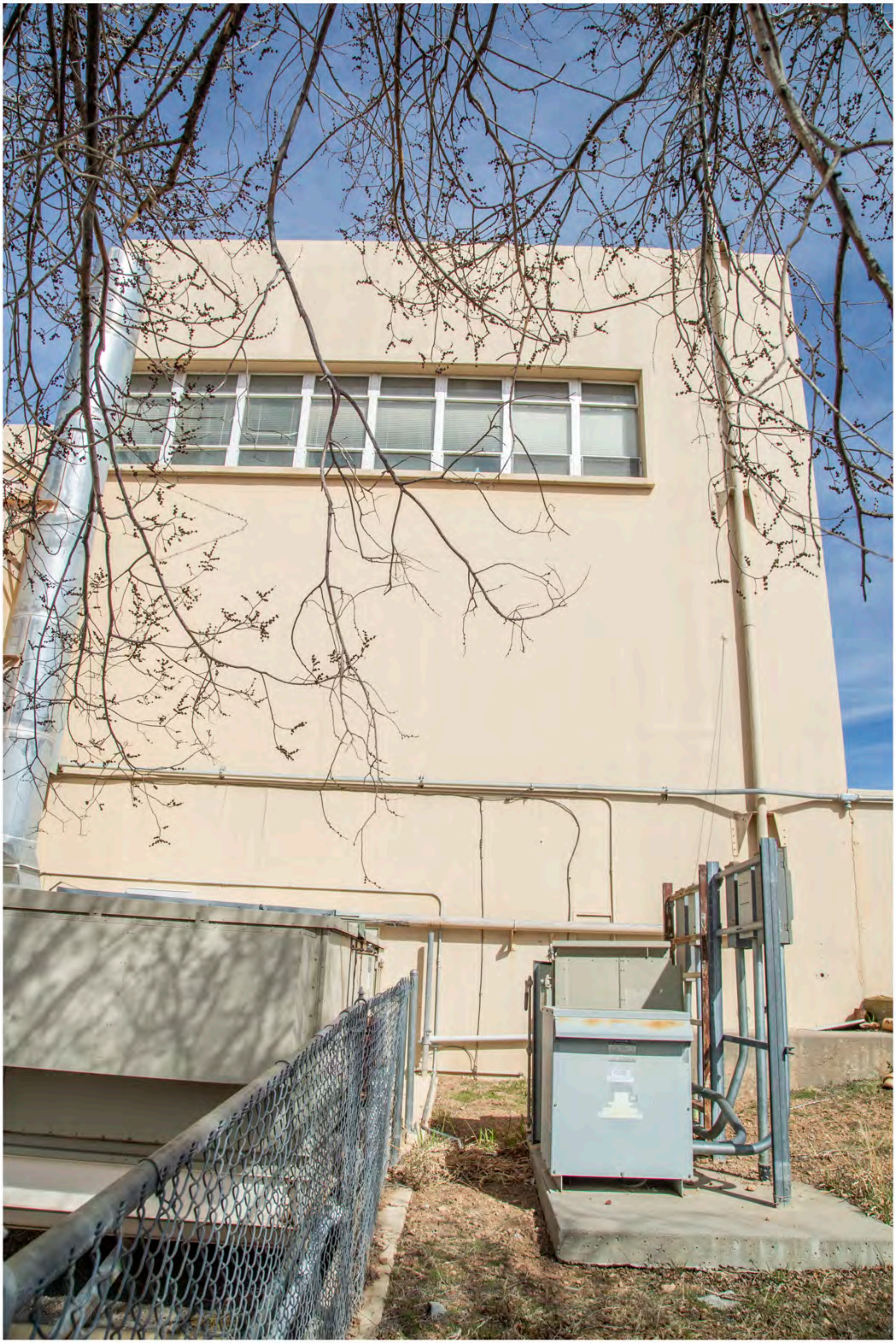
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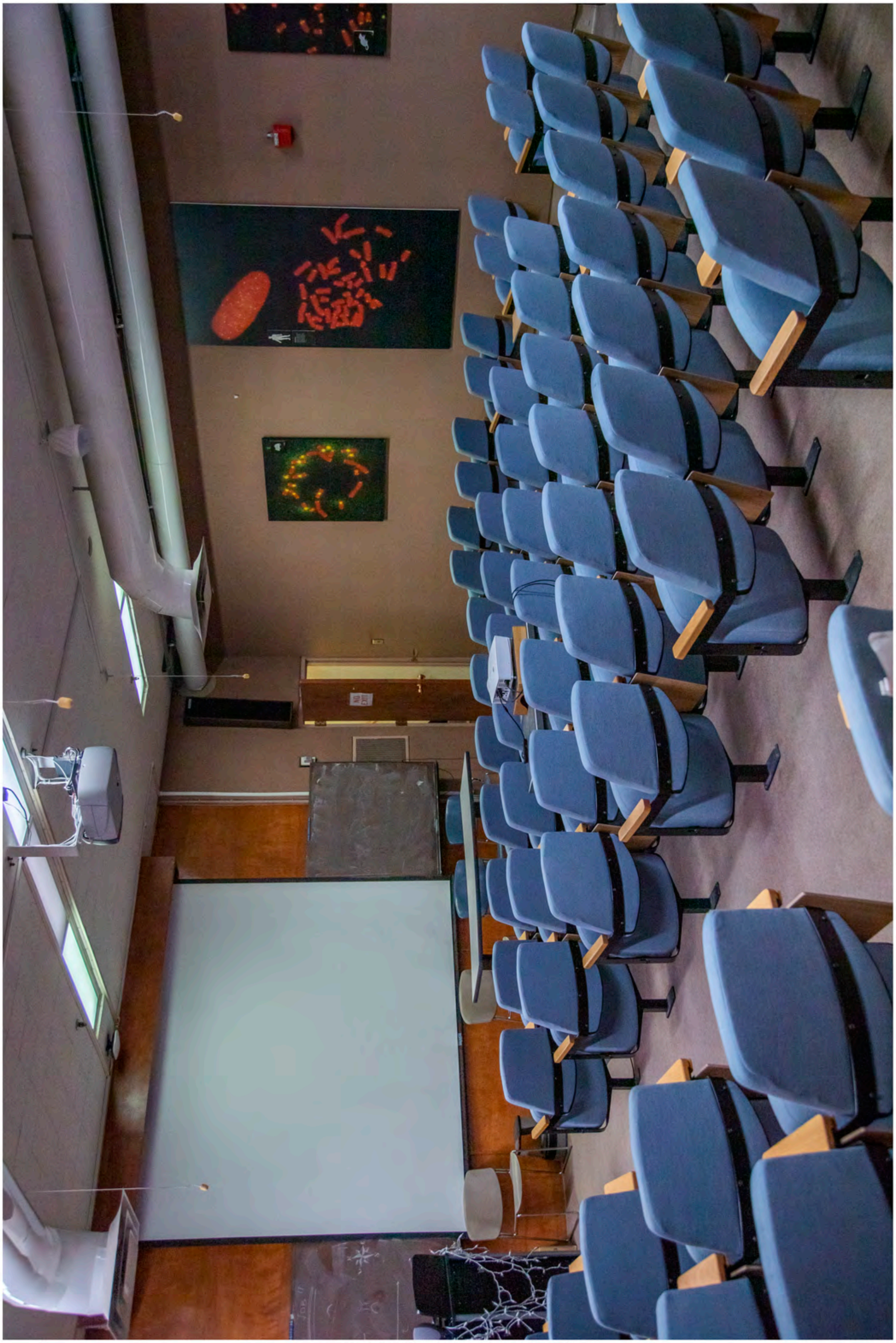
UI-55-2022-112-273

UI-55-2022-112-274

UI-55-2022-112-275

UI-55-2022-112-276



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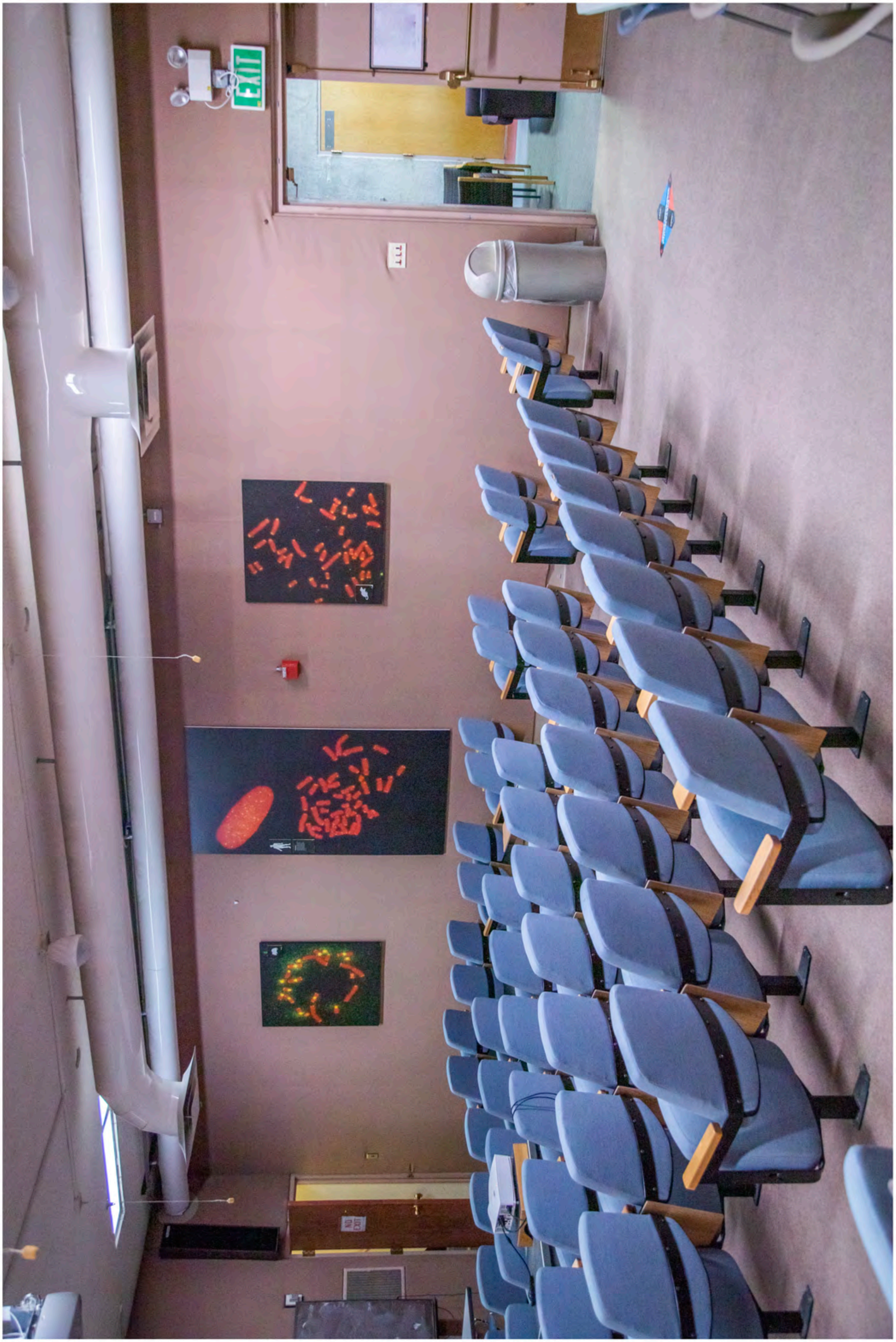
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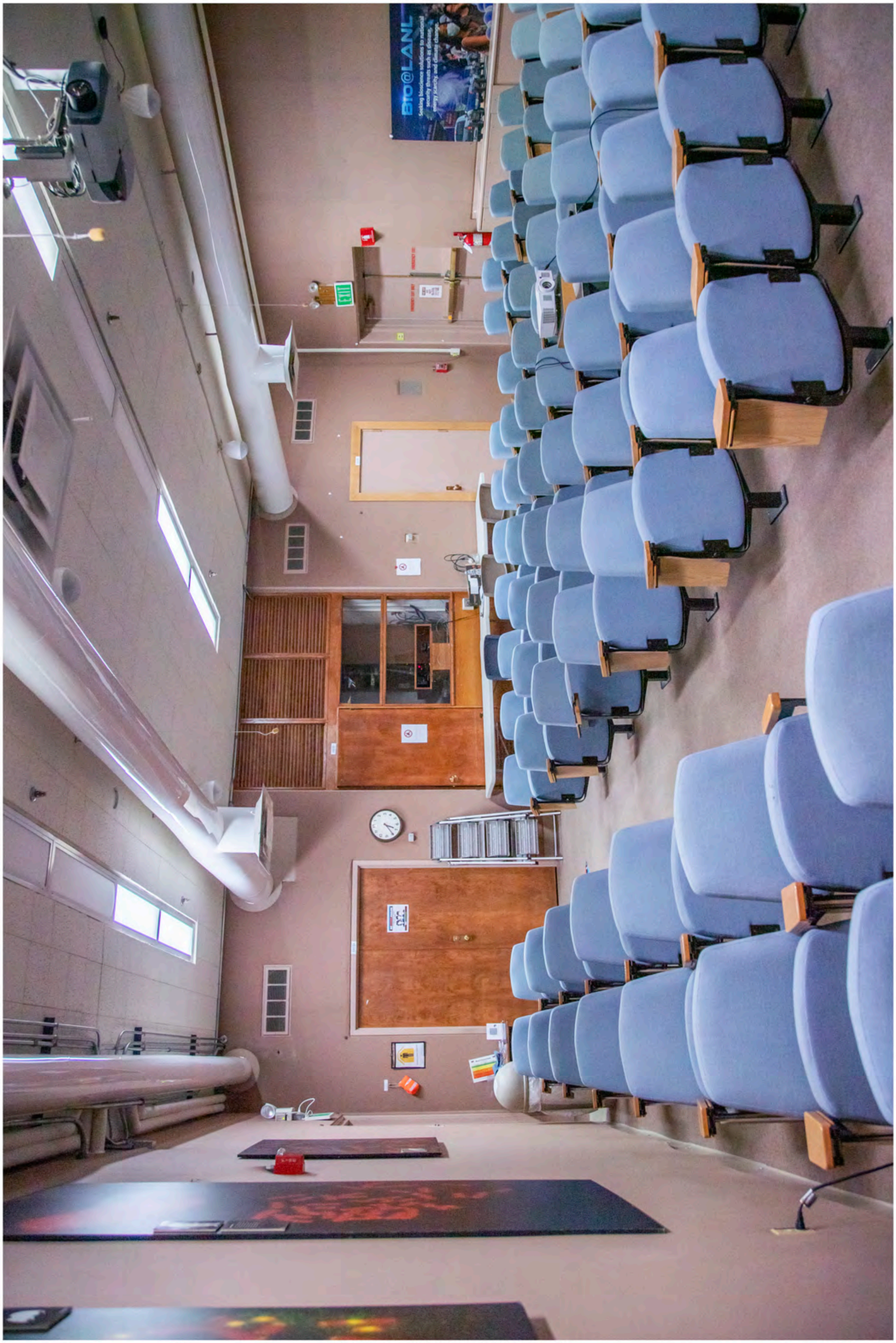

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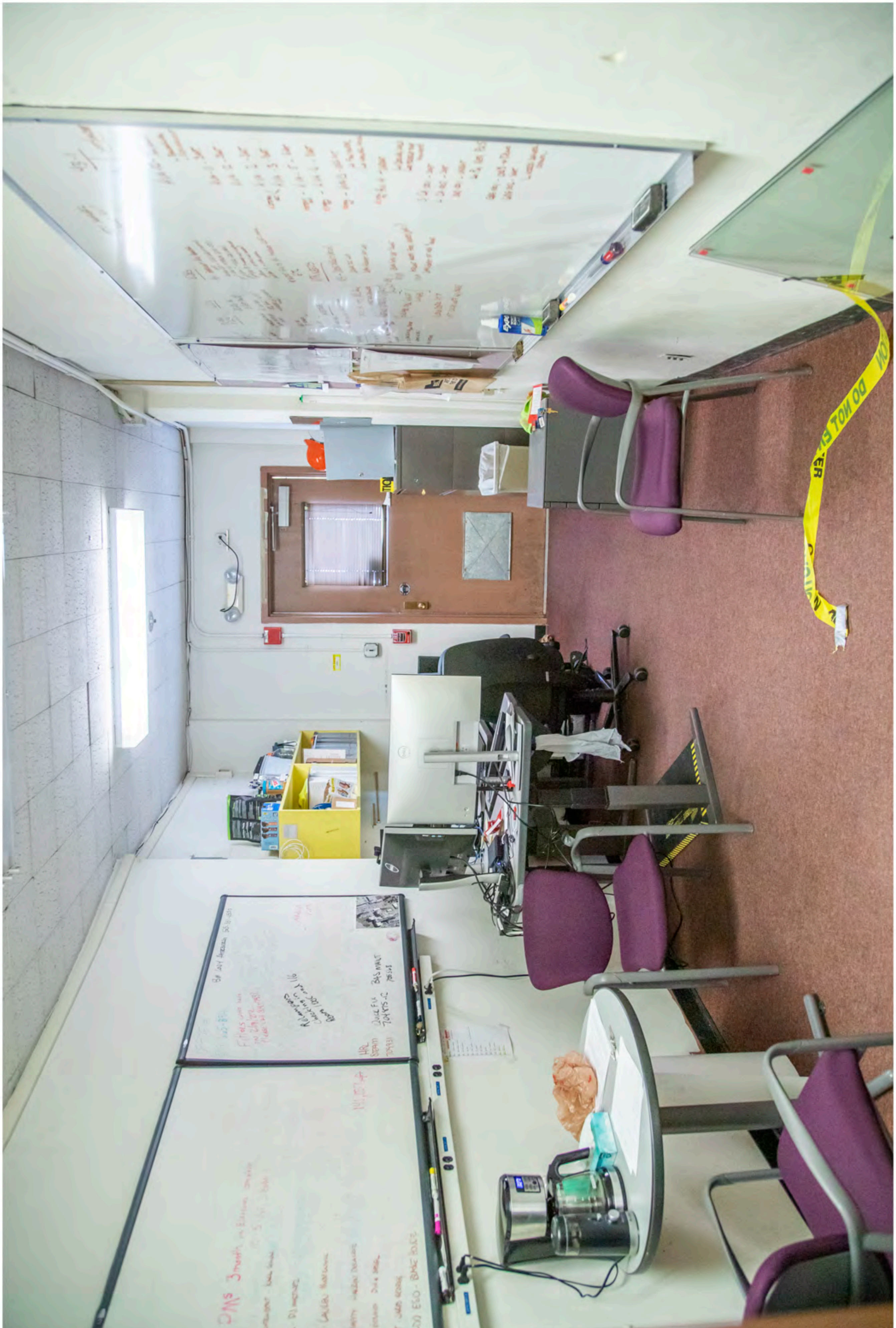
UI-55-2022-112-290

UI-55-2022-112-289



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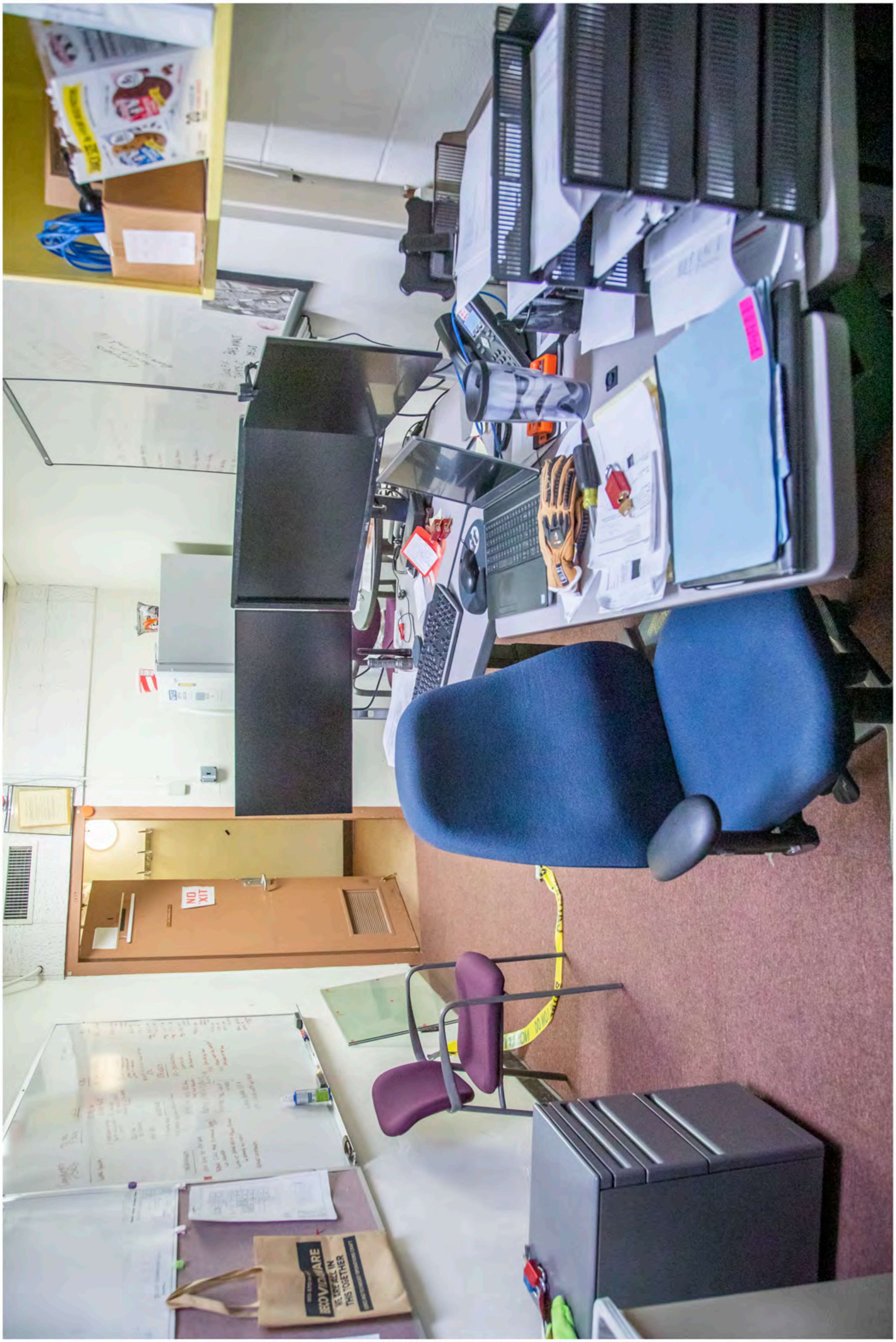


PREVENTION OF FALLS
CAUTION

UI-55-2022-112-268

UI-55-2022-112-301

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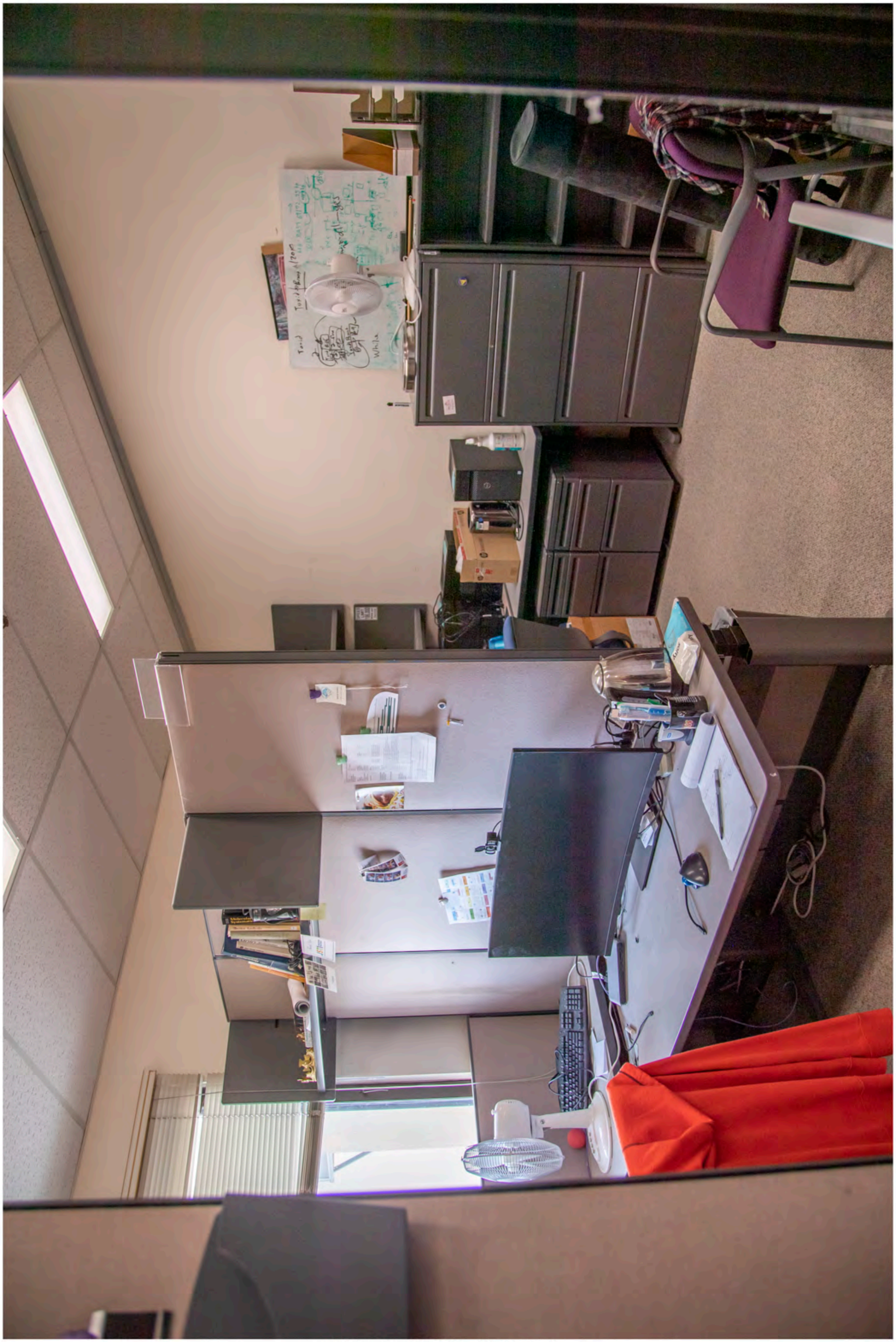
UI-55-2022-112-249

UI-55-2022-112-251



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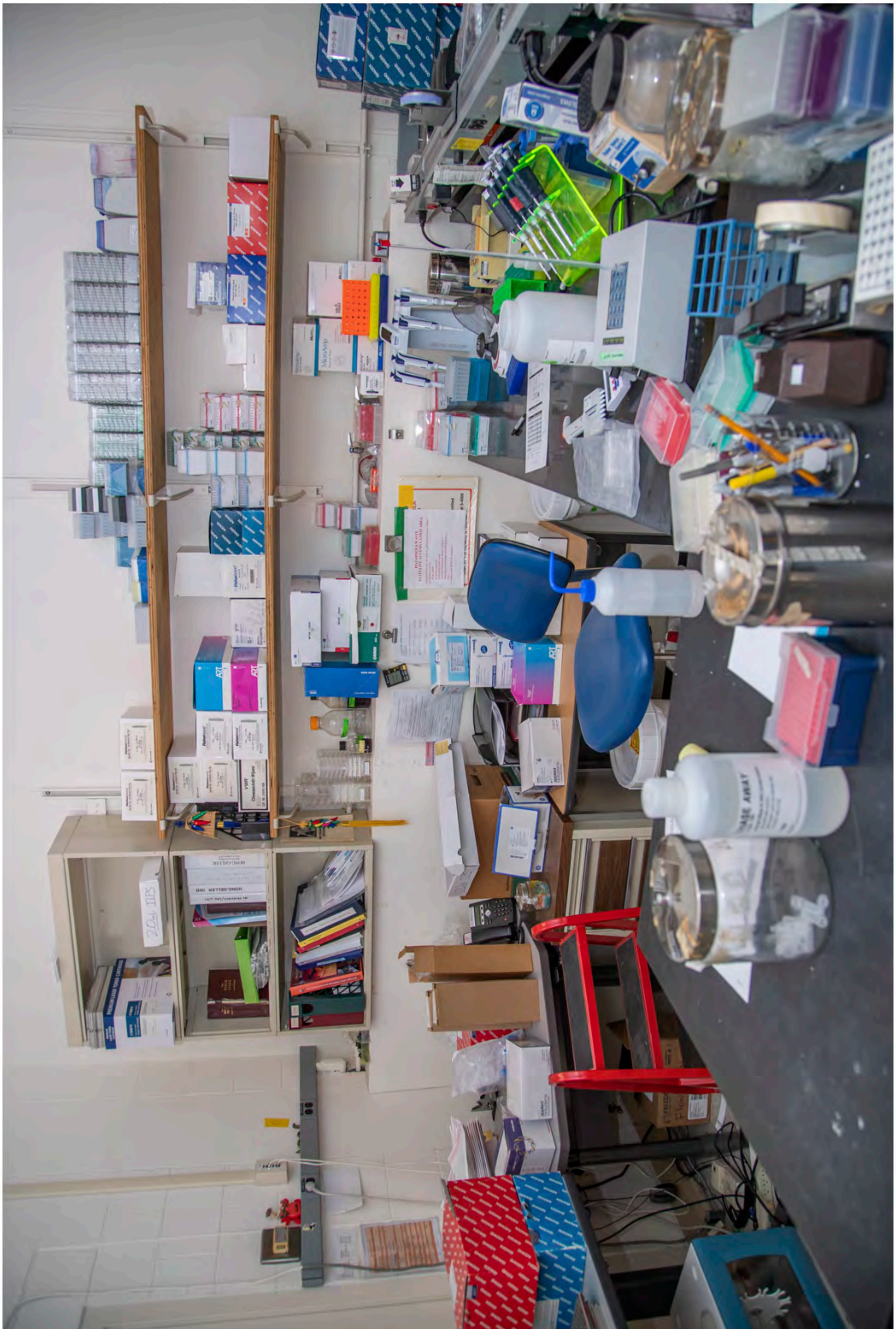

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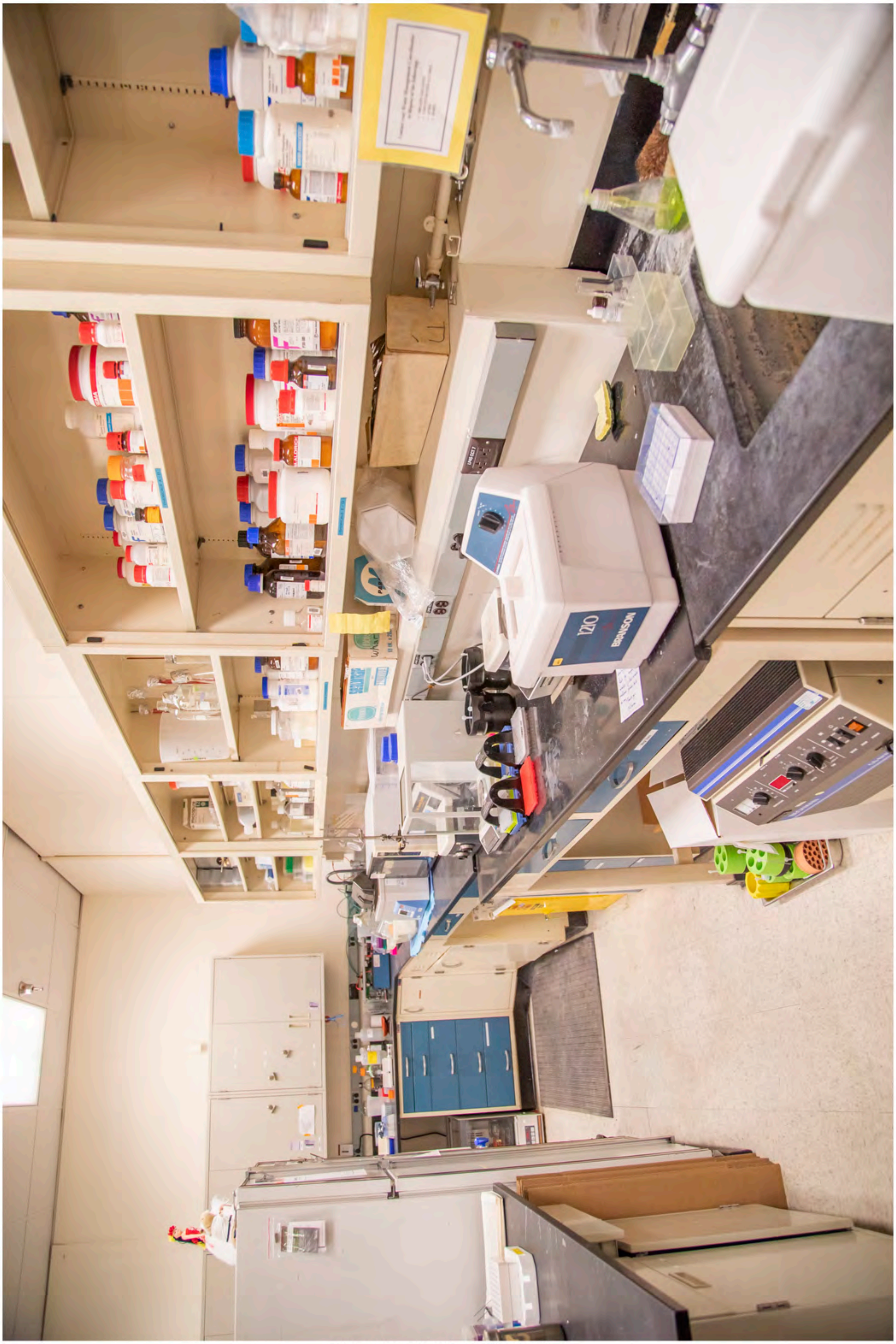
UI-55-2022-112-181

UI-55-2022-112-182



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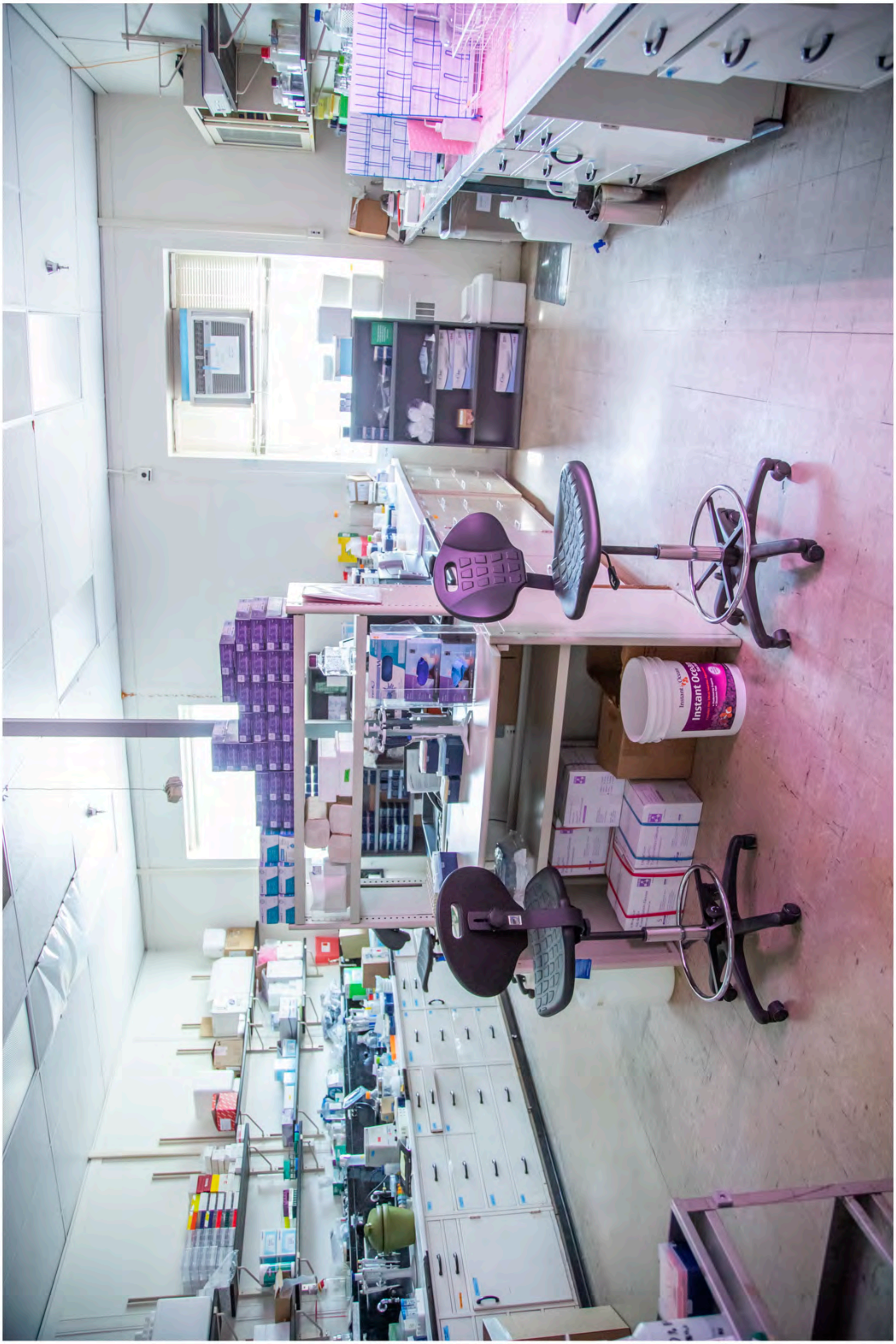

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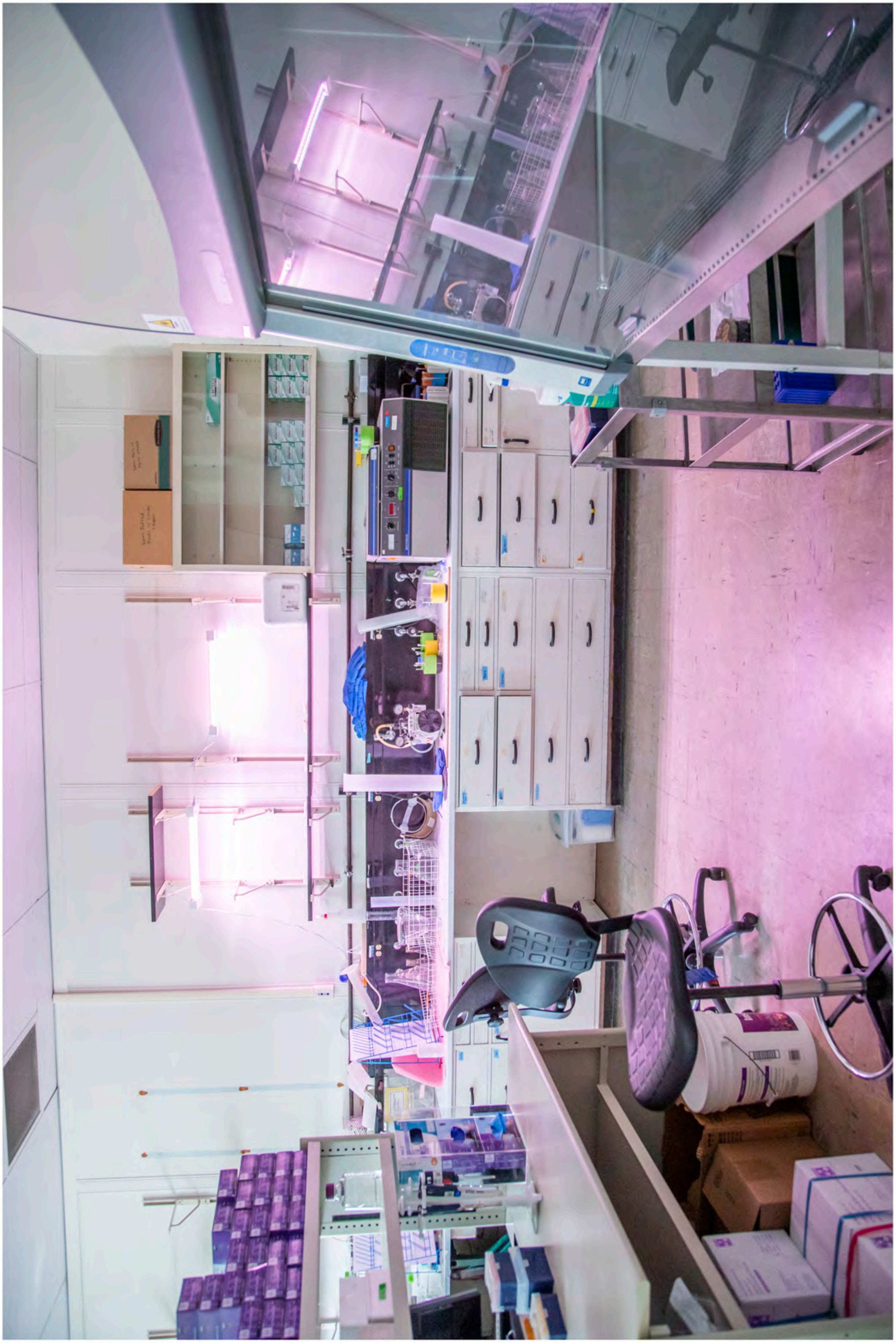

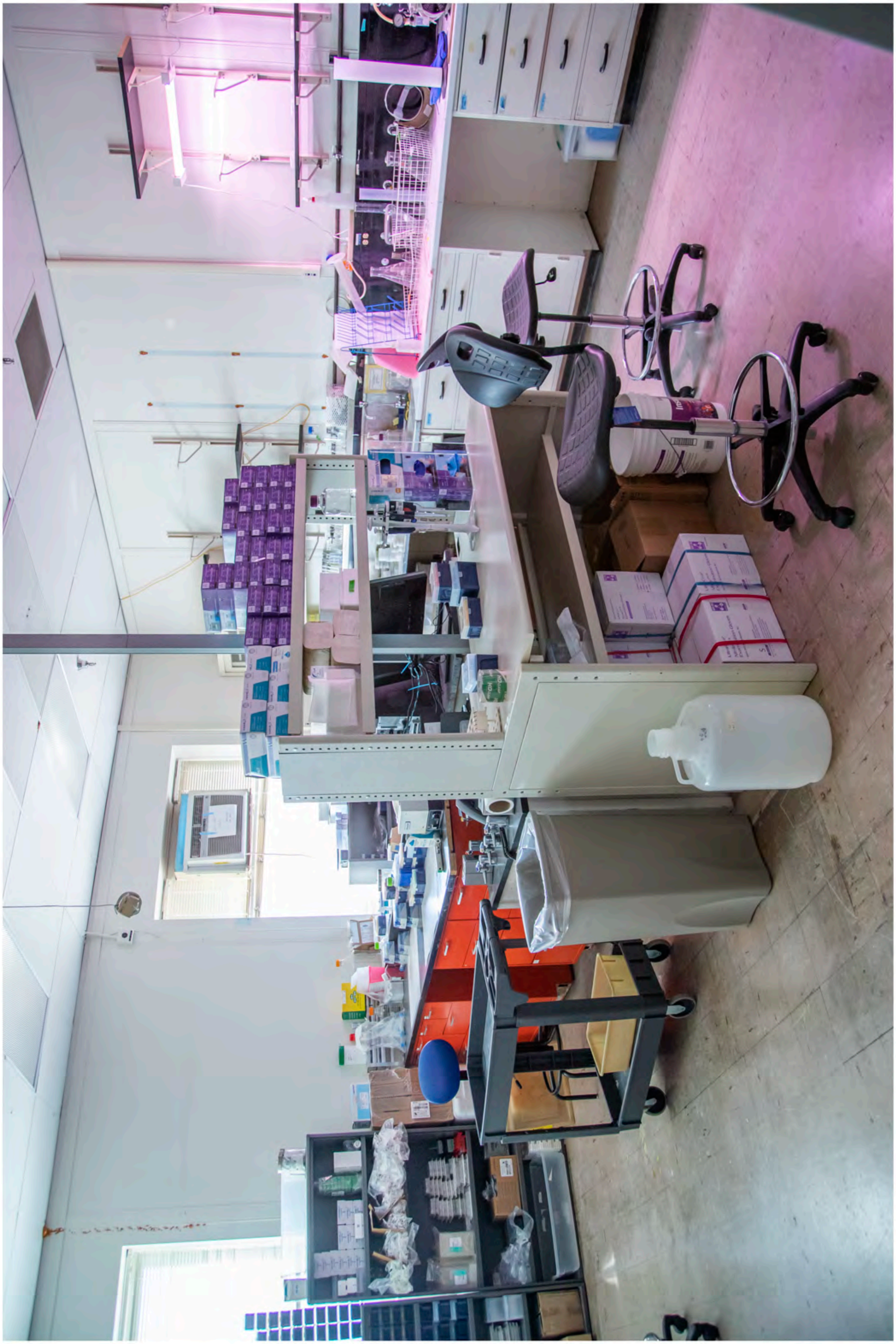

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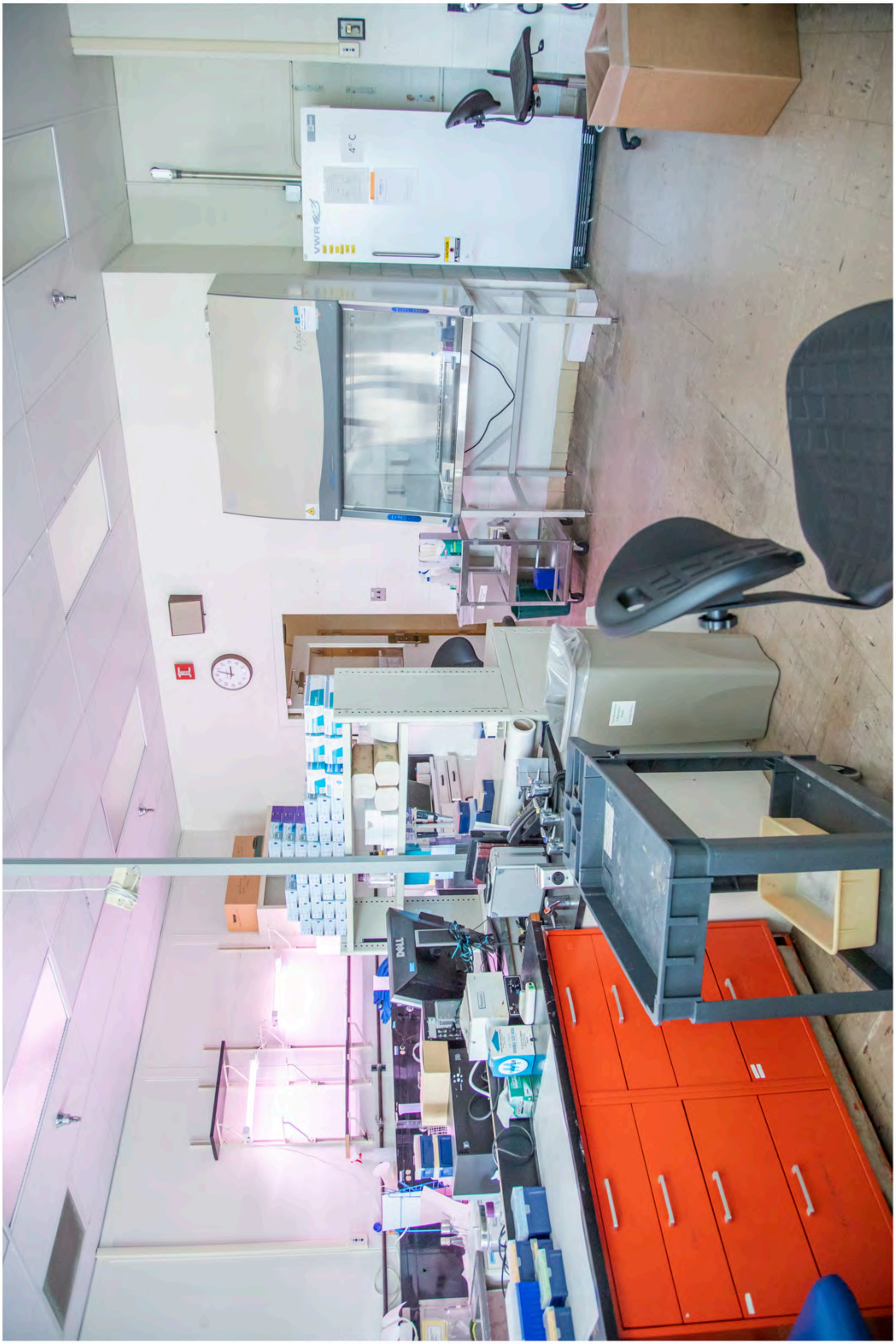

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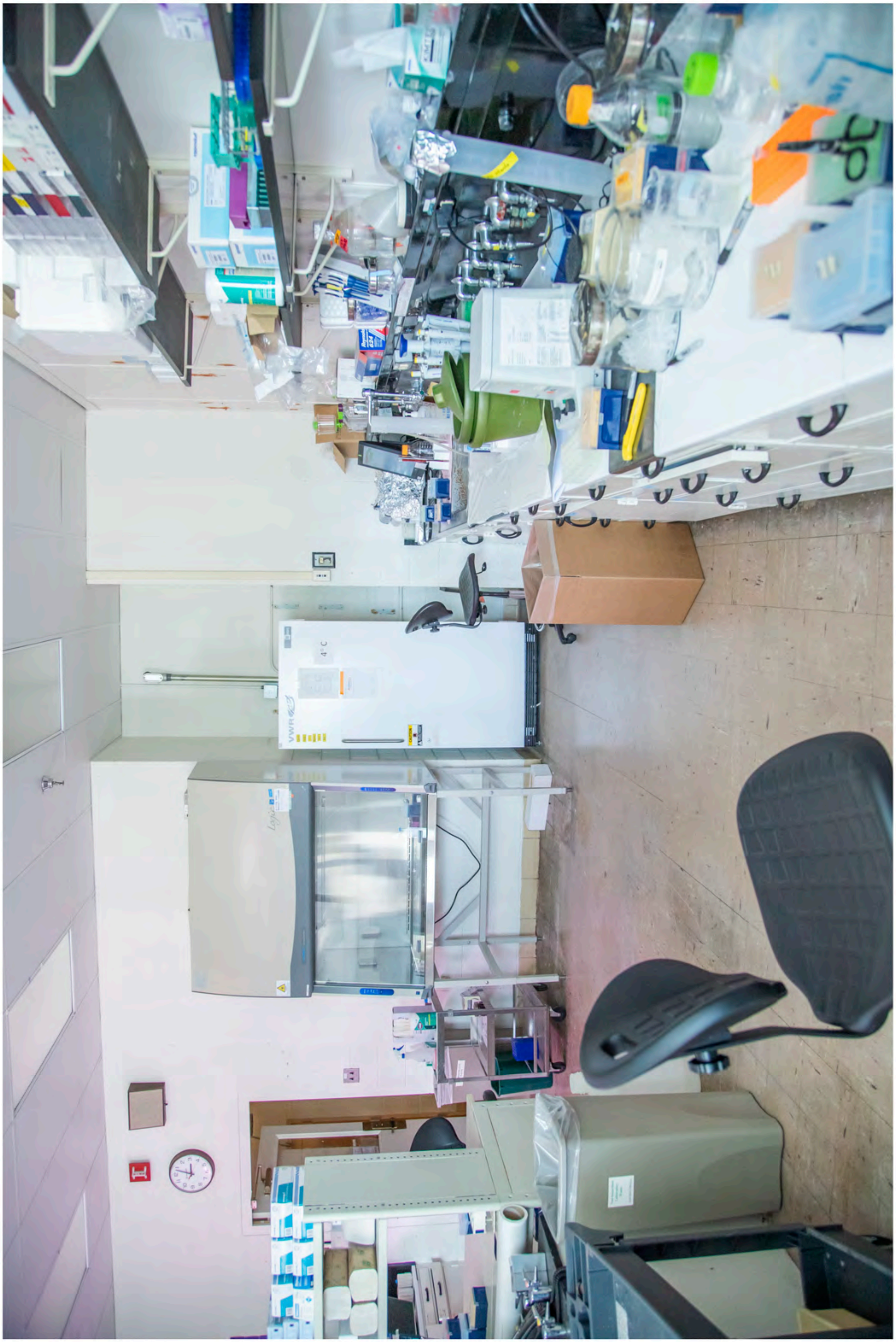

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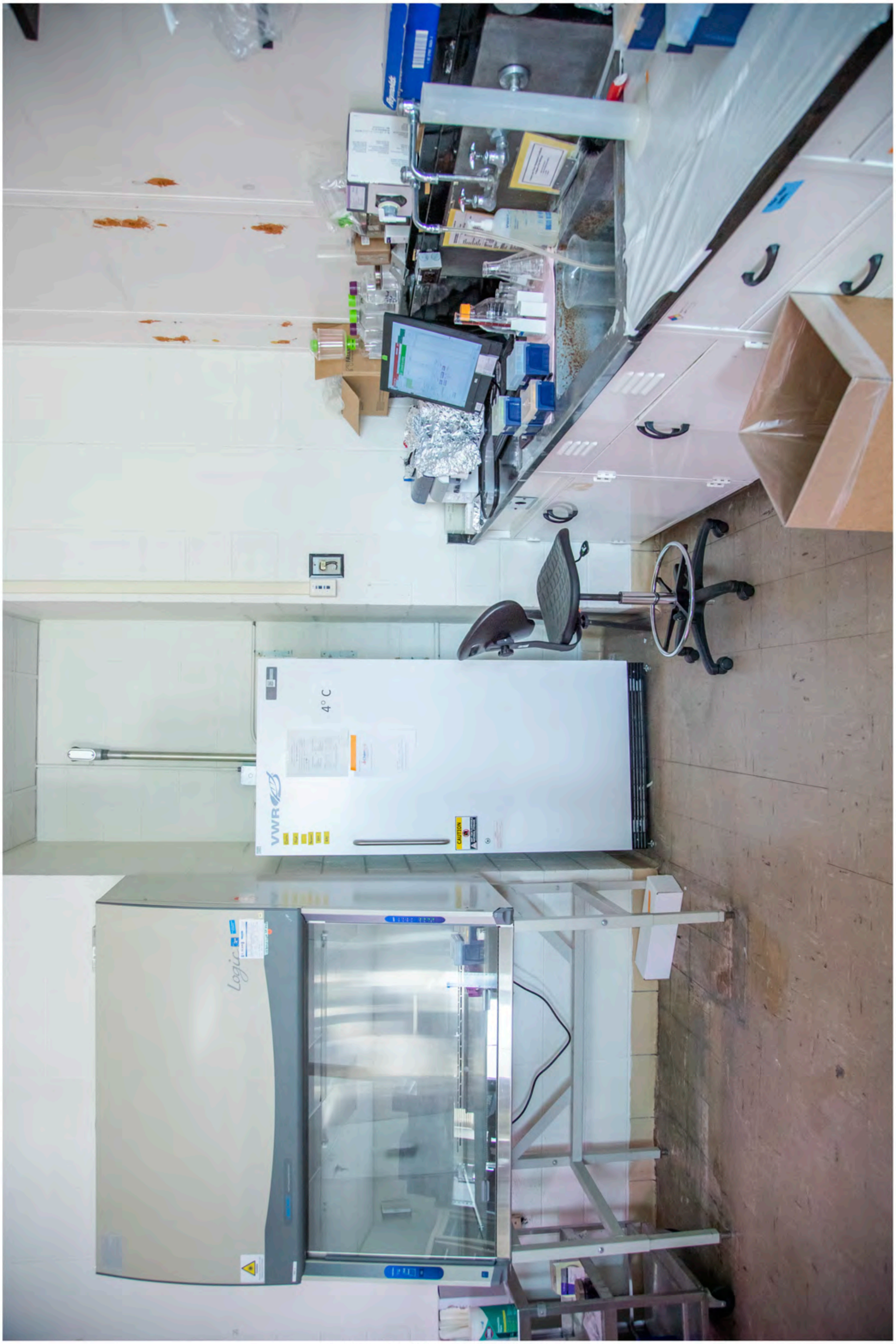

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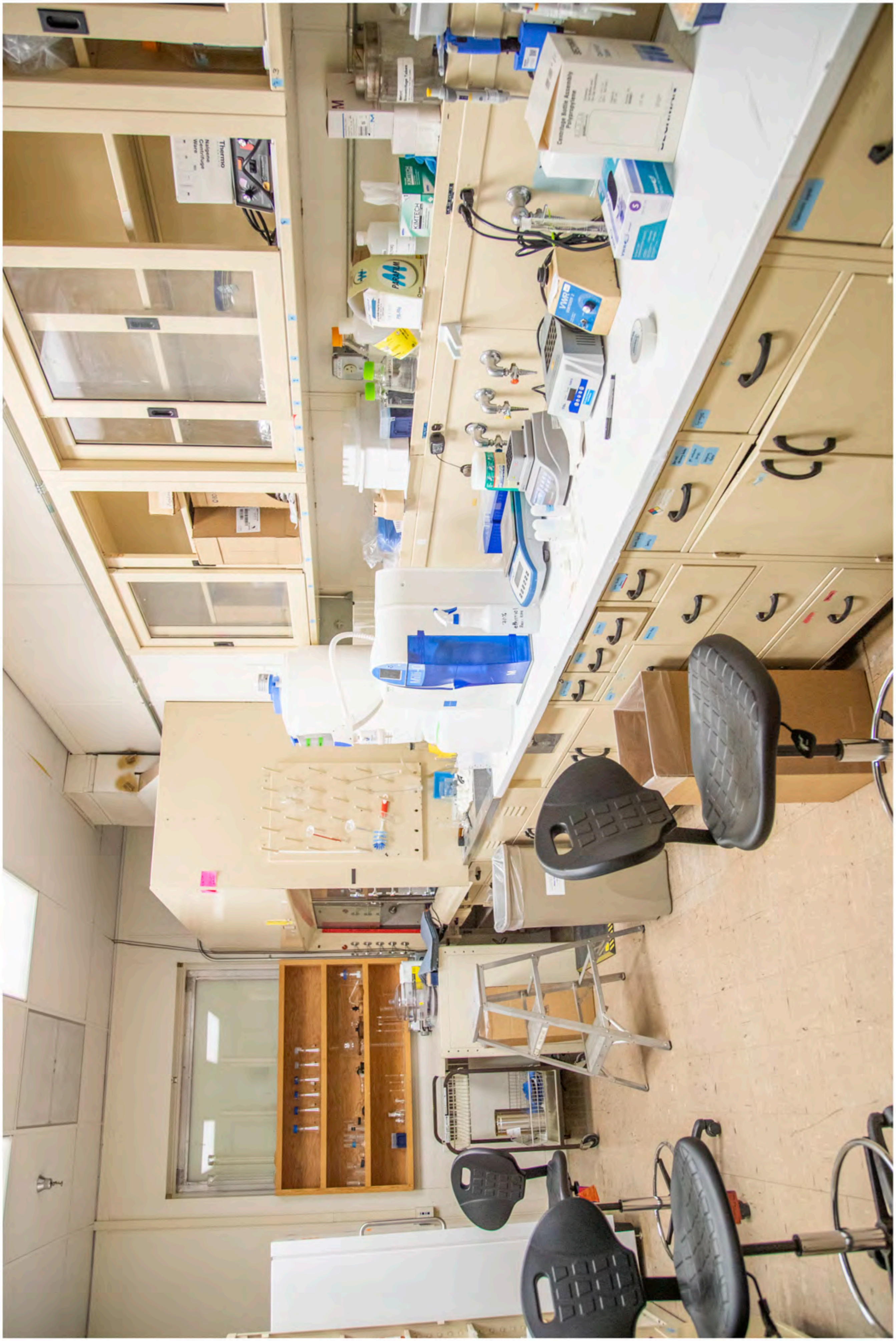

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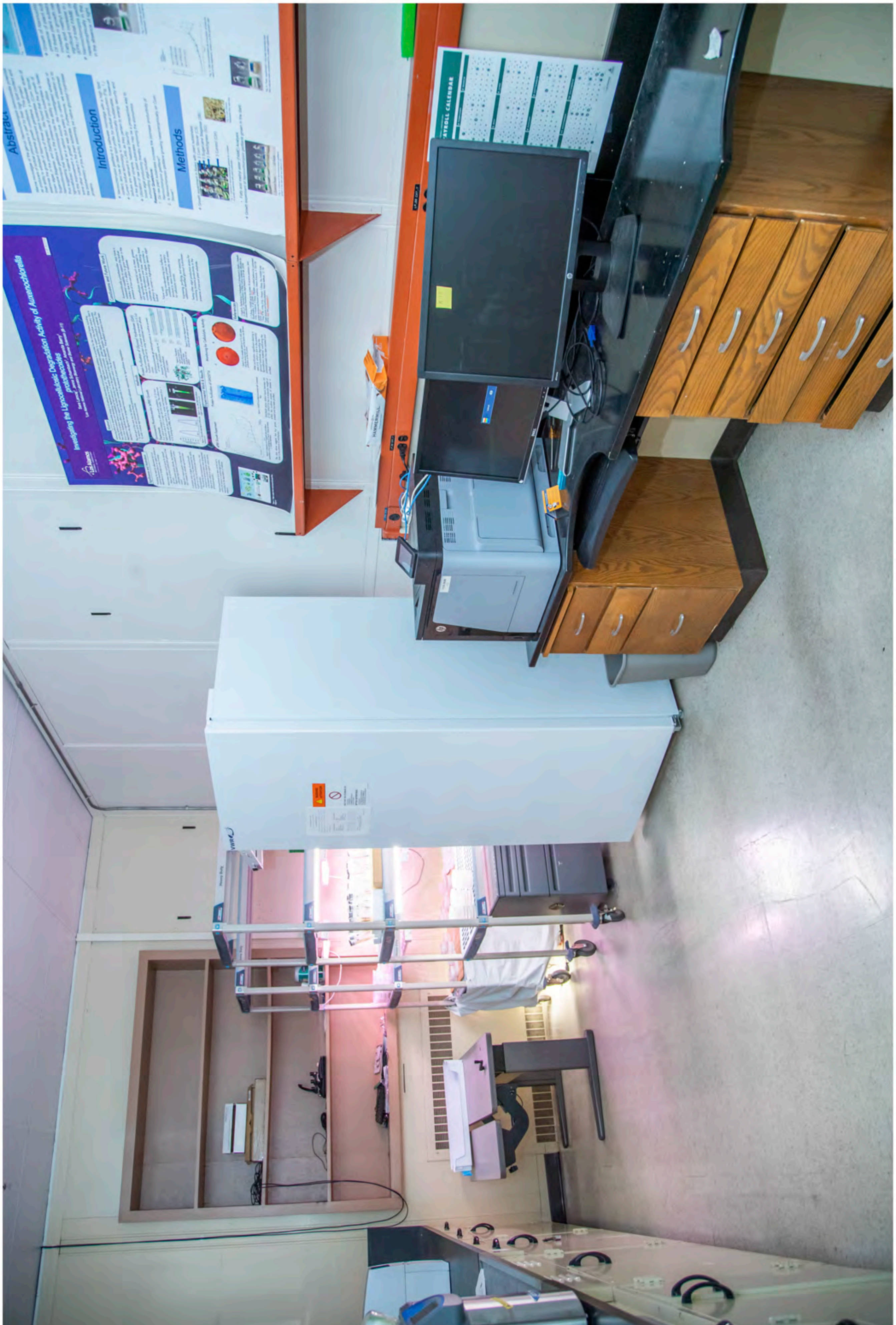


UI-55-2022-112-221


NO FOOD ALLOWED
2021 PAYROLL CALENDAR
Heavy Duty
Heavy Duty

UI-55-2022-112-224

UI-55-2022-112-223

UI-55-2022-112-225

UI-55-2022-112-228

UI-55-2022-112-227

UI-55-2022-112-229

UI-55-2022-112-231

UI-55-2022-112-230

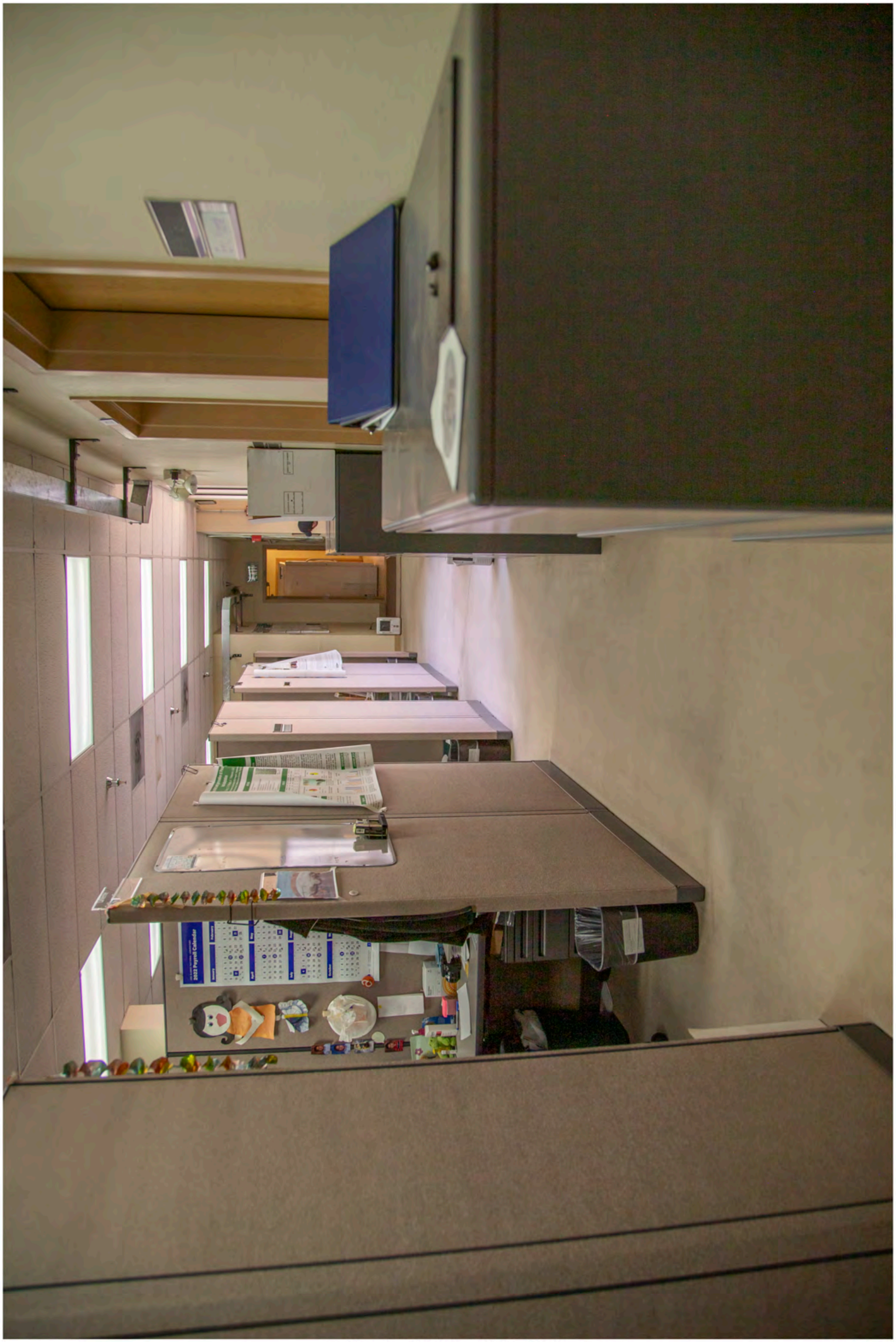
UI-55-2022-112-232

UI-55-2022-112-311


A1
DUNBAR
173
A2
DUNBAR

UI-55-2022-112-309

UI-55-2022-112-234



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UI-55-2022-112-245

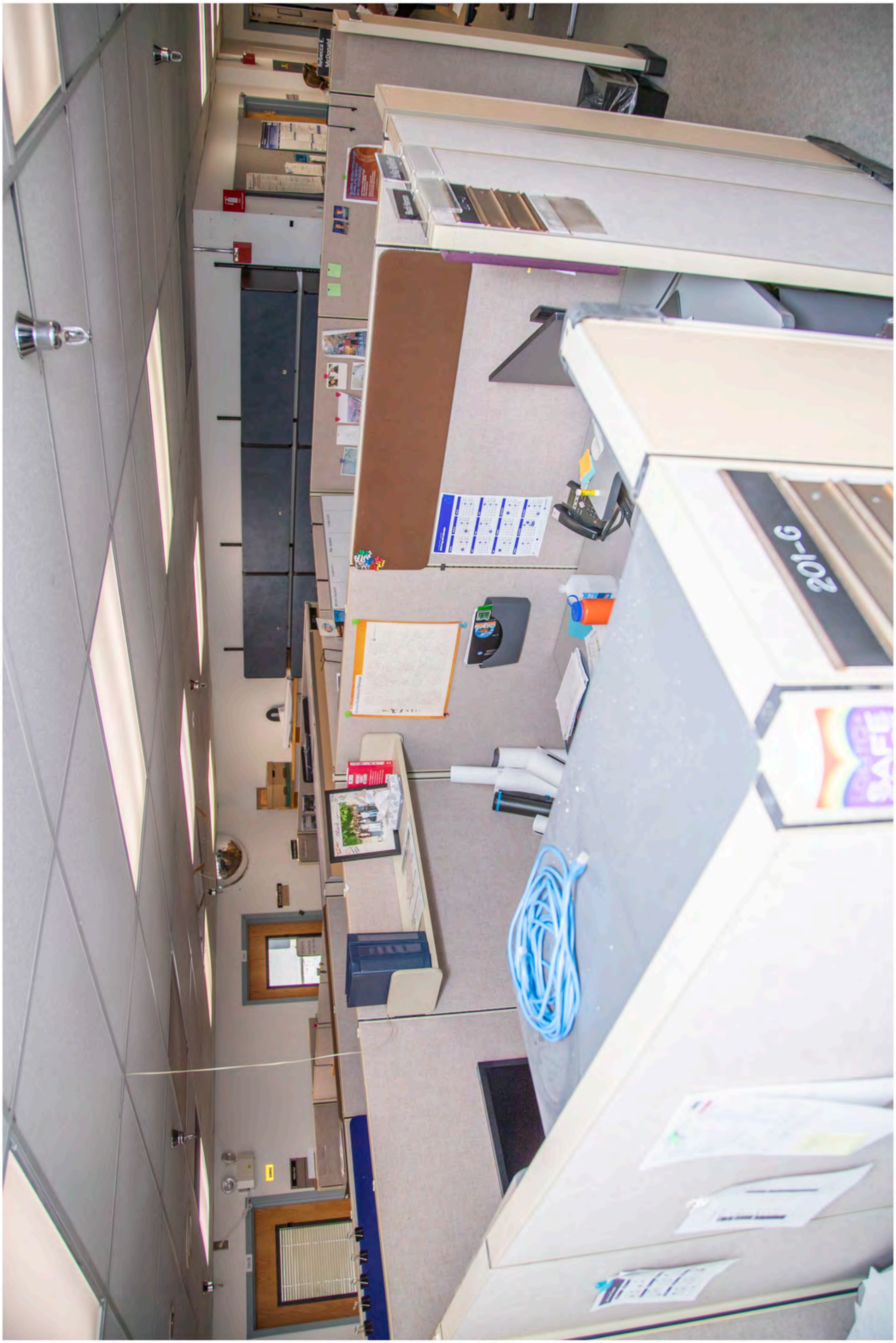
UI-55-2022-112-314

UI-55-2022-112-317

UI-55-2022-112-320

UI-55-2022-112-321


201-L
Rebecca E.
McDonald
201-K
Los Alamos
BIOINFORMATICS
EDGE
Empowering the Development of Genomics Expertise
Making Genomics Accessible to
Julia Kelliher



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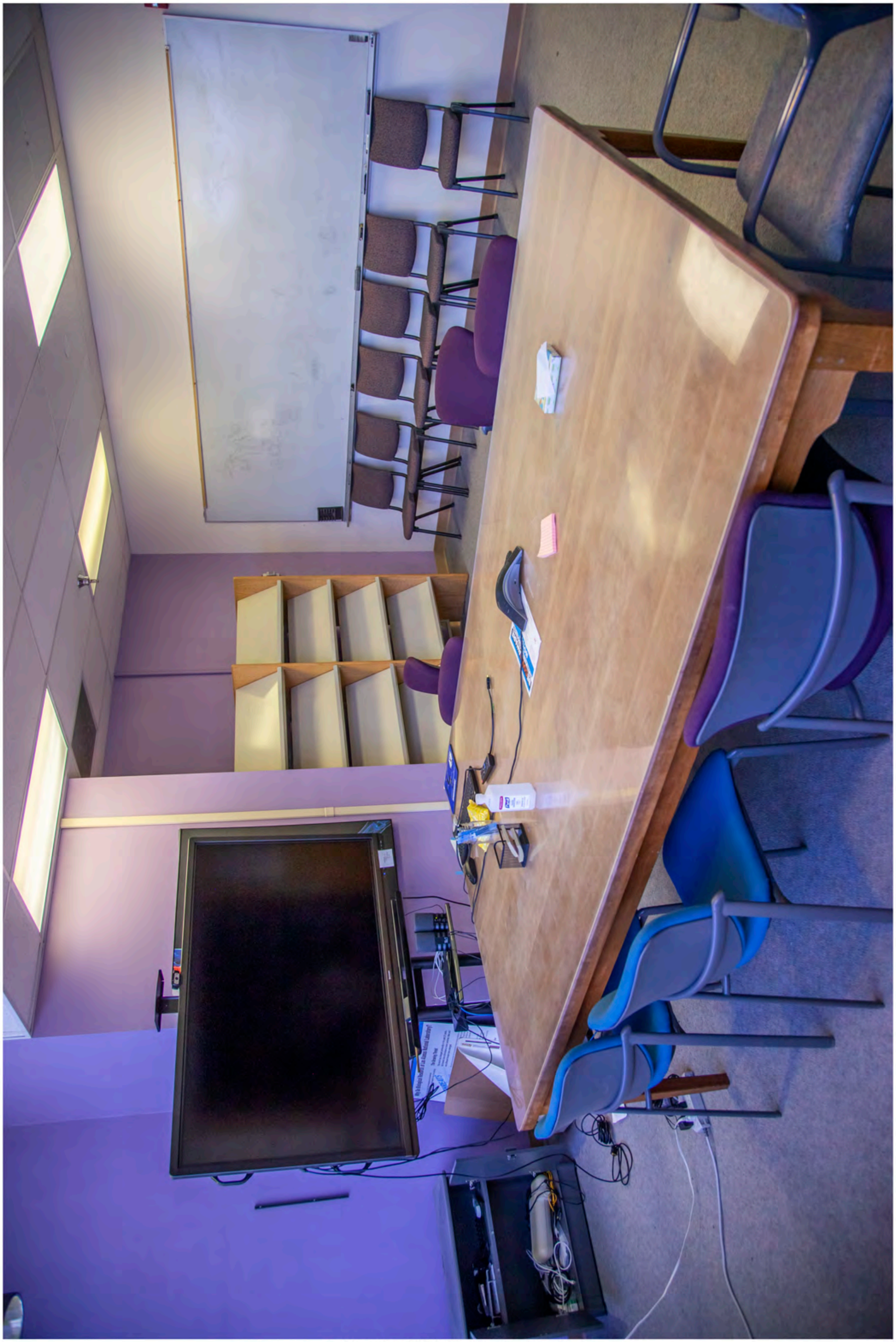

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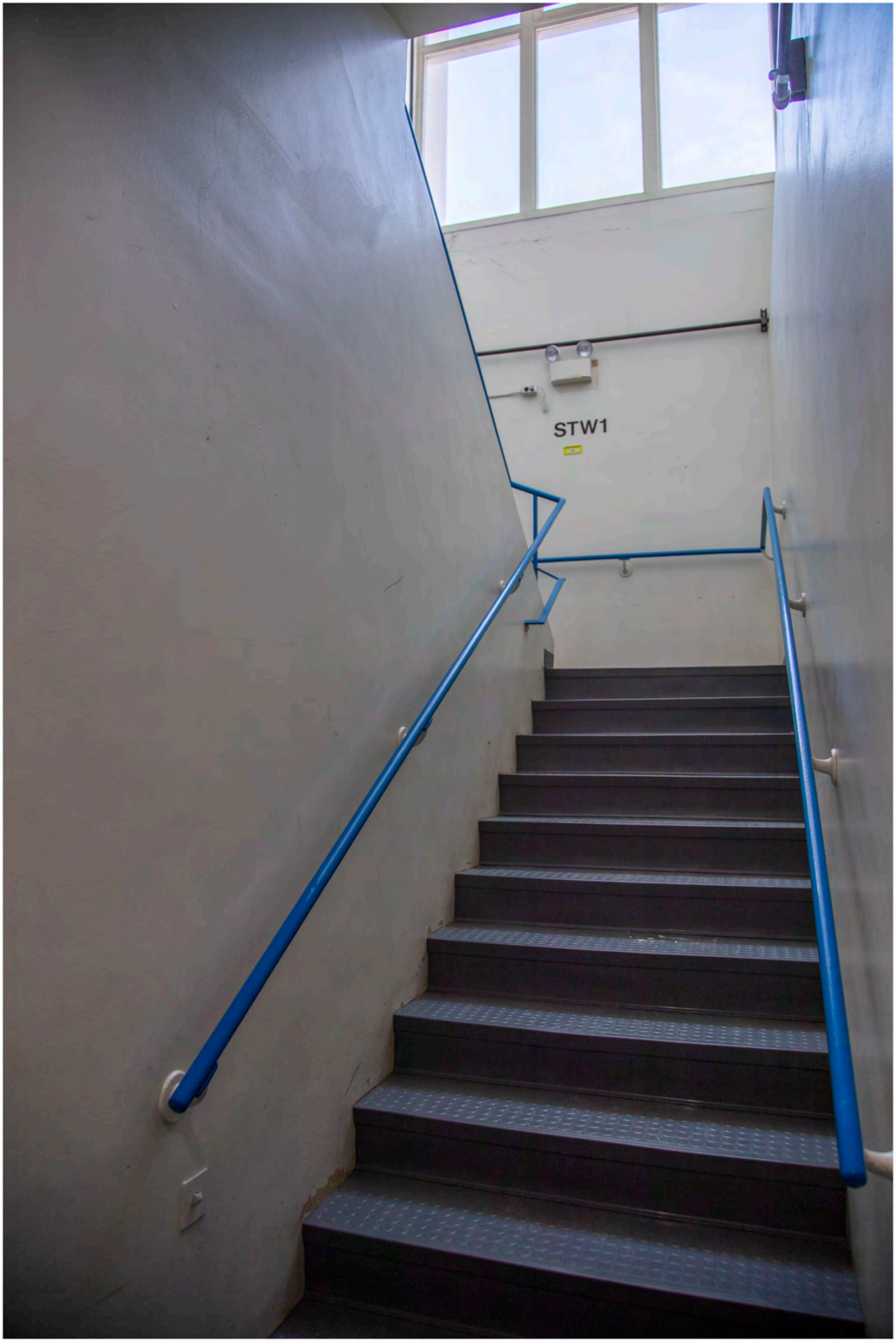

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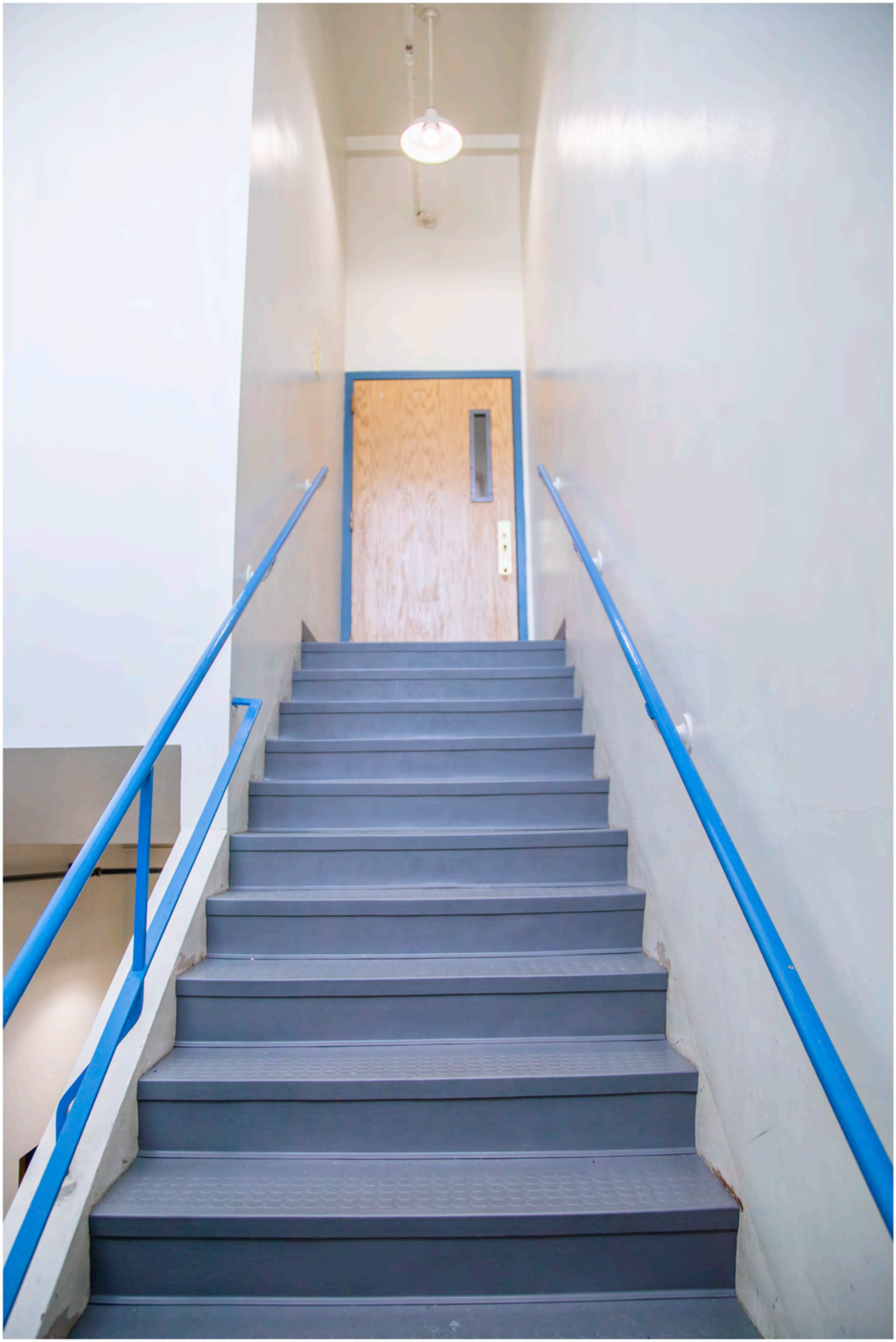

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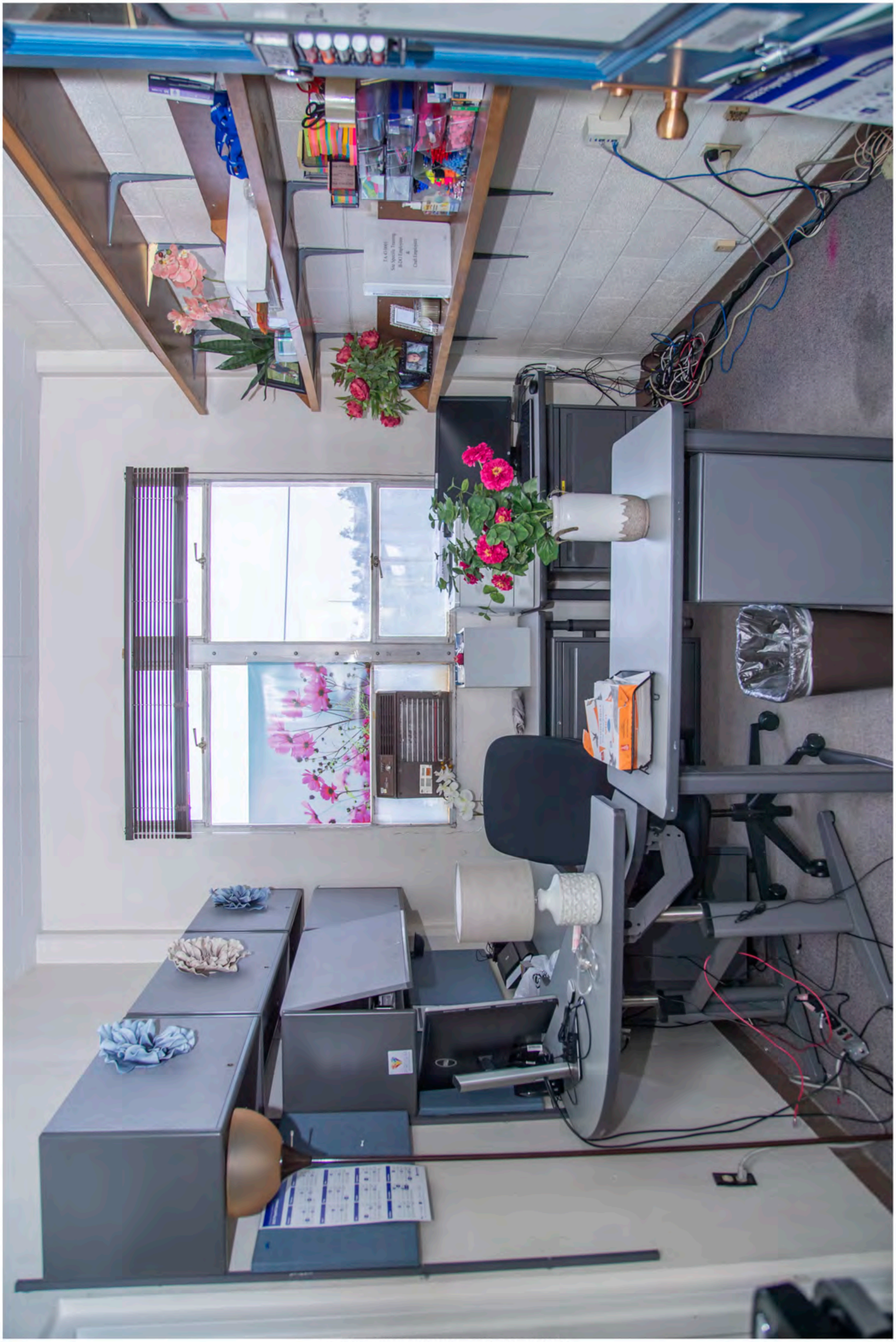
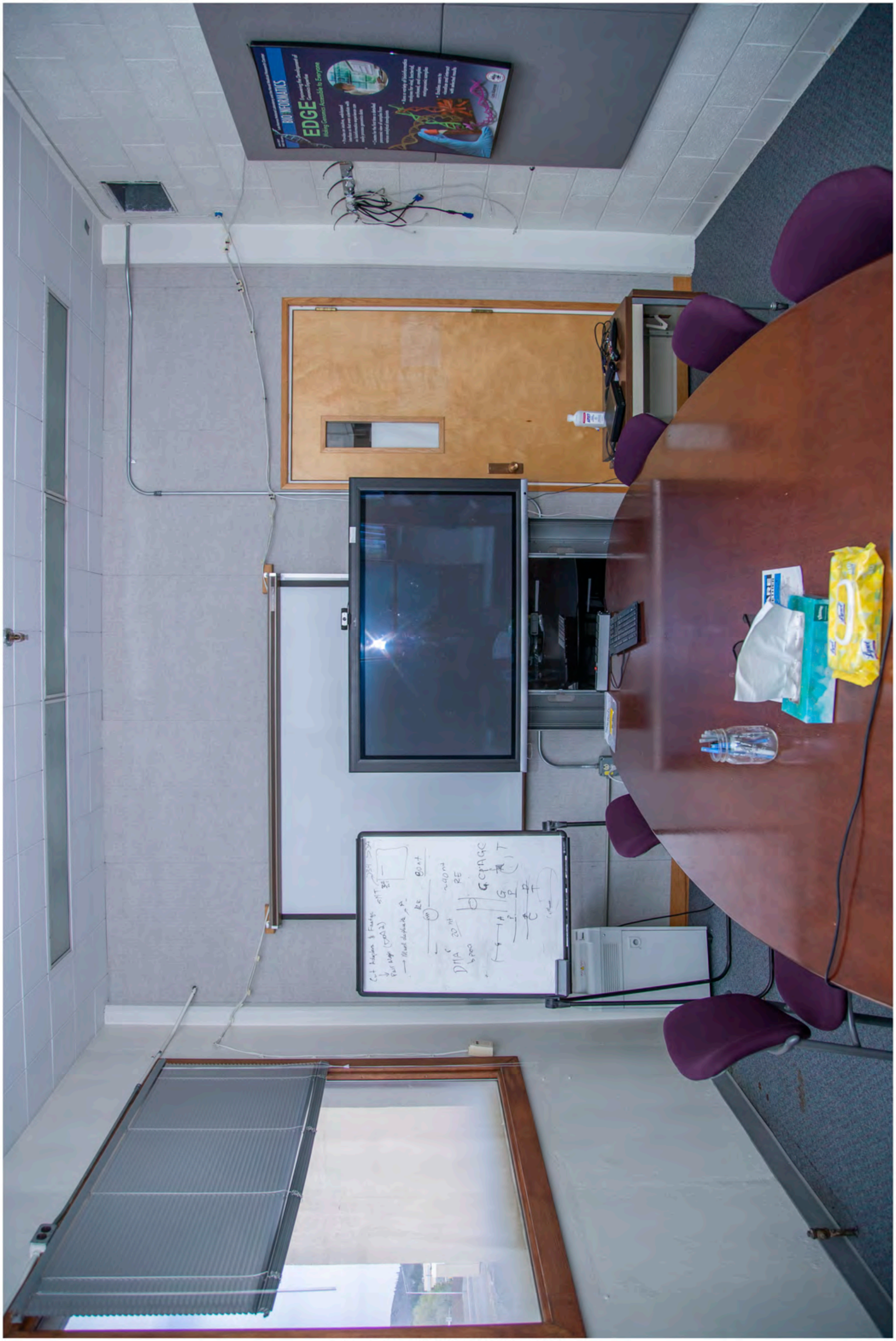



In Case of Emergency
2022 Payroll Calendar

UI-55-2022-112-144



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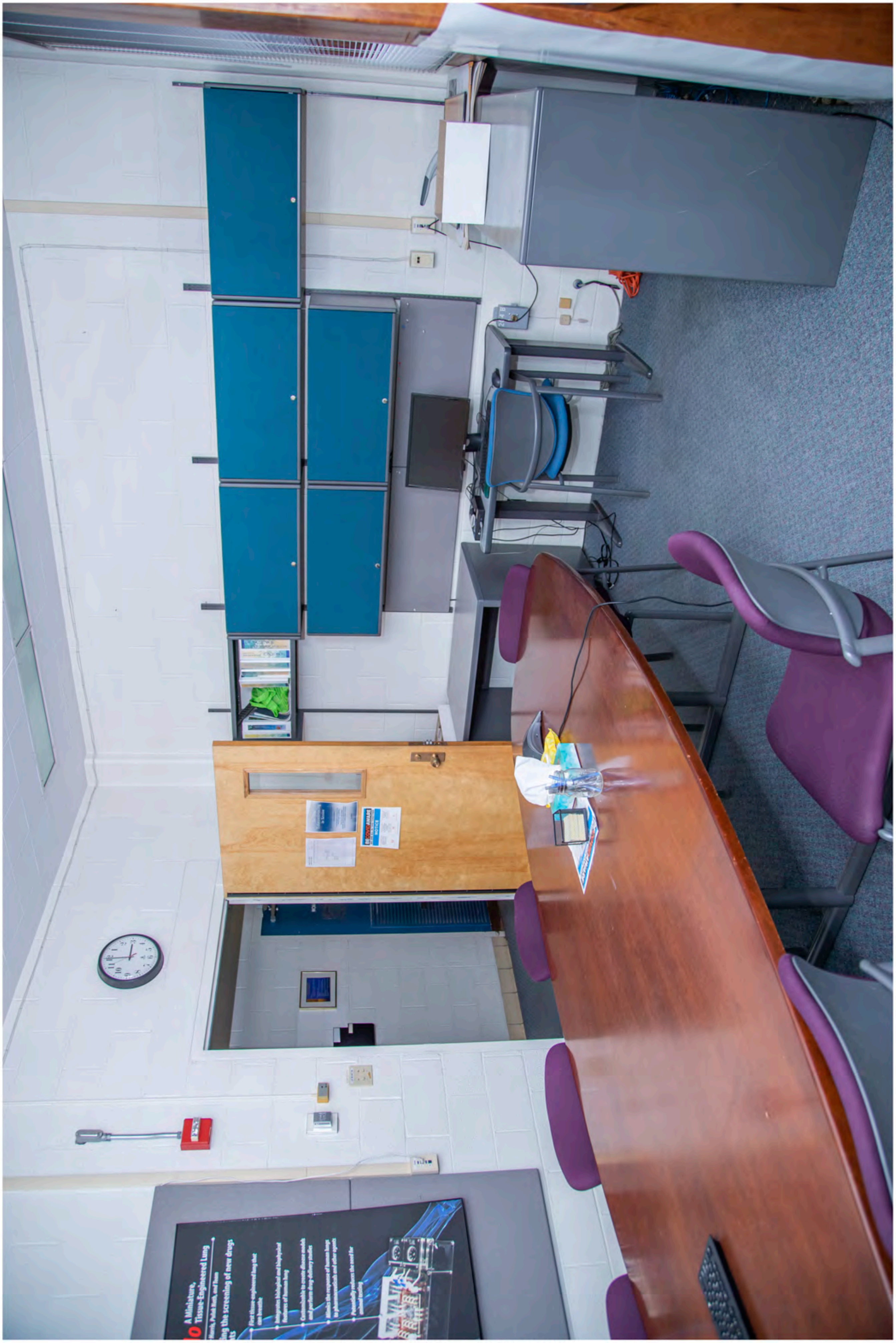

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UI-55-2022-112-127

UI-55-2022-112-126

UI-55-2022-112-125

UI-55-2022-112-118

UI-55-2022-112-122

UI-55-2022-112-123

UI-55-2022-112-130

UI-55-2022-112-128

UI-55-2022-112-357

UI-55-2022-112-52

UI-55-2022-112-73

UI-55-2022-112-76

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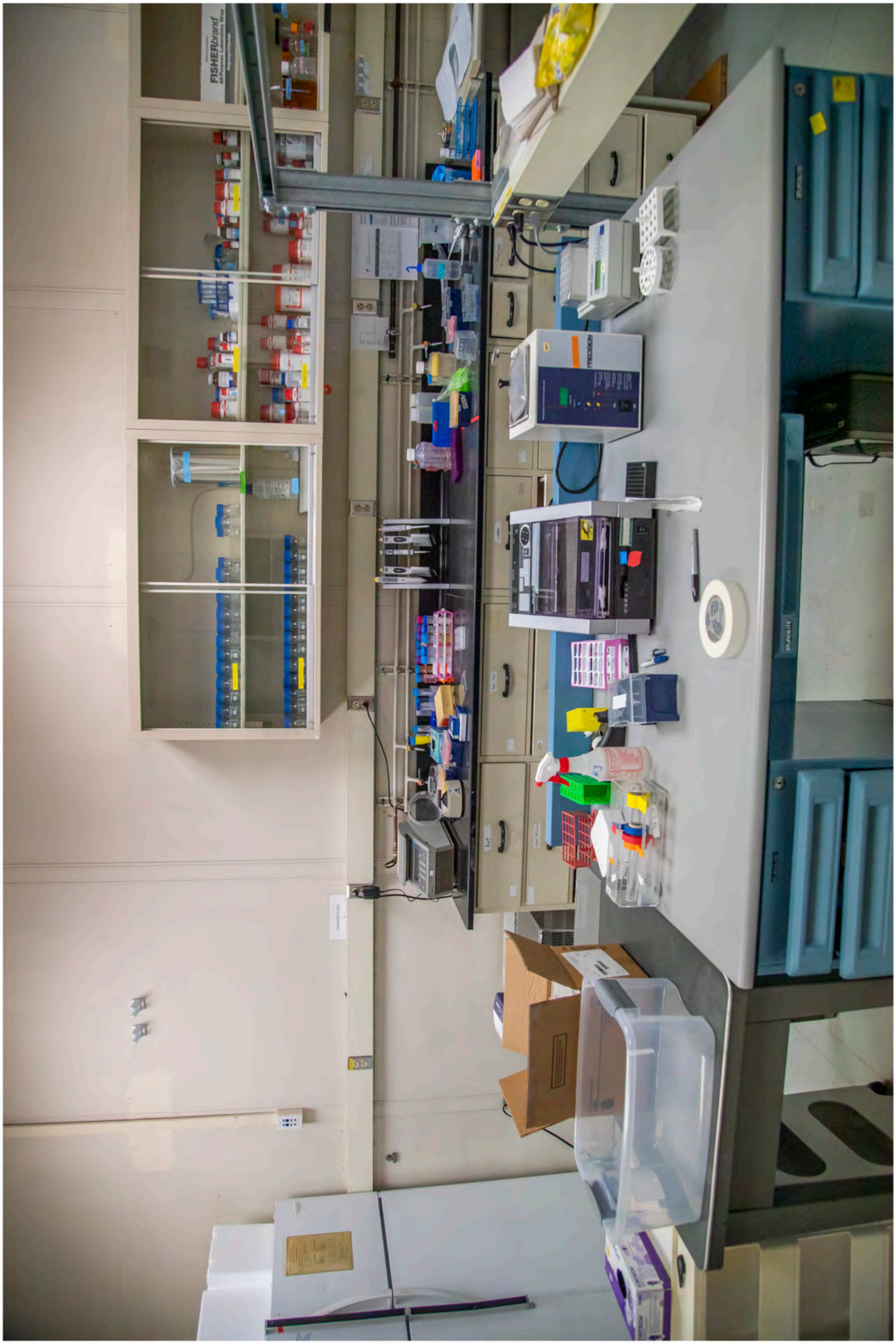

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UI-55-2022-112-86

UI-55-2022-112-87


New Brunswick Scientific

UI-55-2022-112-91

UI-55-2022-112-57

UI-55-2022-112-55

UI-55-2022-112-62

UI-55-2022-112-61

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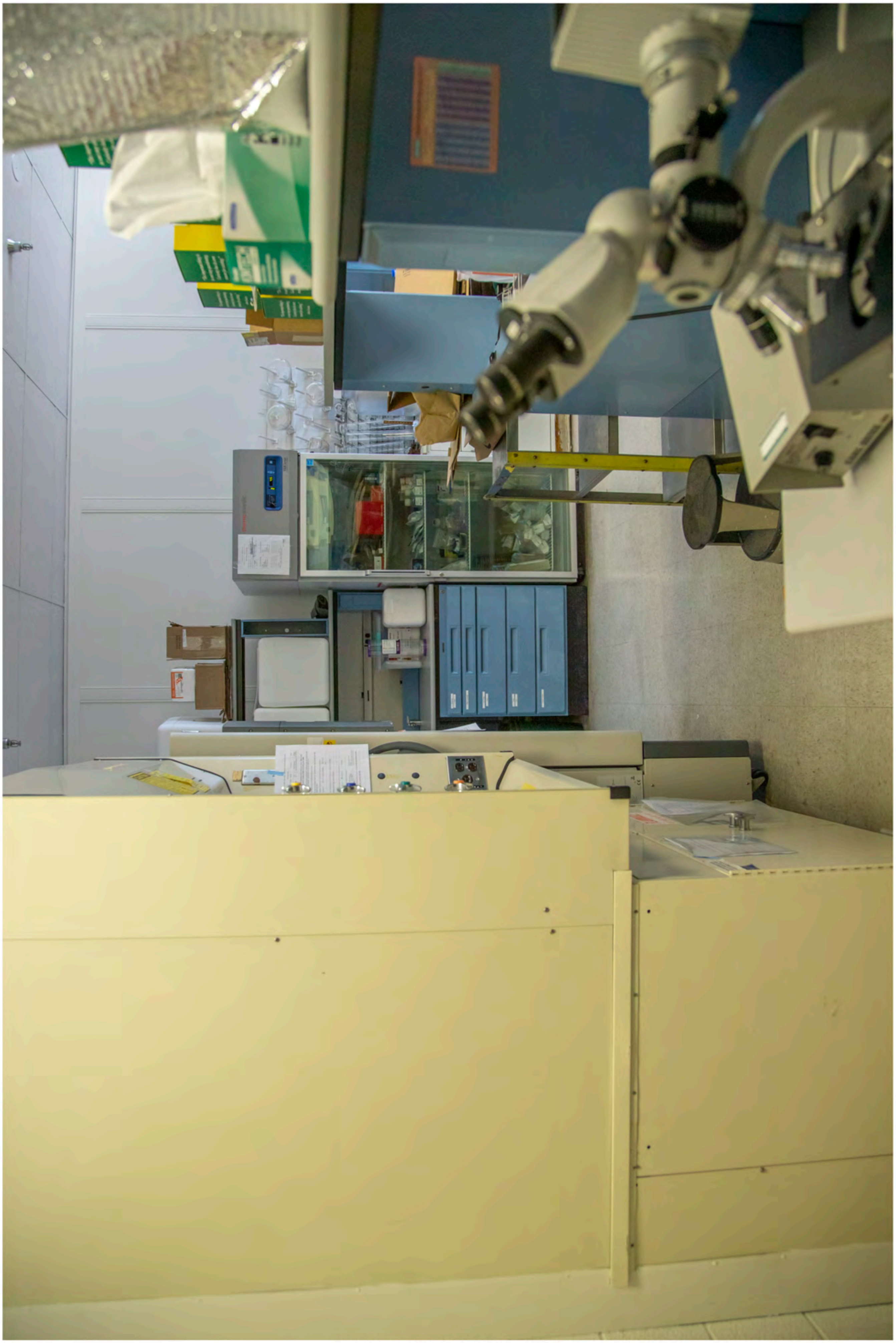

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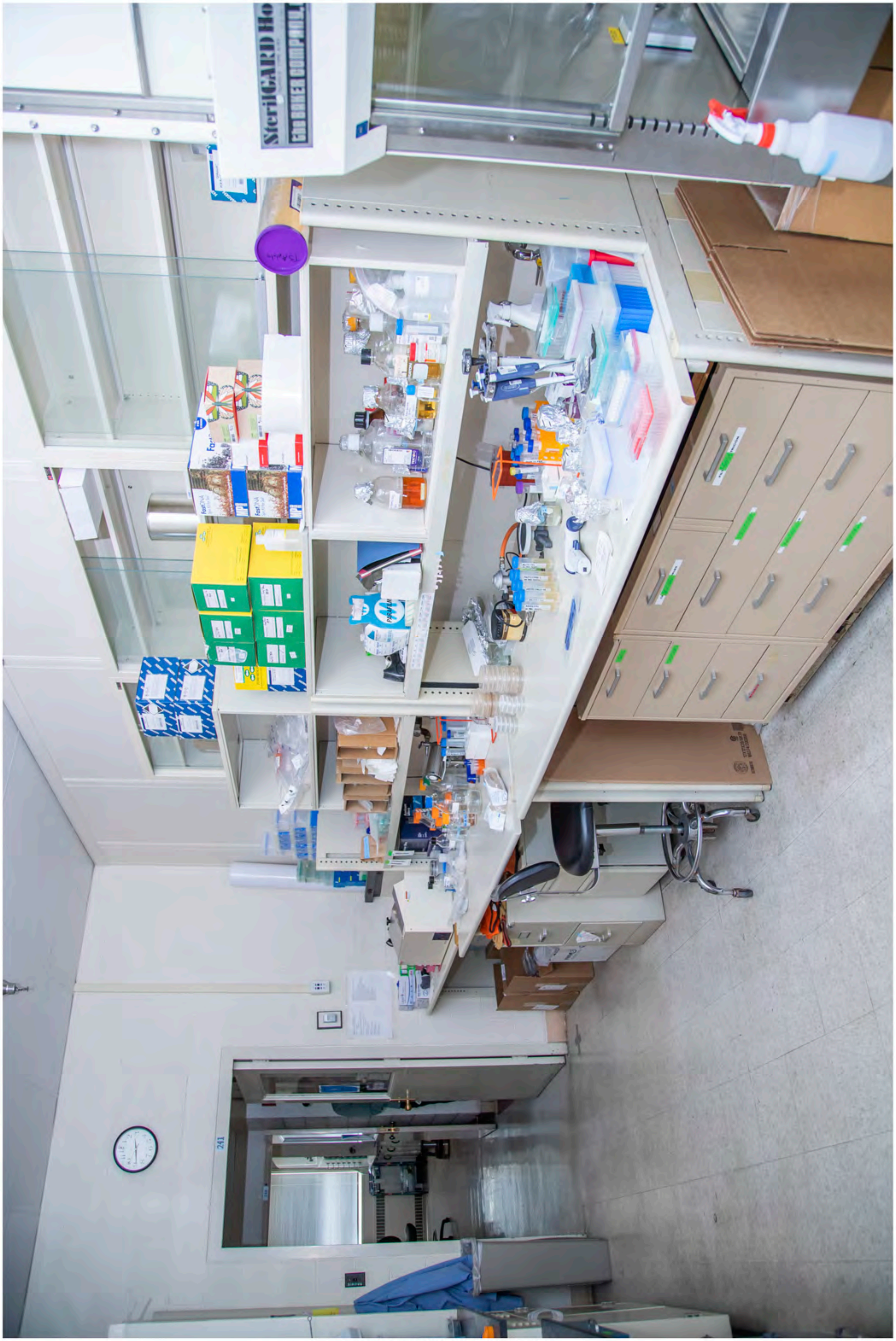

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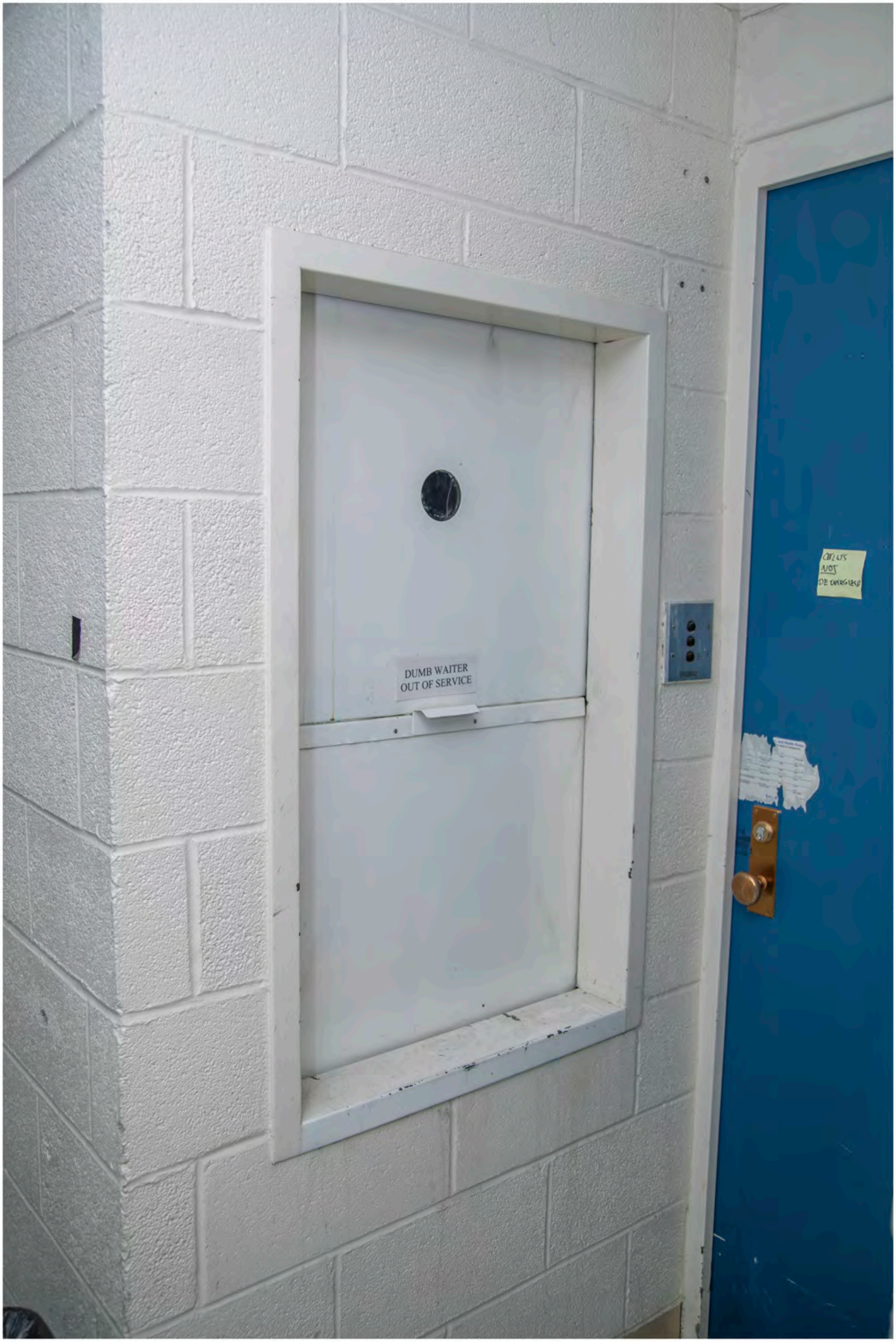

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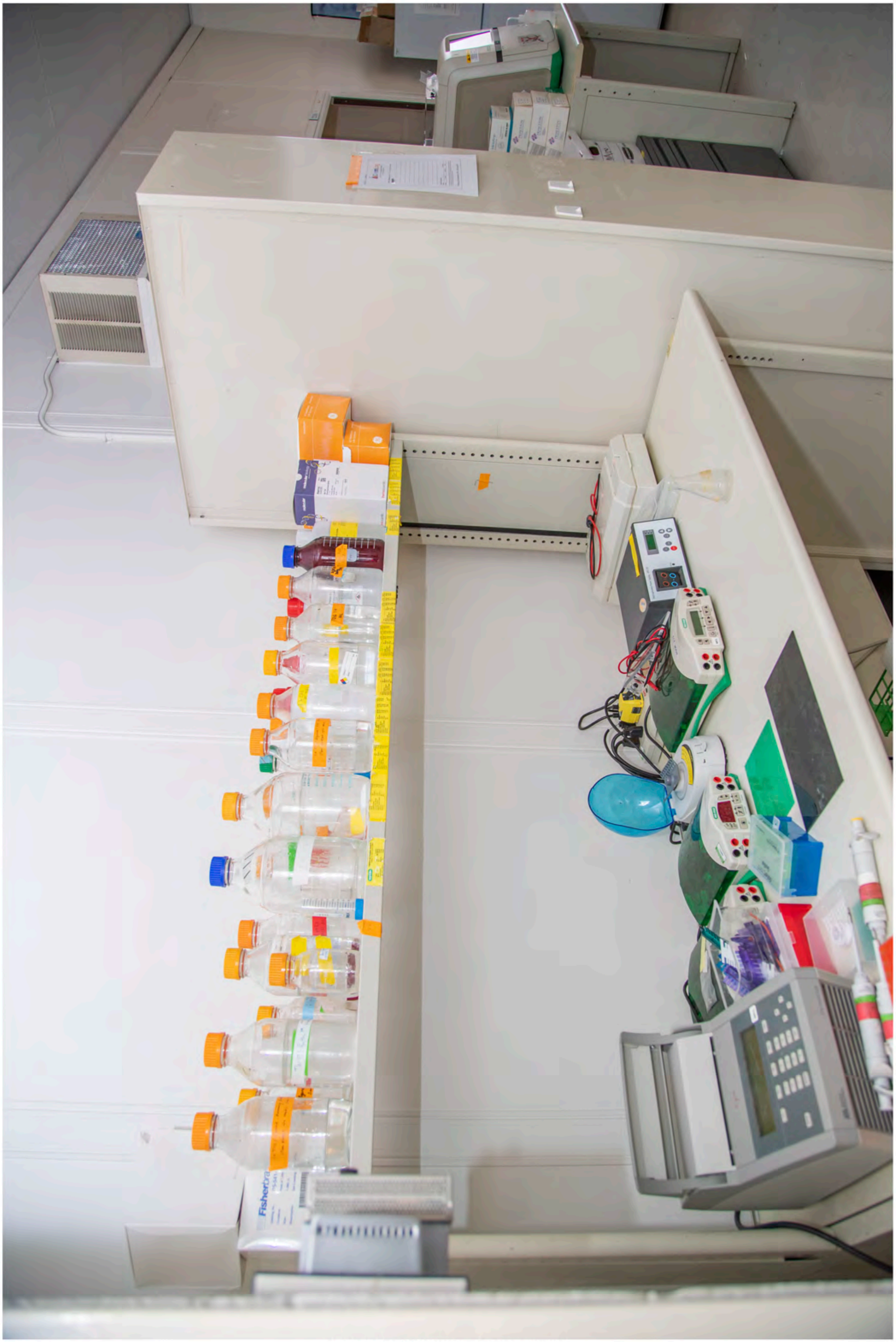

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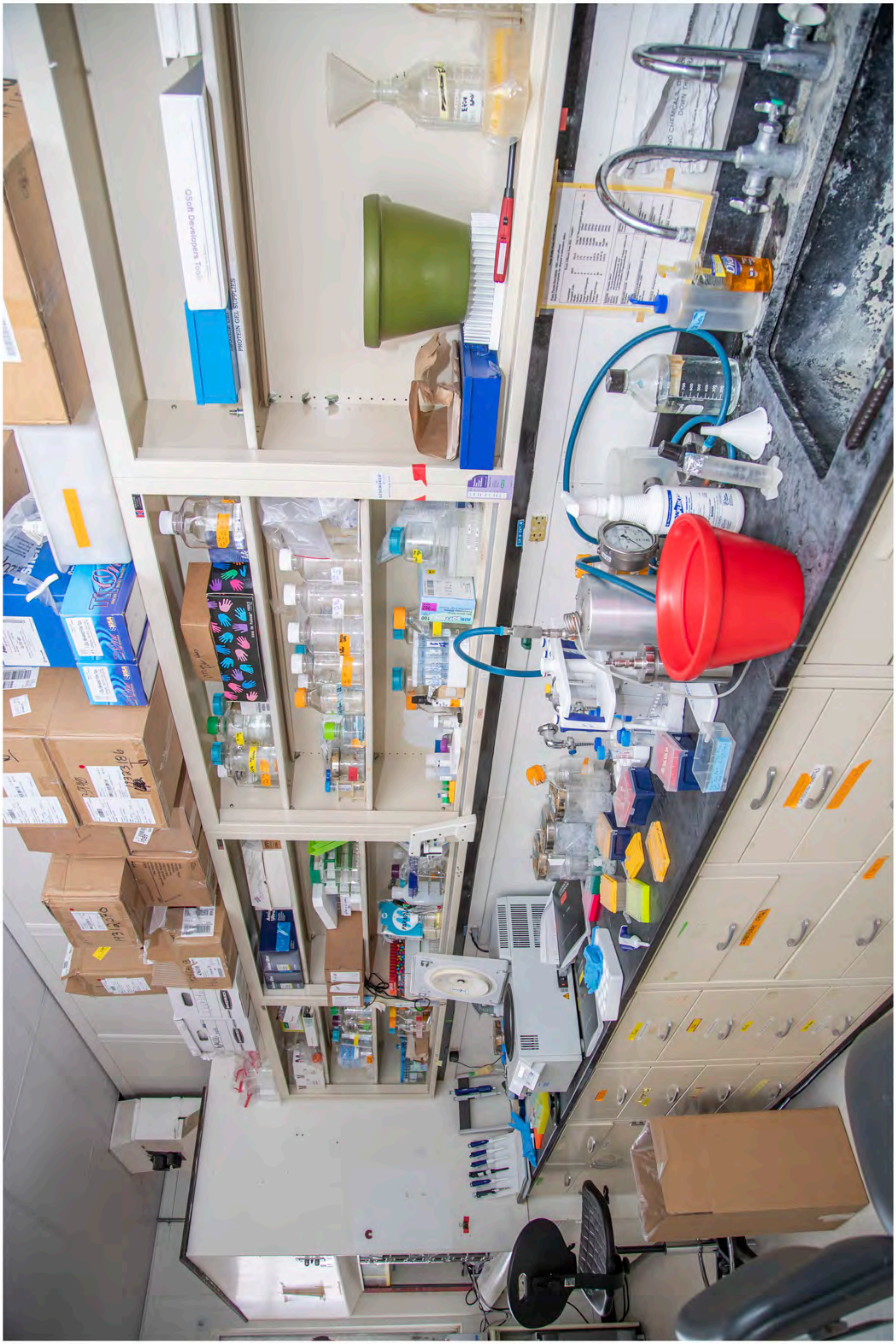

UI-55-2022-112-151

UI-55-2022-112-154

UI-55-2022-112-157


terilGARD® III
Advance®

UI-55-2022-112-161

UI-55-2022-112-162

UI-55-2022-112-159


BANKERS BOX
THE BUMBLEBEE

UI-55-2022-112-166

UI-55-2022-112-167

UI-55-2022-112-170

UI-55-2022-112-168

UI-55-2022-112-53

UI-55-2022-112-28

UI-55-2022-112-29

UI-55-2022-112-30

UI-55-2022-112-31

UI-55-2022-112-32

UI-55-2022-112-33

UI-55-2022-112-44

UI-55-2022-112-40

UI-55-2022-112-39

UI-55-2022-112-35

UI-55-2022-112-38

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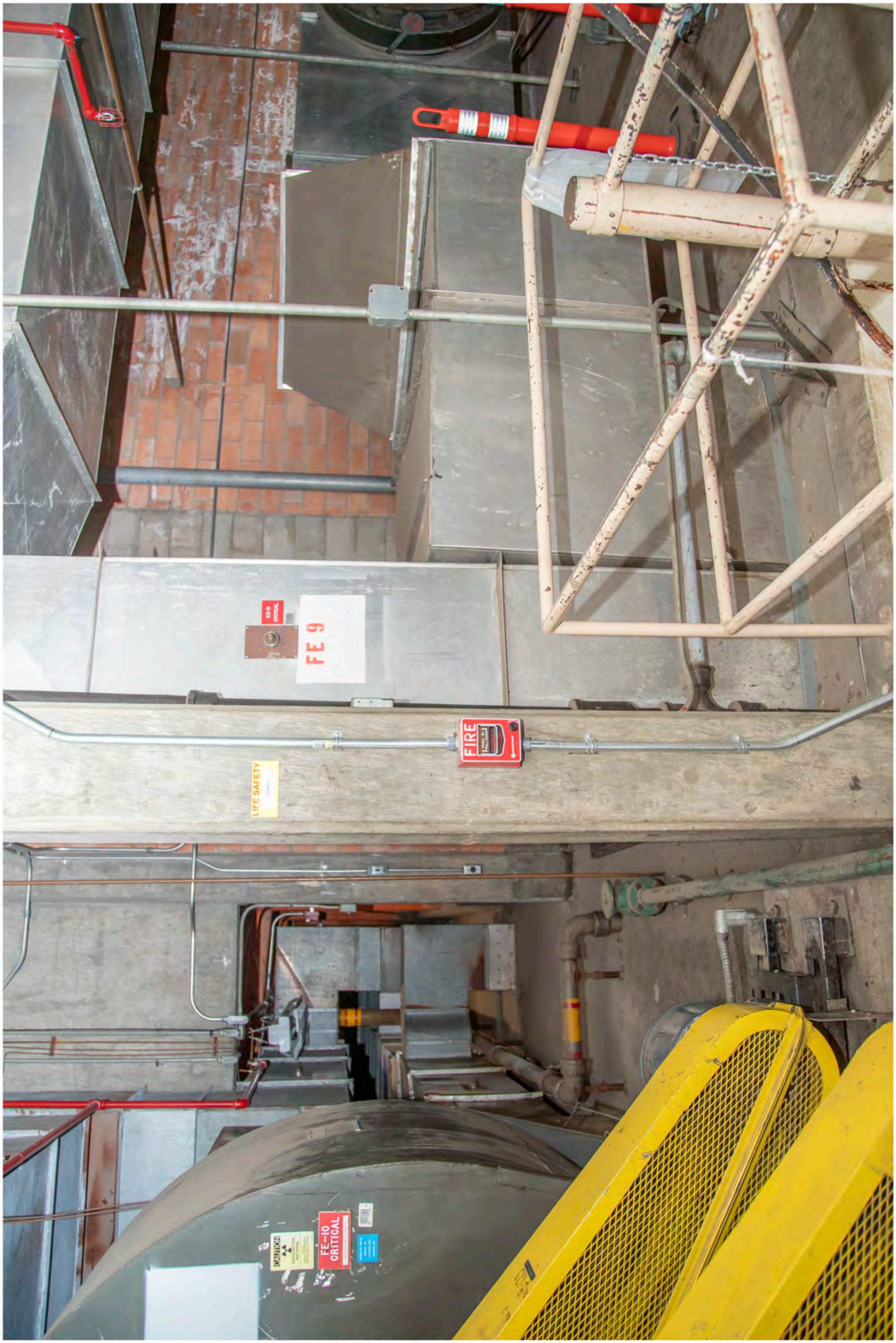

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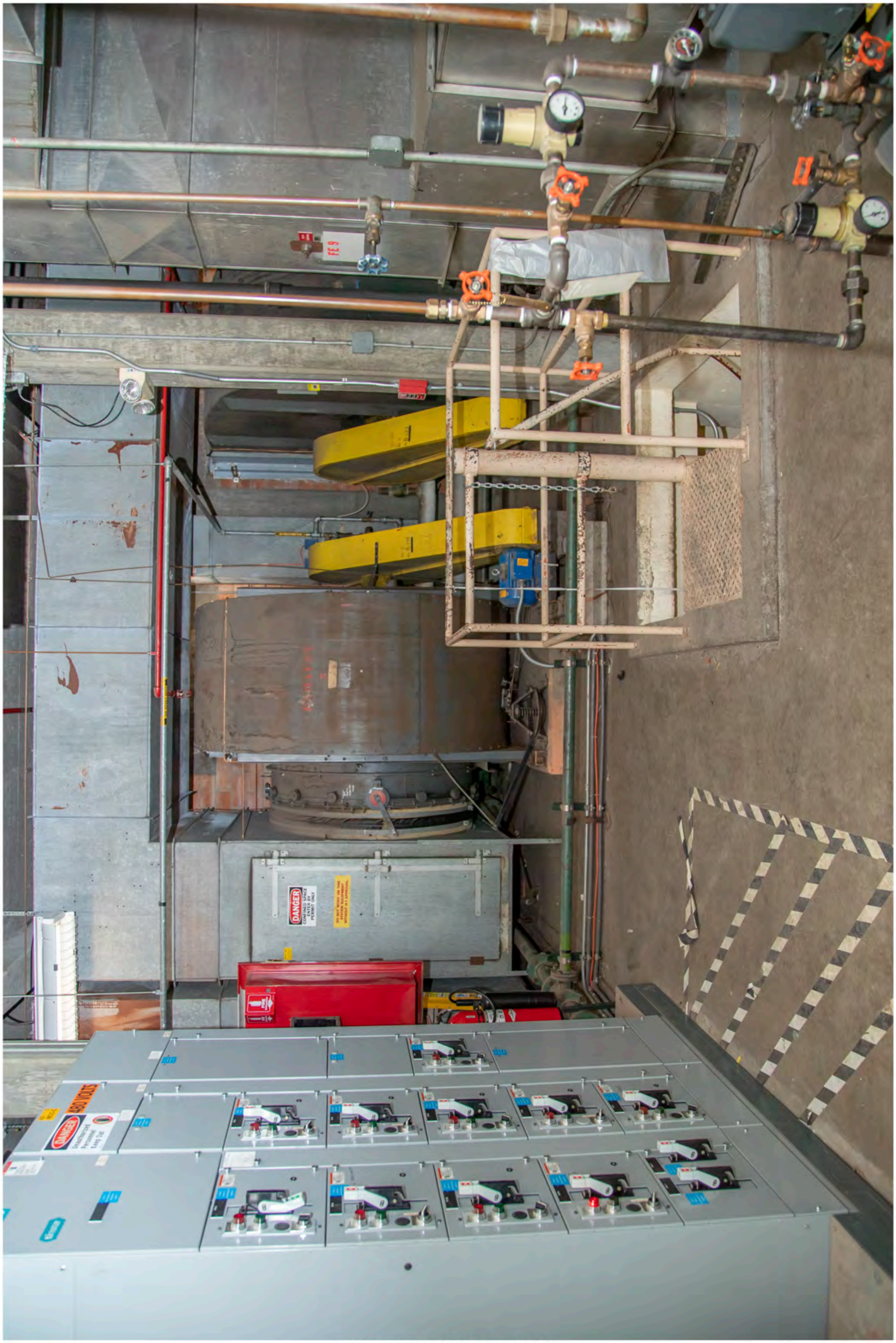

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UI-55-2022-111-323

UI-55-2022-111-326

UI-55-2022-111-328

UI-55-2022-111-336

UI-55-2022-111-329

UI-55-2022-111-330

UI-55-2022-111-340

UI-55-2022-111-334

UI-55-2022-111-332

UI-55-2022-111-339

UI-55-2022-111-335

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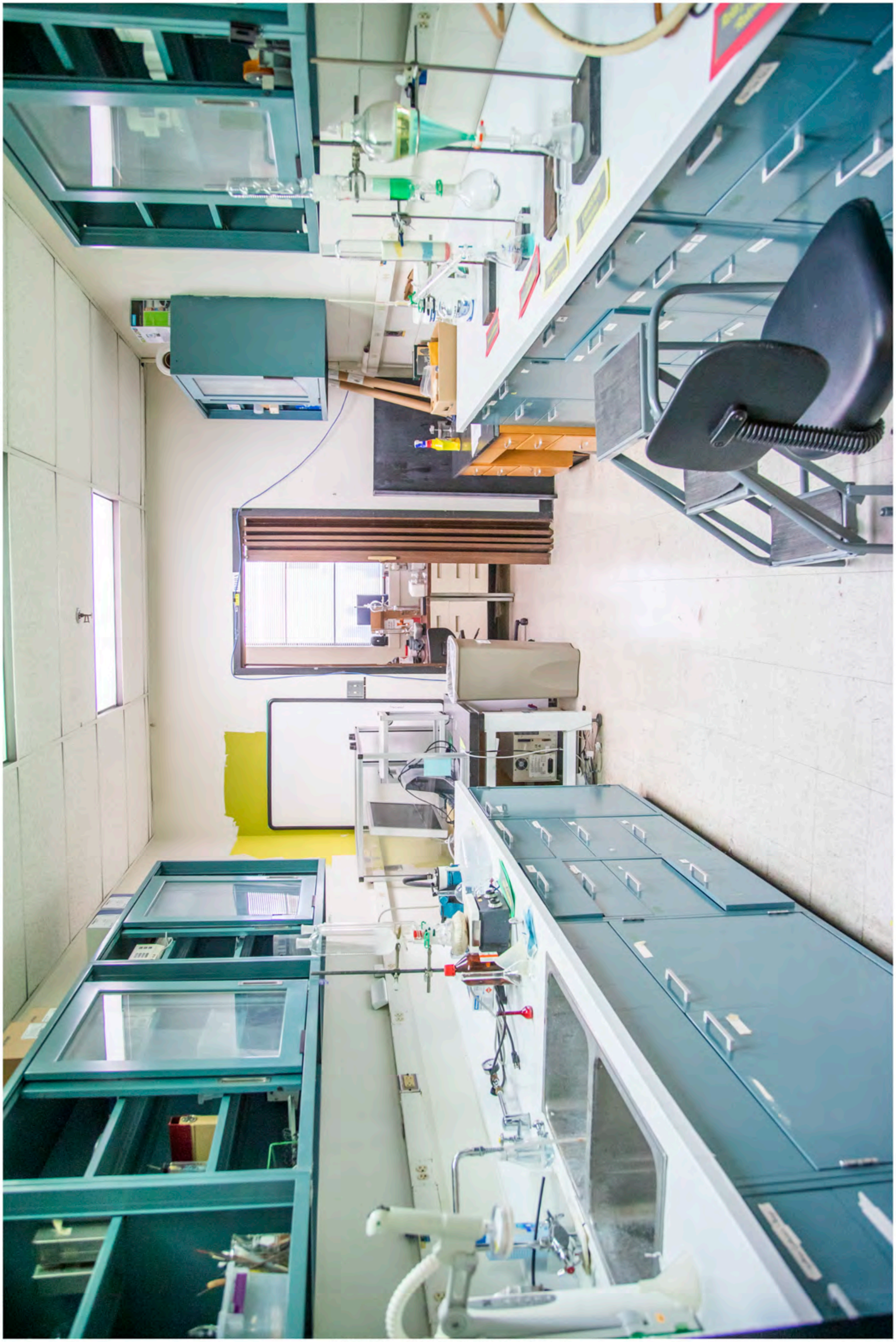

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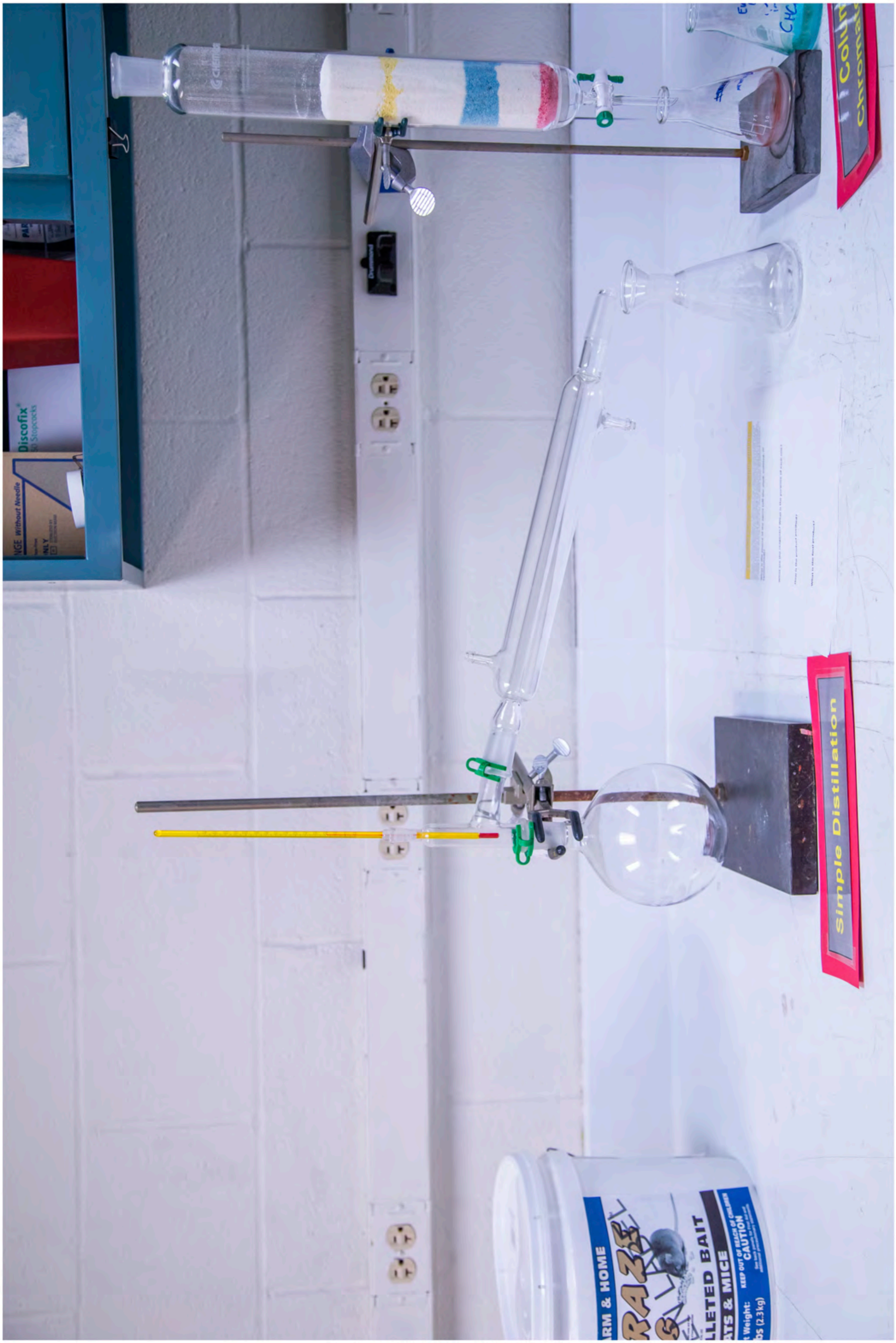

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B218A

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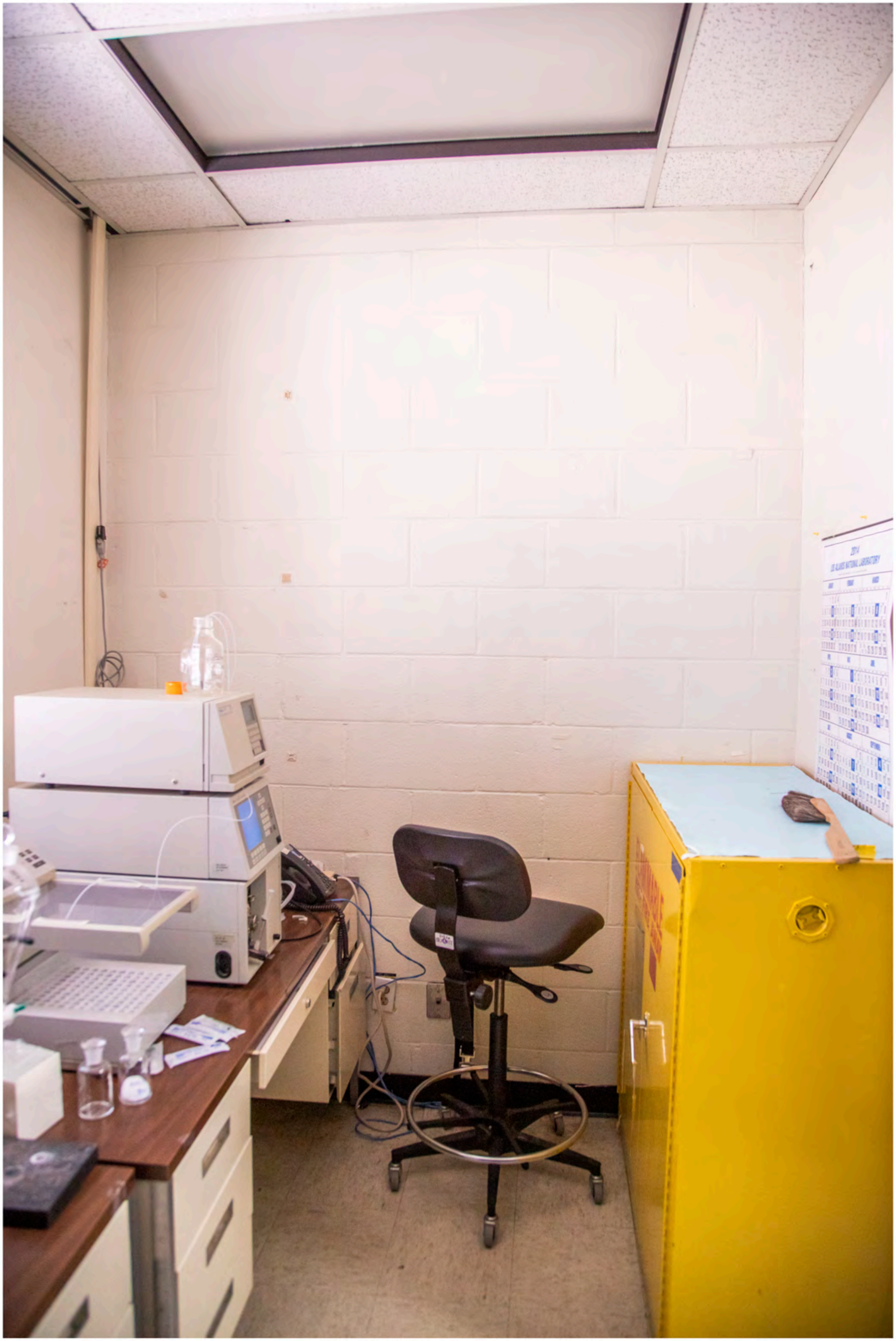
UI-55-2022-111-378

UI-55-2022-111-370



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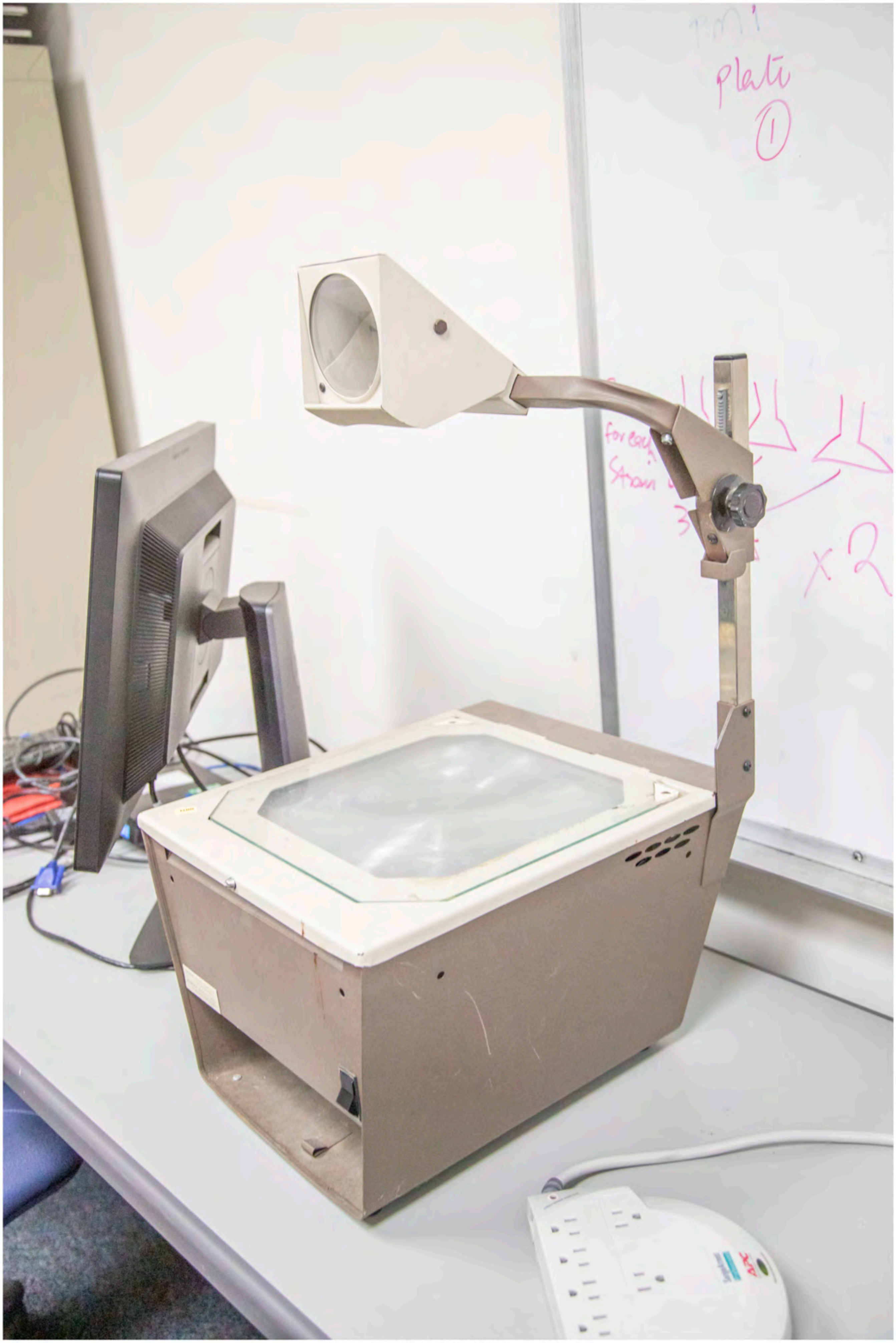

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UI-55-2022-112-4

UI-55-2022-112-9

UI-55-2022-112-11

UI-55-2022-112-14

UI-55-2022-112-13

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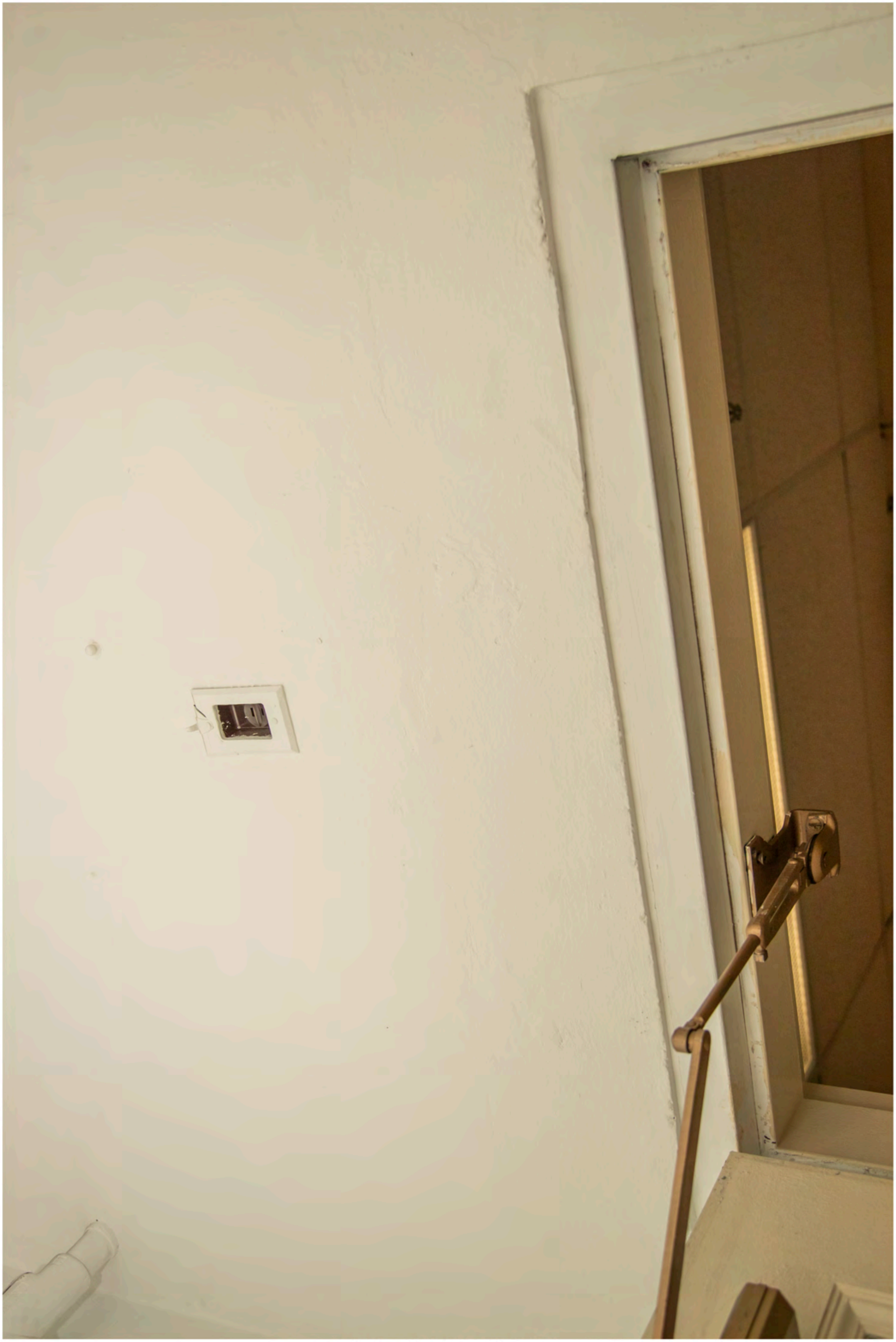
UI-55-2022-112-25



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UI-55-2022-111-188

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UI-55-2022-111-197

UI-55-2022-111-199

UI-55-2022-111-209

UI-55-2022-111-213

UI-55-2022-111-200

UI-55-2022-111-202

UI-55-2022-111-207

UI-55-2022-111-205

UI-55-2022-111-208

UI-55-2022-111-224

UI-55-2022-111-215

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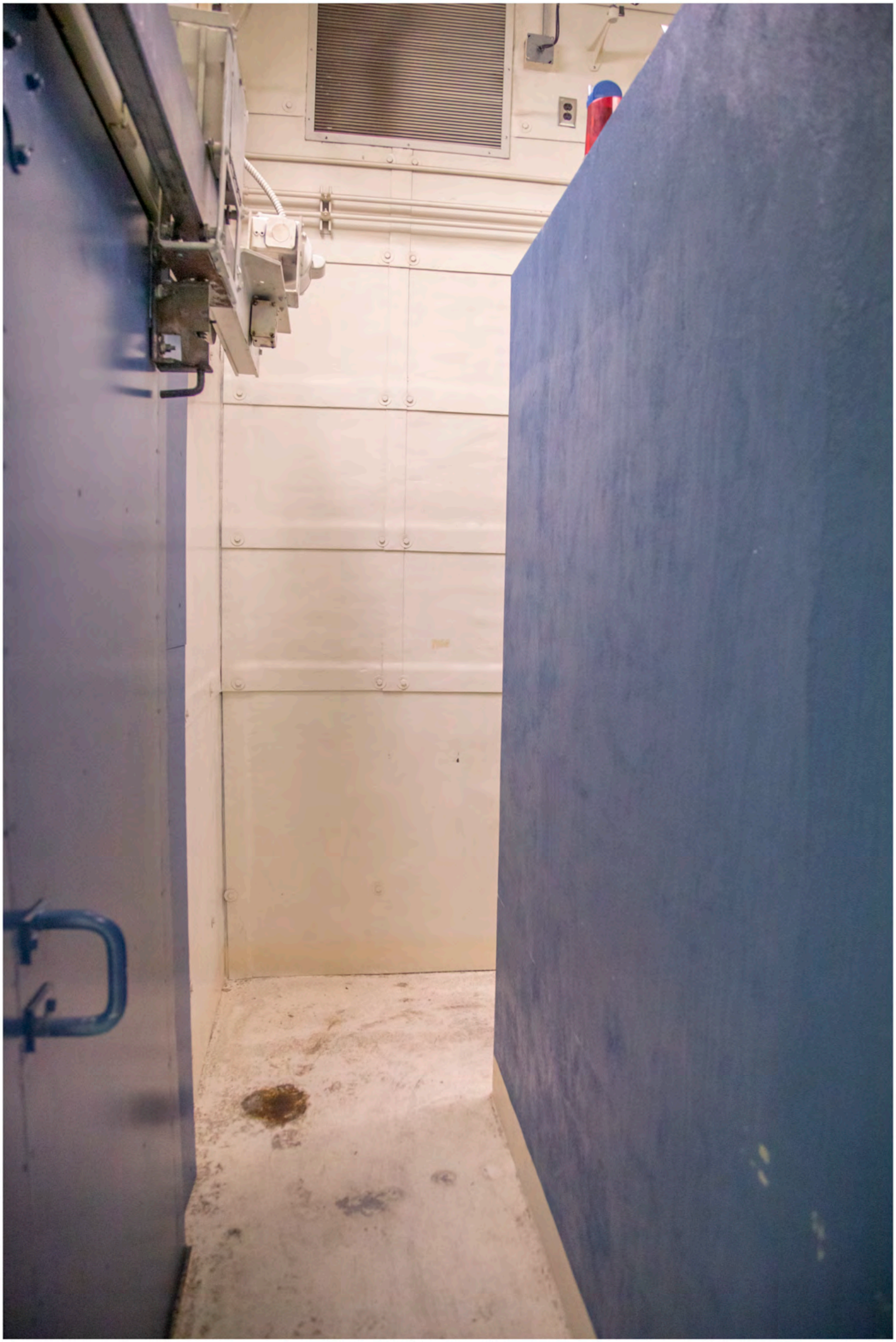

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UI-55-2022-111-236

UI-55-2022-111-237


PANIC BUTTON

UI-55-2022-111-242

UI-55-2022-111-239

UI-55-2022-111-240

UI-55-2022-111-247

UI-55-2022-111-245

UI-55-2022-111-248

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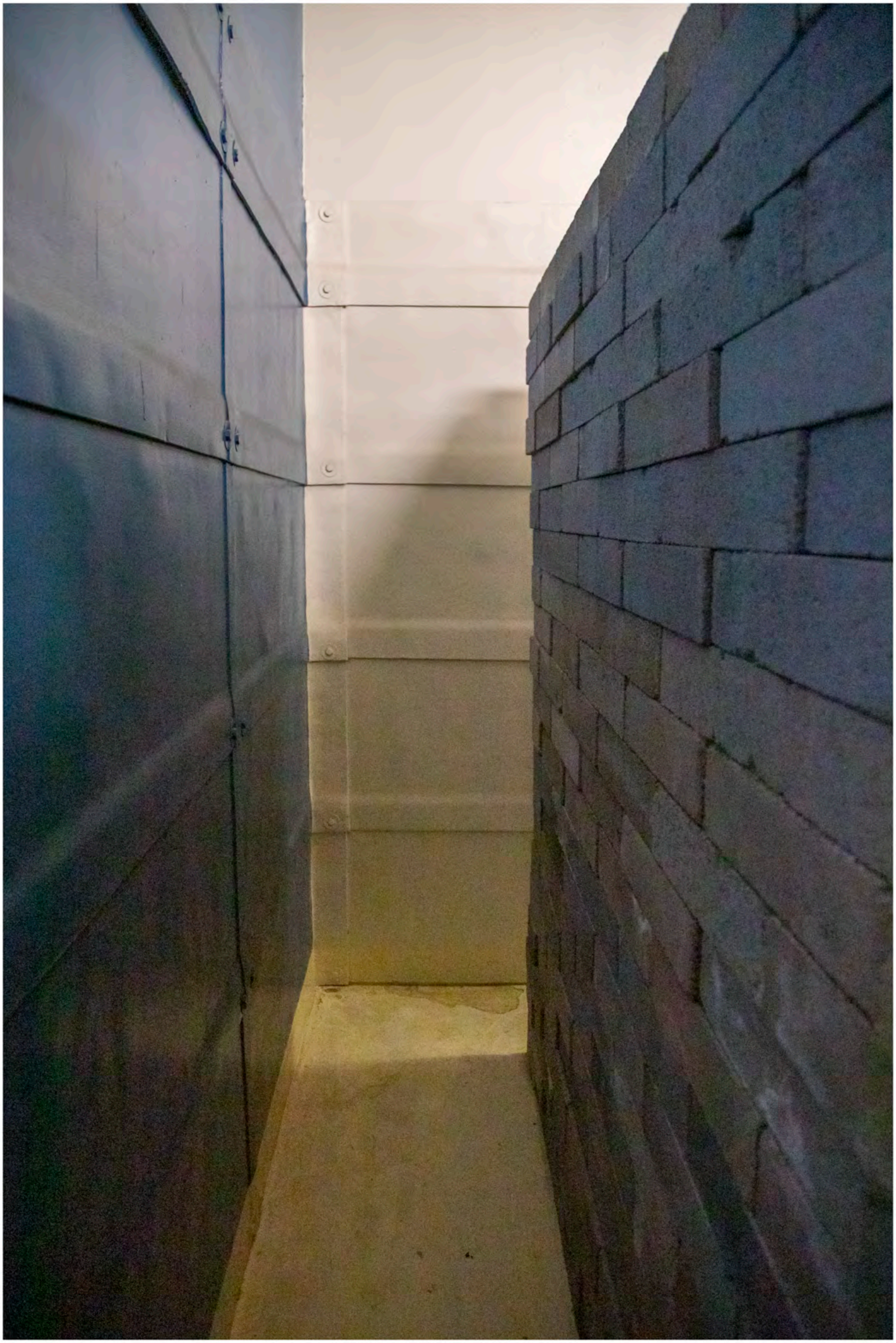
UI-55-2022-111-254

UI-55-2022-111-252



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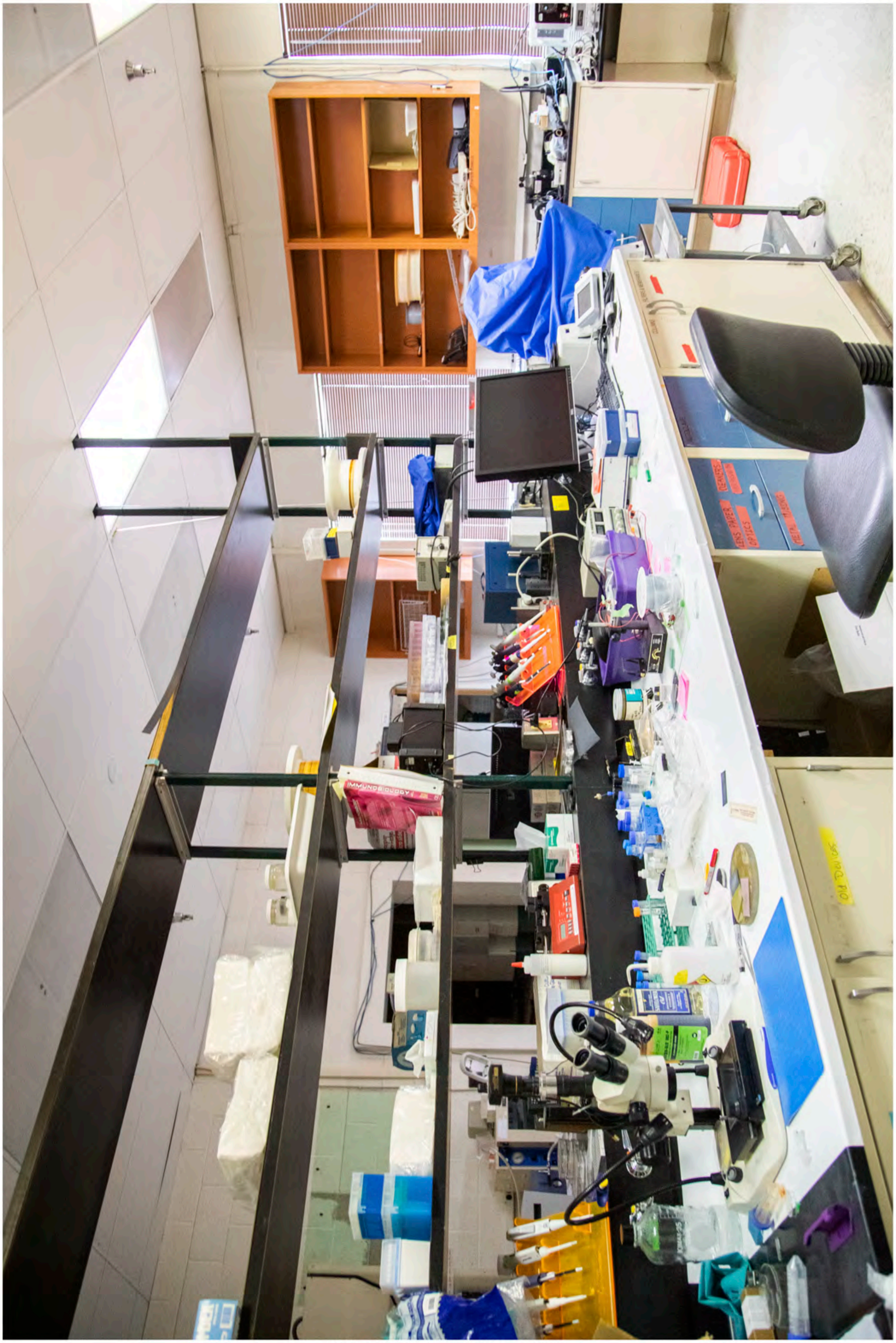

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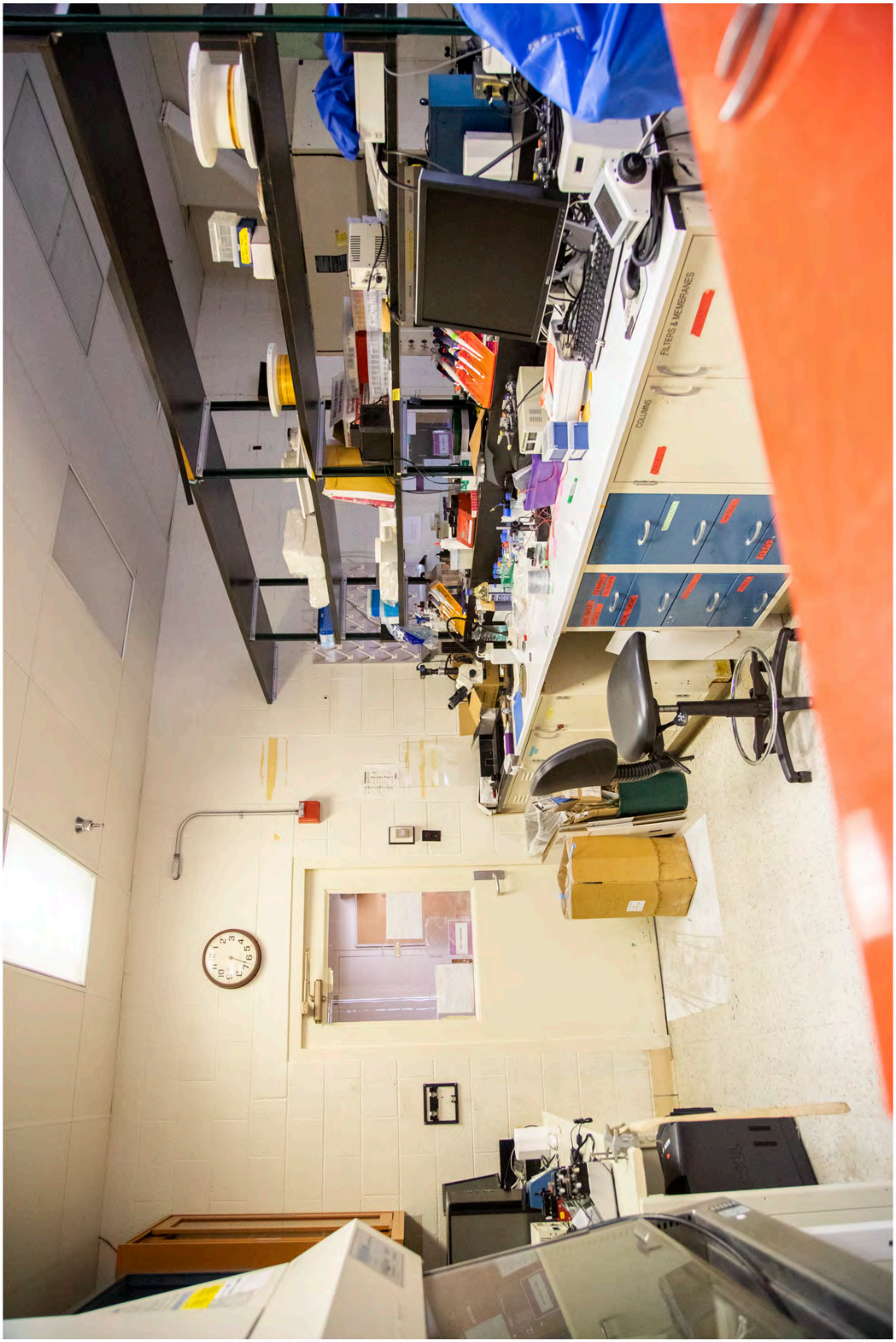

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UI-55-2022-111-428

UI-55-2022-111-427


NOTICE
CAUTION

UI-55-2022-111-440

UI-55-2022-111-433

UI-55-2022-111-439

UI-55-2022-111-436

UI-55-2022-111-438

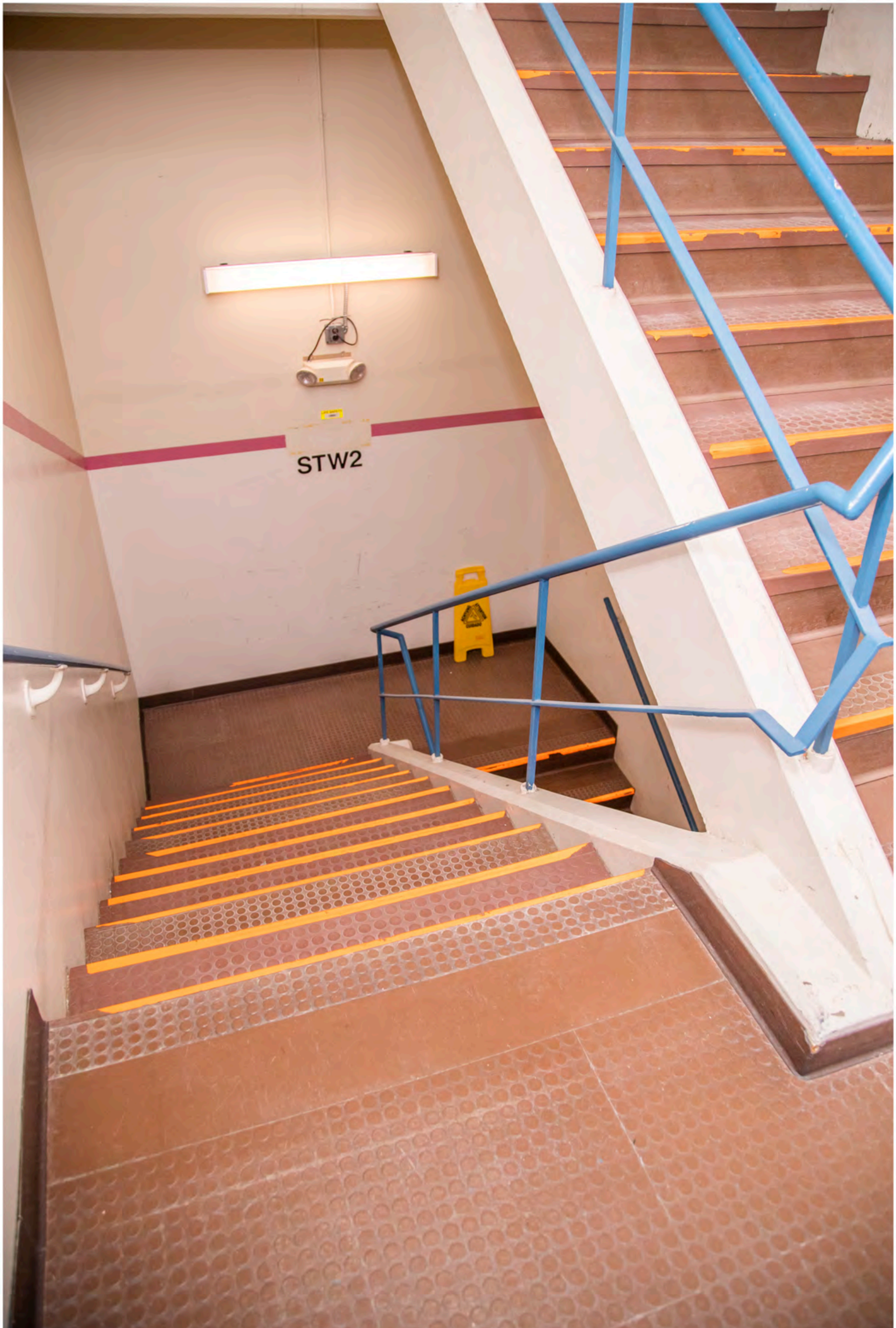
UI-55-2022-111-437

UI-55-2022-111-442

UI-55-2022-111-443

UI-55-2022-111-446


WEIGH BOATS
SYRINGE FILTERS
PASTEUR PIPETS



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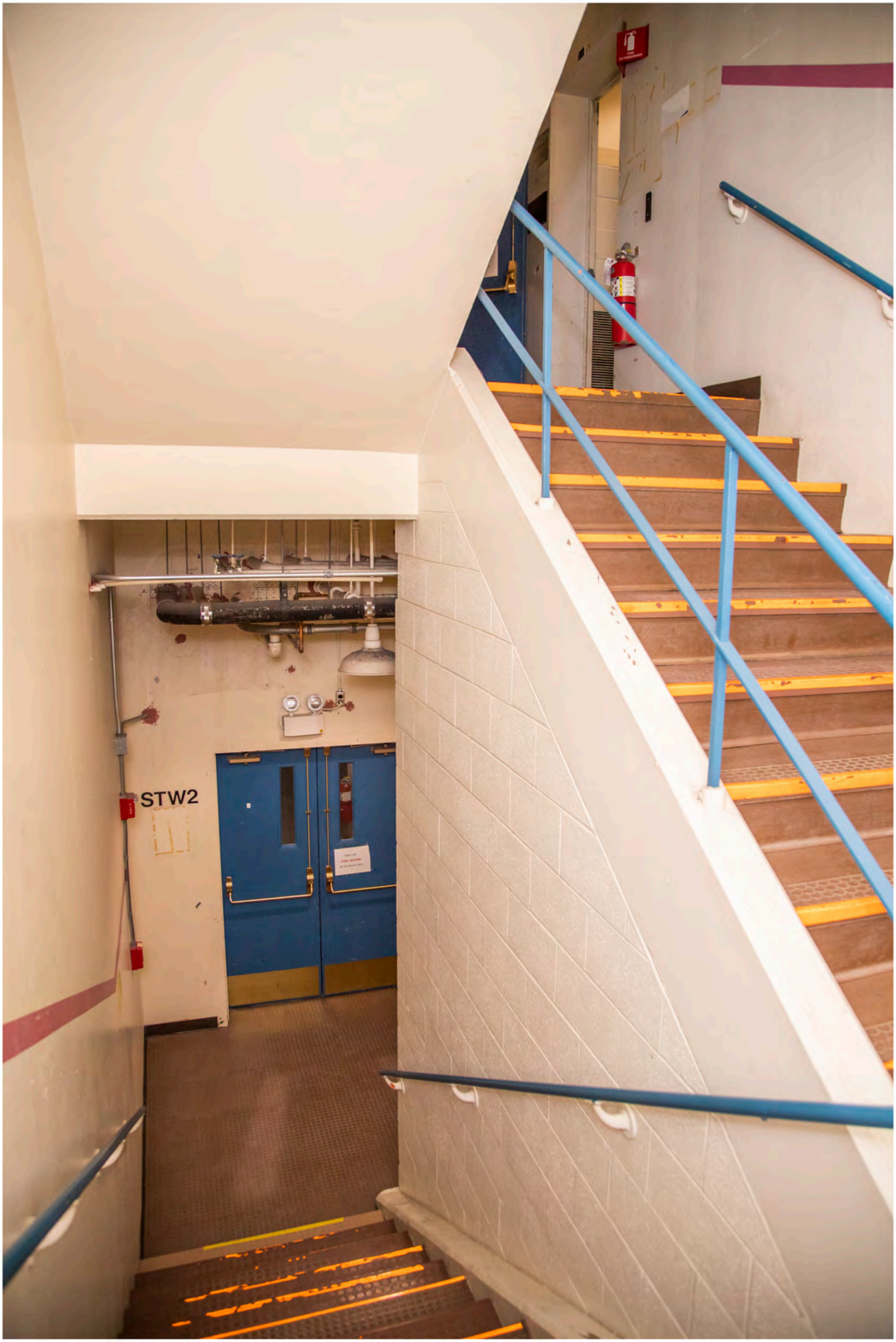

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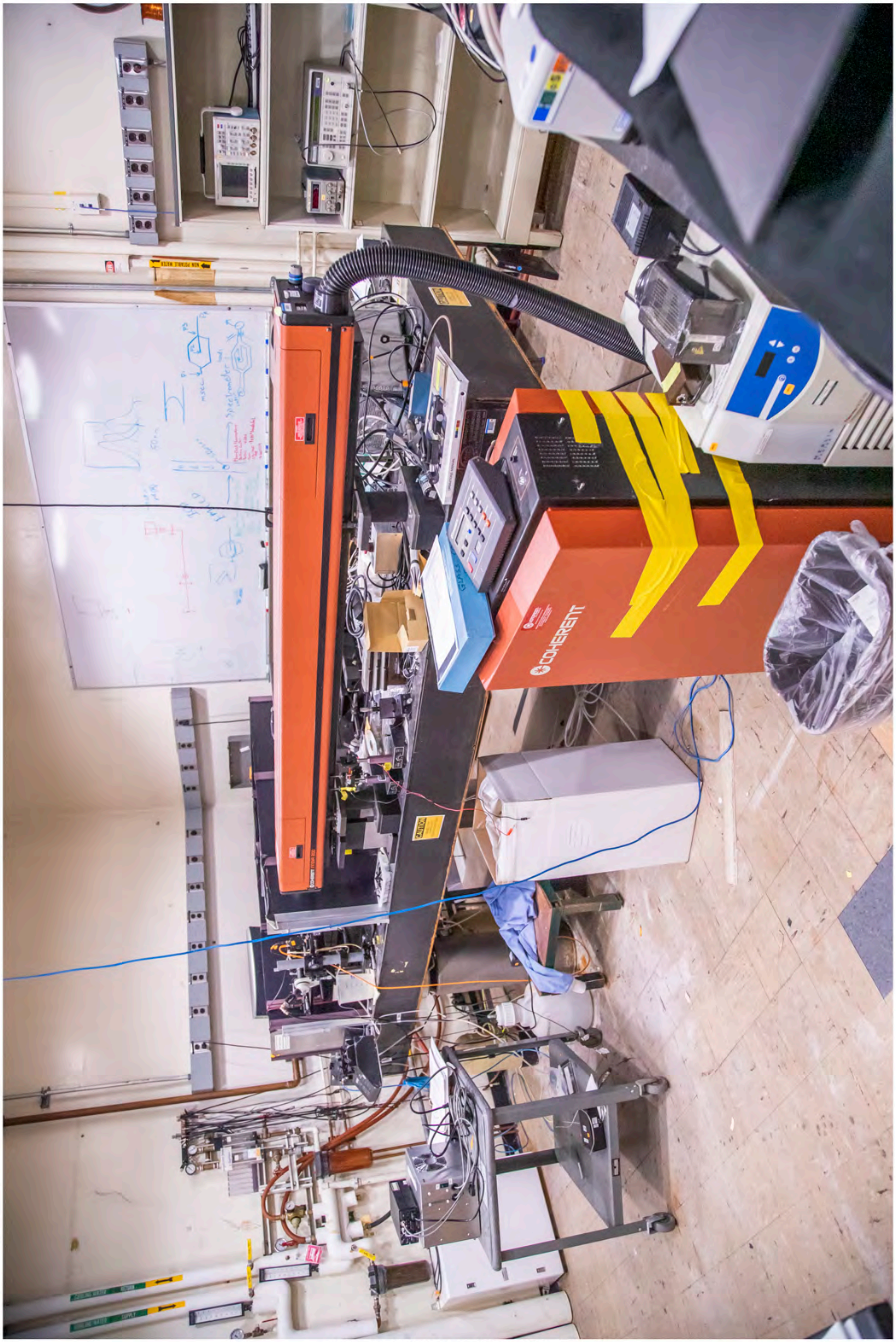

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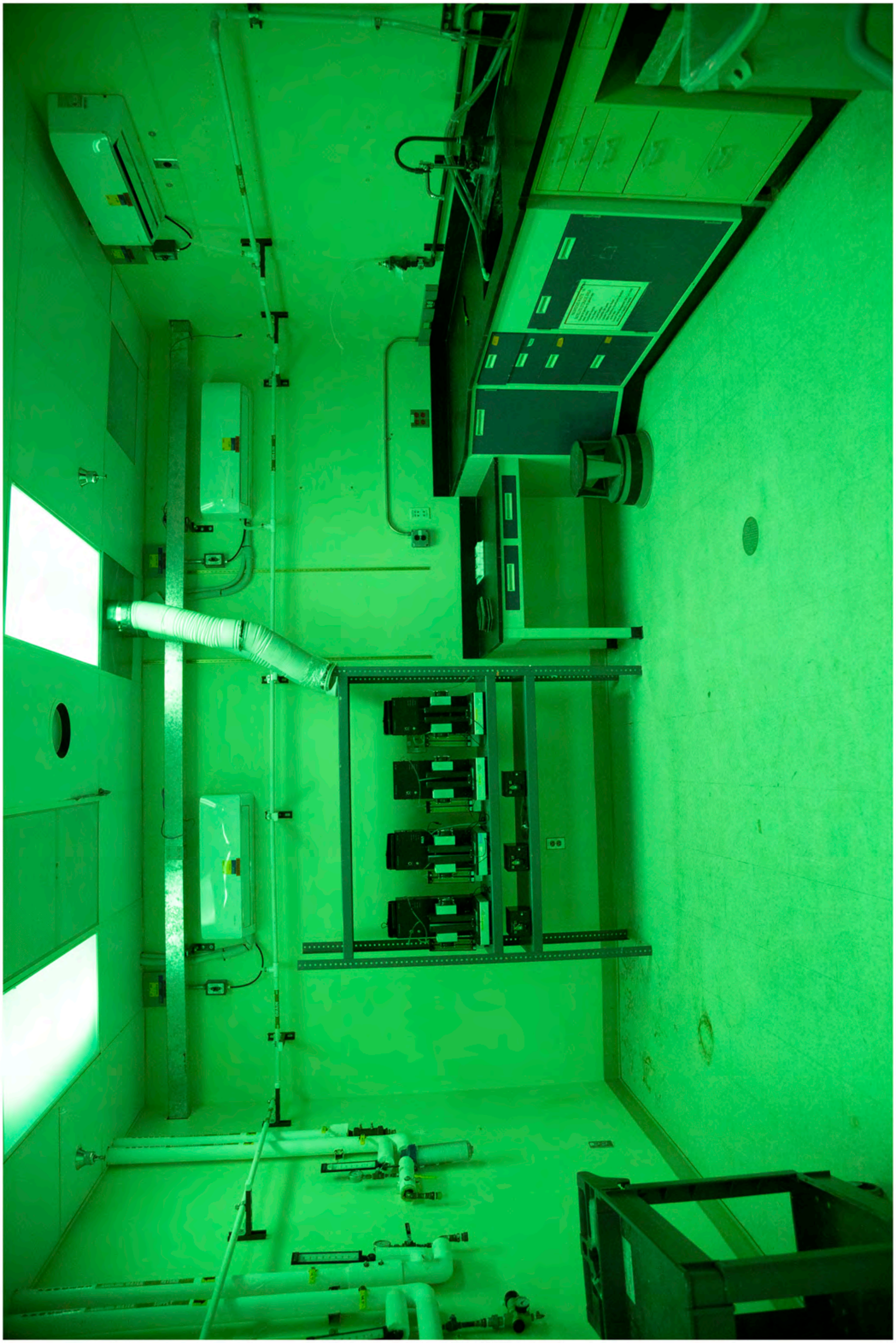

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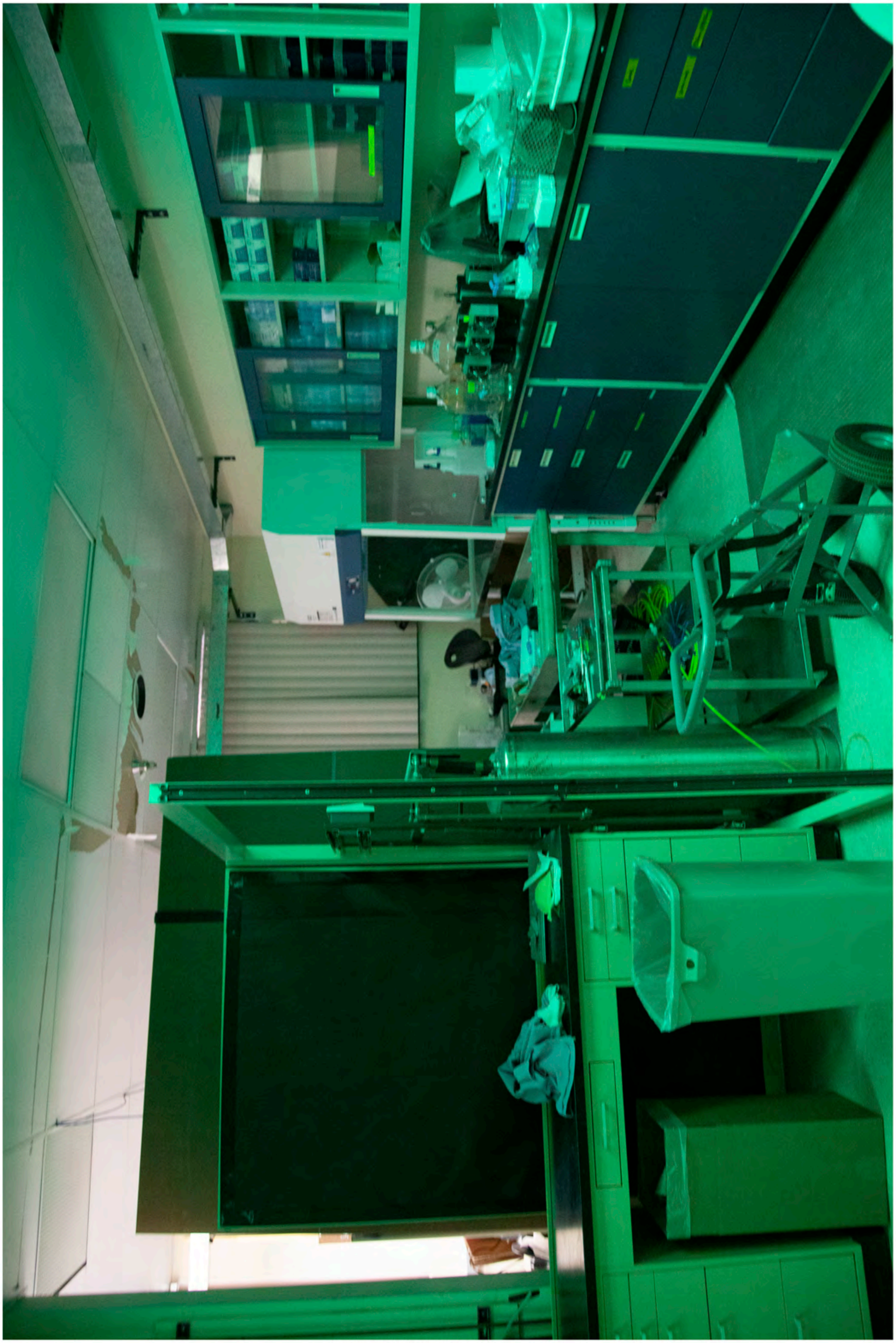

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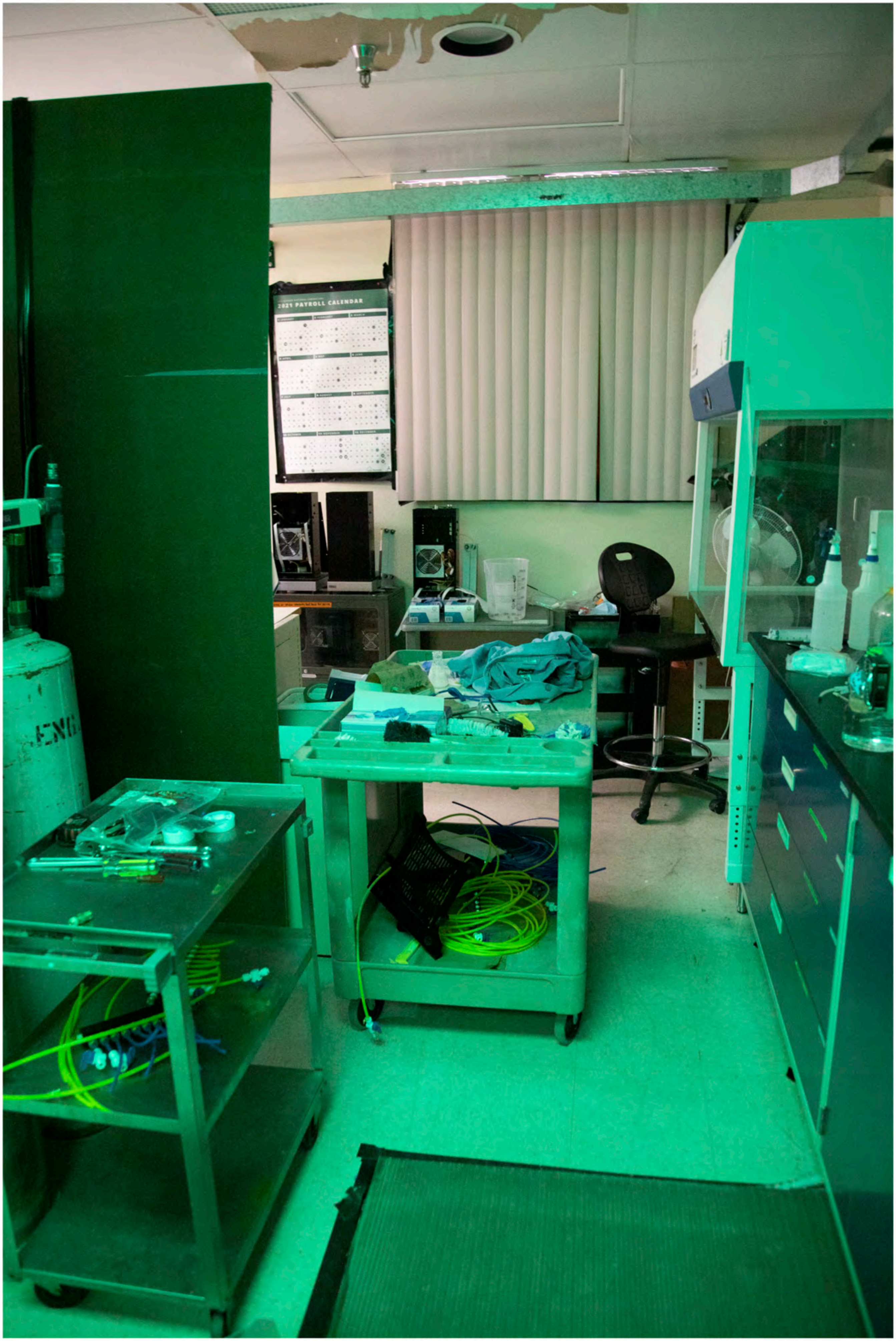

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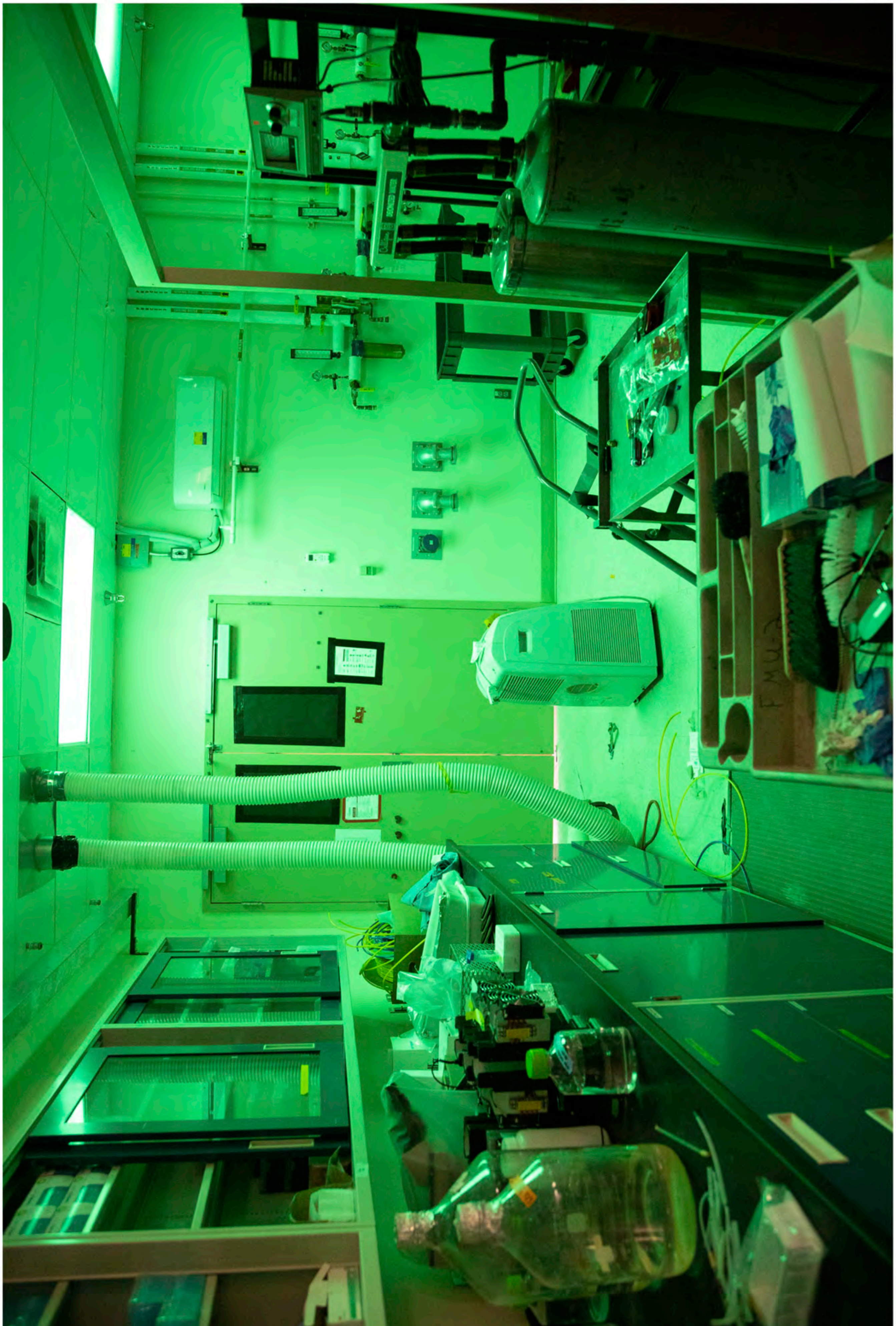

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UI-55-2022-111-412

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UI-55-2022-111-120

UI-55-2022-111-122

UI-55-2022-111-124

UI-55-2022-111-126

UI-55-2022-111-121

UI-55-2022-111-127


DIEGO PLEASE
GIVE ME A CALL
BEFORE CLEANING
THIS SINK

UI-55-2022-111-131

UI-55-2022-111-134

UI-55-2022-111-136

UI-55-2022-111-138

UI-55-2022-111-142

UI-55-2022-111-143

UI-55-2022-111-146

UI-55-2022-111-149

UI-55-2022-111-152

UI-55-2022-111-145

UI-55-2022-111-155

UI-55-2022-111-154

UI-55-2022-111-139

UI-55-2022-111-153

UI-55-2022-111-157

UI-55-2022-111-140

UI-55-2022-111-116

UI-55-2022-111-161

UI-55-2022-111-160

UI-55-2022-111-166

UI-55-2022-111-167

UI-55-2022-111-172

UI-55-2022-111-169

UI-55-2022-111-171

UI-55-2022-111-173

UI-55-2022-111-163

UI-55-2022-111-164


REVCO
NO FOOD OR DRINK PERMITTED IN THIS FREEZER.

UI-55-2022-111-175

UI-55-2022-111-177

UI-55-2022-111-181

UI-55-2022-111-182

UI-55-2022-111-180

UI-55-2022-111-179

UI-55-2022-111-459

UI-55-2022-111-466

UI-55-2022-111-469

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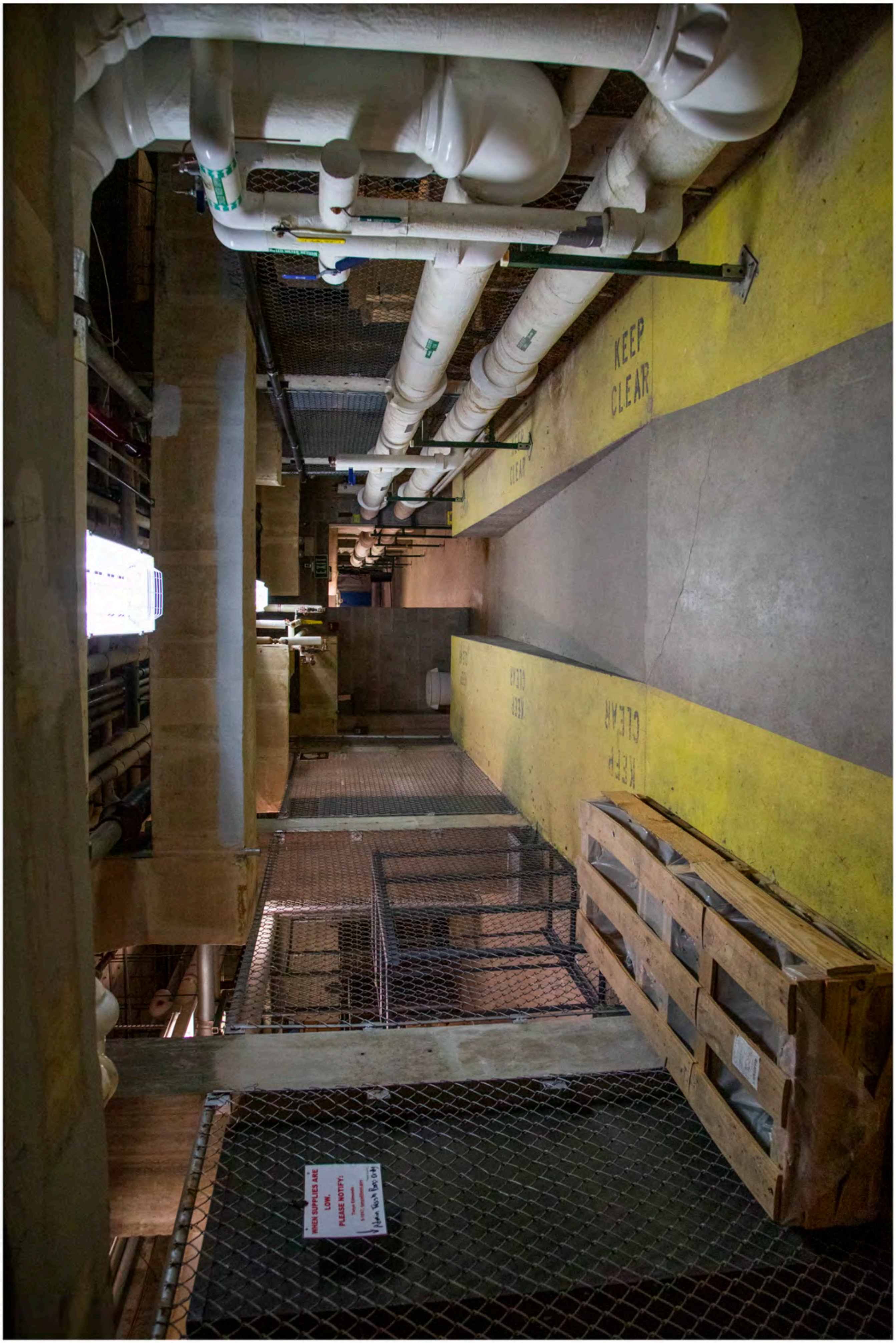
UI-55-2022-111-480

UI-55-2022-111-479



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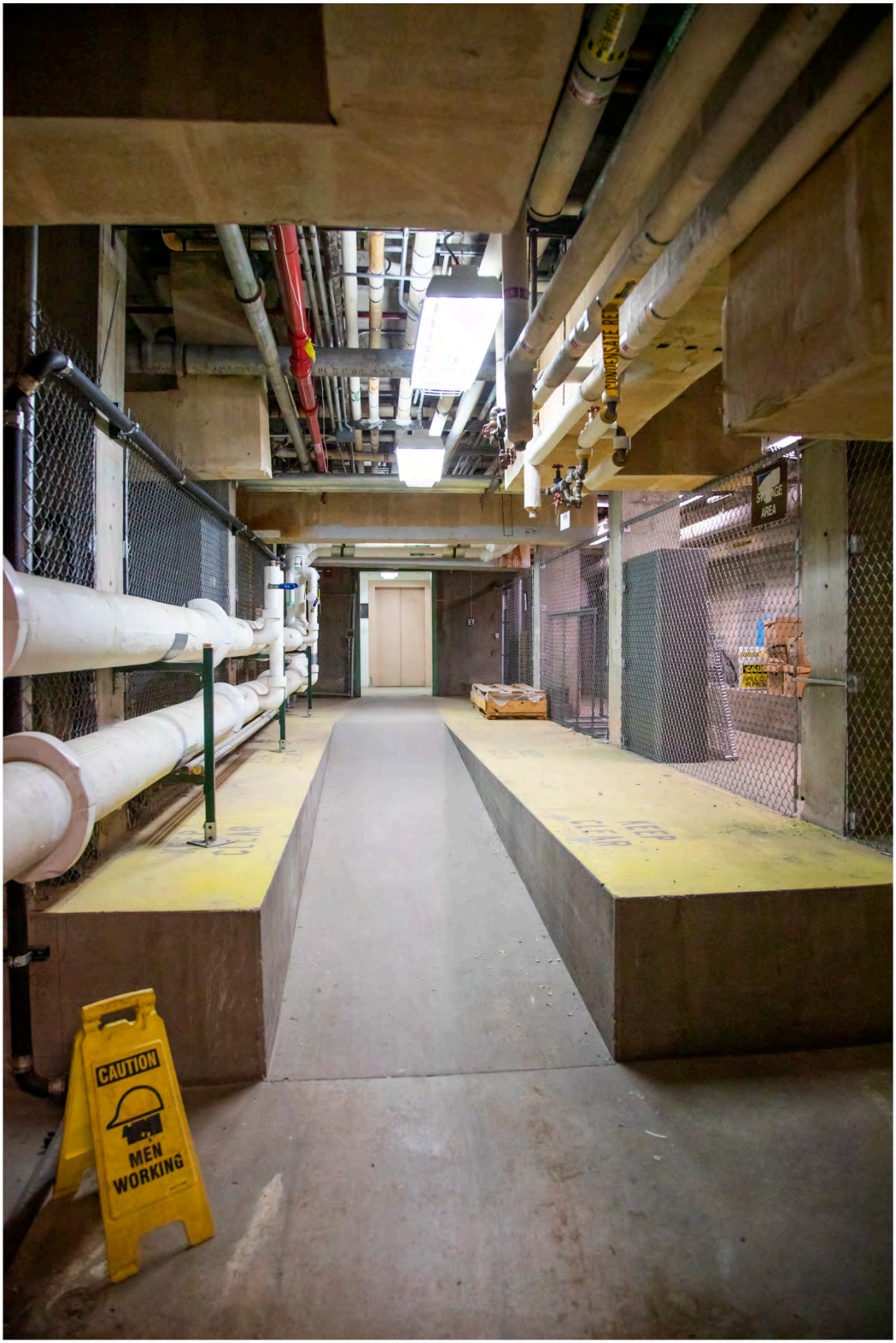

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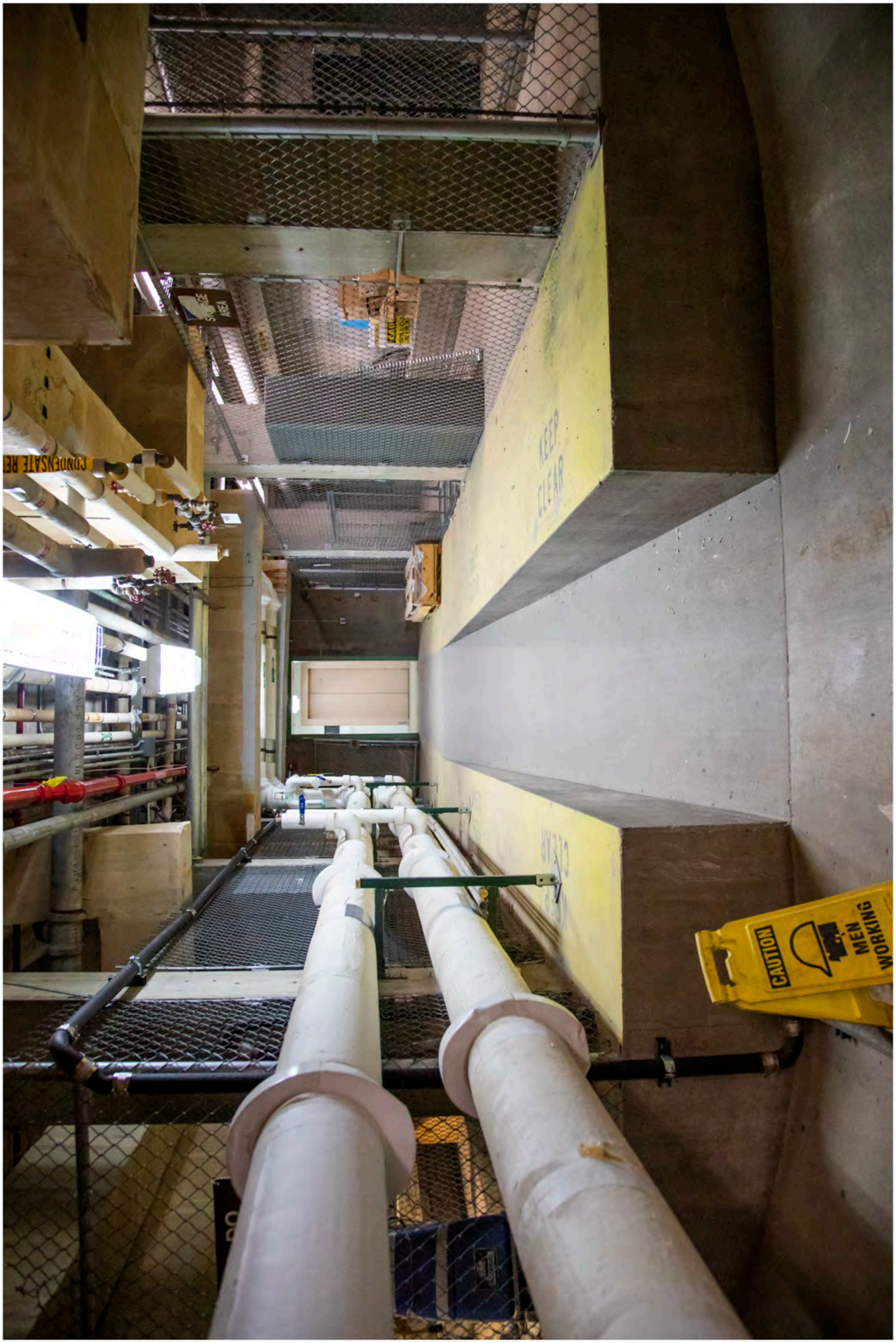

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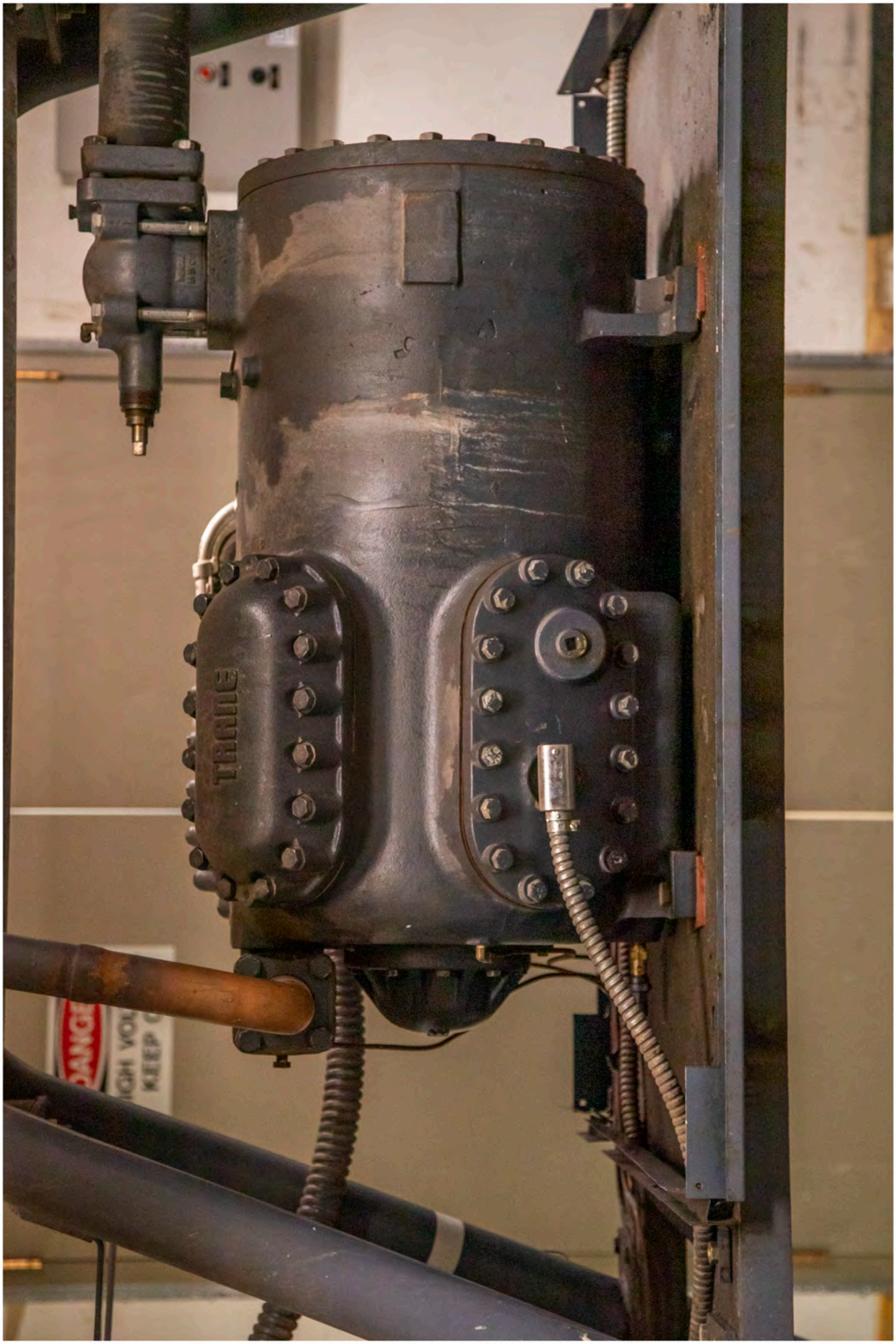

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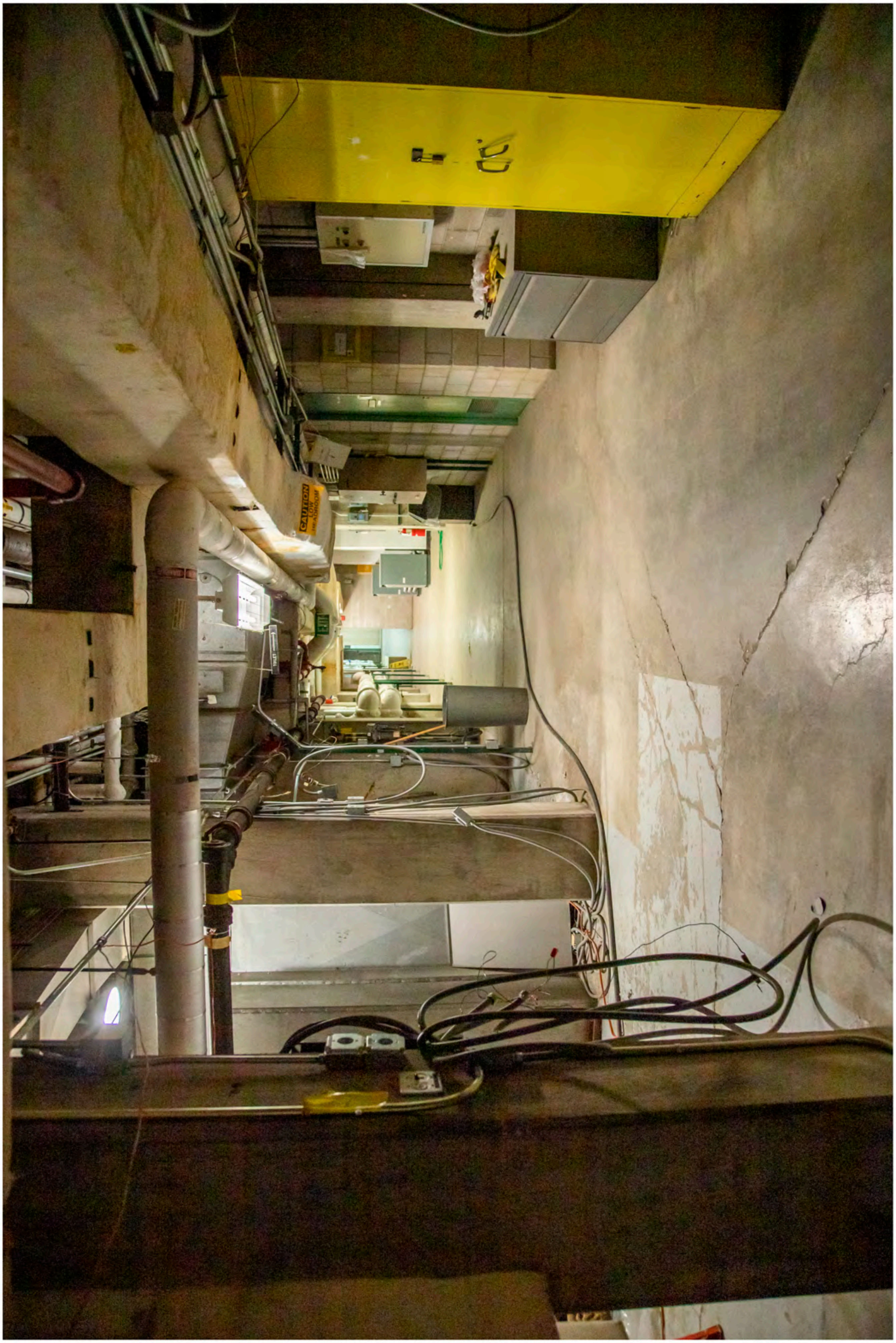

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UI-55-2022-111-72

UI-55-2022-111-78

UI-55-2022-111-79

UI-55-2022-111-81

UI-55-2022-111-82

UI-55-2022-111-104

UI-55-2022-111-85

UI-55-2022-111-87

UI-55-2022-111-92

UI-55-2022-111-91

UI-55-2022-111-88

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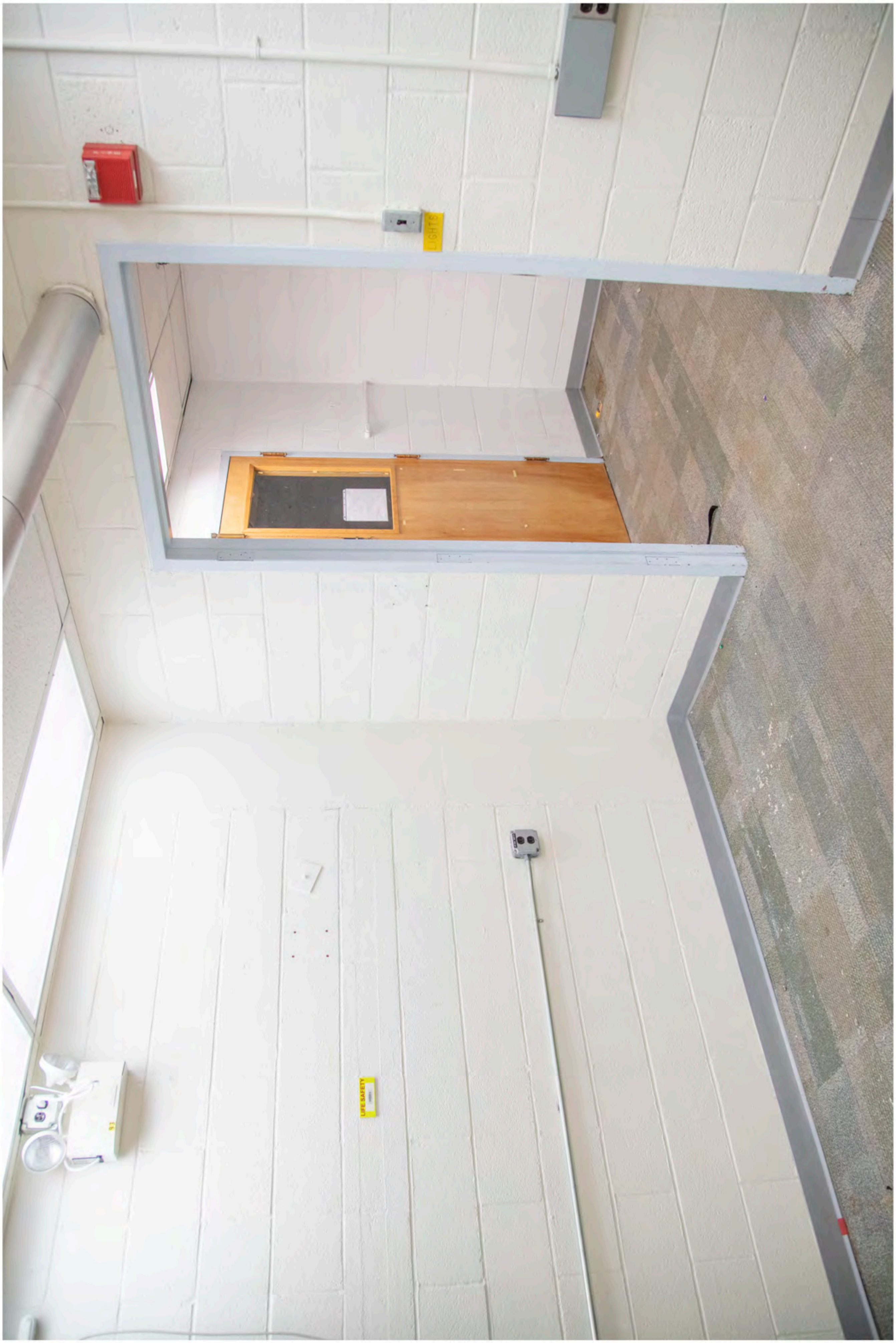
UI-55-2022-111-57



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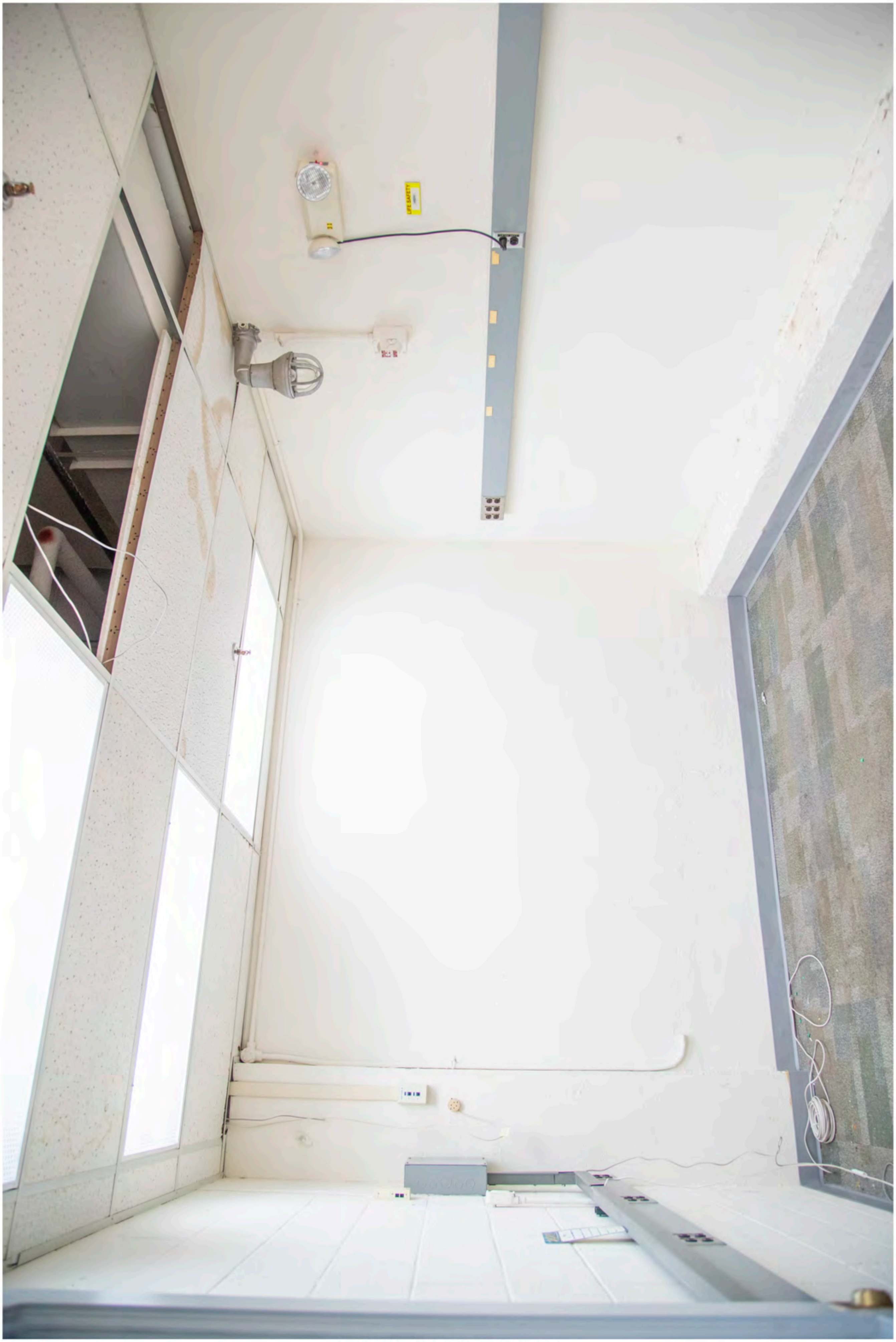

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UI-55-2022-111-22

UI-55-2022-111-24

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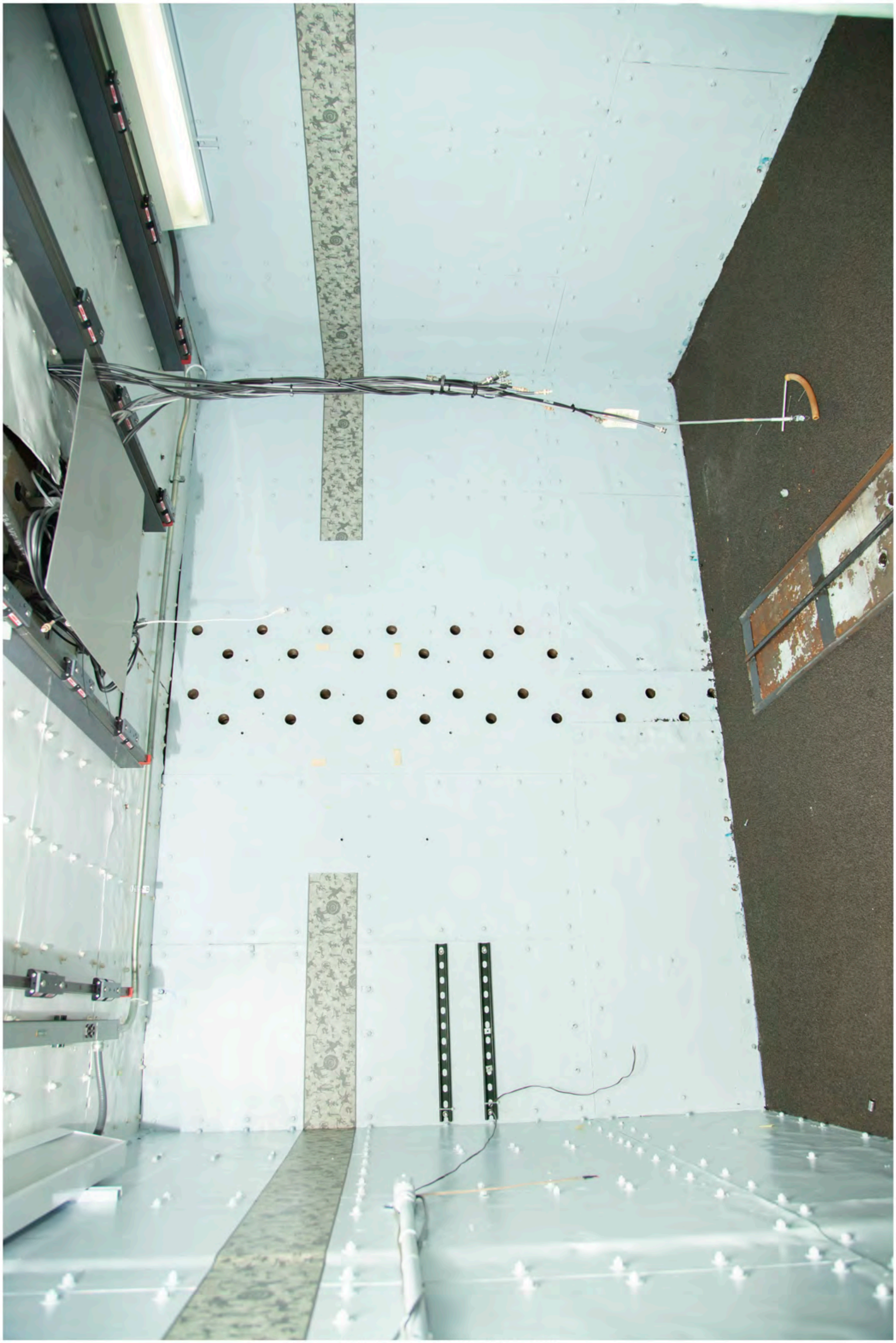

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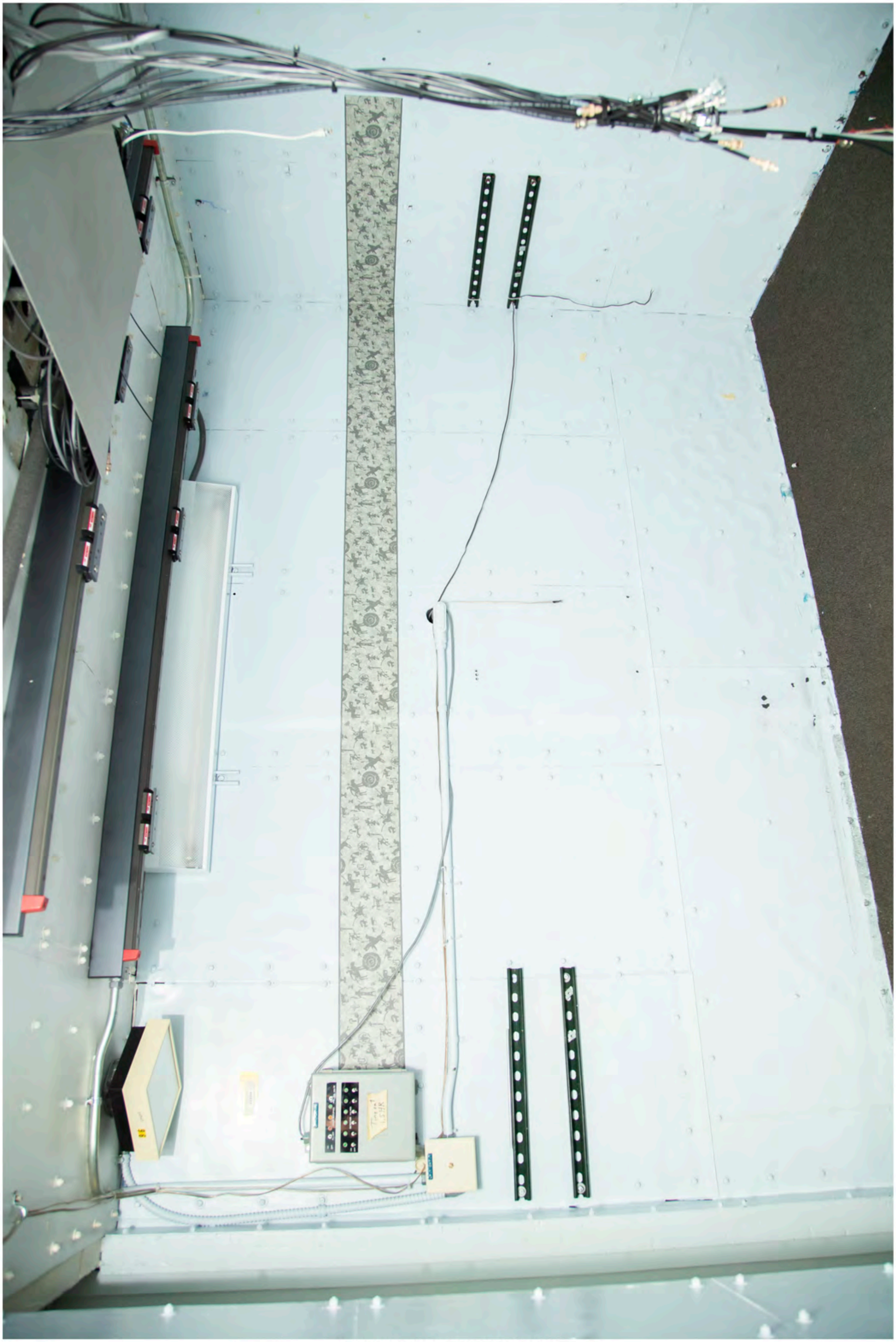

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UI-55-2022-111-41

UI-55-2022-111-43

UI-55-2022-111-42

UI-55-2022-111-44

UI-55-2022-111-45

UI-55-2022-111-46

UI-55-2022-111-47

UI-55-2022-111-48

UI-55-2022-111-49

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UI-55-2022-111-52

UI-55-2022-111-53

UI-55-2022-111-54

UI-55-2022-111-55