ANNUAL 2021

THE VAULT

NATIONAL SECURITY THEN & NOW

Los Alamos
NATIONAL LABORATORY


HE WAS CALLED BRILLIANT, GENIUS
AND, MOST IMPORTANTLY, DIRECTOR.
HEAR OPPENHEIMER
SPEAK
NSRC
LOS ALAMOS
Scan to listen.
nsrc@lanl.gov
When J. Robert Oppenheimer spoke, his words commanded attention, though he never sought publicity. In a rare interview just two years before his death, Oppenheimer talks about developing the world's first atomic bombs and life in Los Alamos during World War II. Listen to this 1965 audio recording from the Voices of the Manhattan Project.
NATIONAL SECURITY
RESEARCH CENTER
LOS ALAMOS NATIONAL LABORATORY

LETTER FROM THE NSRC DIRECTOR

Looking back, I can say with certainty that we rose to the challenge.

Like other entities all around the globe, the National Security Research Center was tested by the COVID-19 pandemic. As a young organization (we celebrated our second anniversary in June 2021) and one that is critical to Los Alamos National Laboratory's national security charge, we faced the difficult task of continuing our mission-essential work while keeping our staff safe.

The NSRC is one of the largest libraries in the United States, and it houses the country's most-comprehensive collections of nuclear weapons-related national security material. The NSRC contains millions of documents, films, photos, and other materials on the development, testing, and production of nuclear weapons. These are accessed on a daily basis by scientists, engineers, and researchers at Los Alamos and other National Nuclear Security Administration's labs and sites, as well as partners in the Department of Defense.

It was not an option for us to close our doors — our nation's security depended on us not to. Not only did we continue operating under new safety protocols, we successfully accomplished many pre-pandemic goals. Thanks to the NSRC's dedicated staff, our accomplishments during our second year are too numerous to list, though two in particular come to mind.

The NSRC stood up seven high-speed digitization labs to make one-of-a-kind nuclear weapons materials from the past accessible to today's researchers. Standing up a lab is no small endeavor; it is a lengthy project that requires researching industry best-practices, hiring new staff, and implementing new equipment. Creating these labs is absolutely critical to weapons-related mission work at Los Alamos. Millions of hard-copy media are transferred into electronic formats so they can be more easily searched, accessed, and stored, which negates the need to recreate the information, saving vast amounts of time and even more money.

Notably, the newest of these labs was in partnership with the Weapons Production directorate in support of the Lab's pit production work — a critical endeavor entrusted to Los Alamos to increase the country's plutonium-processing and pit-manufacturing capabilities. (Pits are part of nuclear warheads. Aging plutonium, security advancements, and other factors mean that pits eventually must be replaced.)

As our growth in materials preservation continues to increase, so too does our role in creating new ways to share information. The NSRC is expanding into book publishing — although we are in the early stages, we already have four titles in the works that range from a coffee table-style book on Los Alamos Nobel laureates to the history of the H-bomb. These books are based on the photographs, data, and other materials that make up the NSRC's collections.

It's hard to believe that the NSRC's second year was just as exciting as our first and, I have to say, I couldn't be more optimistic for the continued growth and new endeavors that our third year already promises.

Rizwan Ali
Director, National Security Research Center

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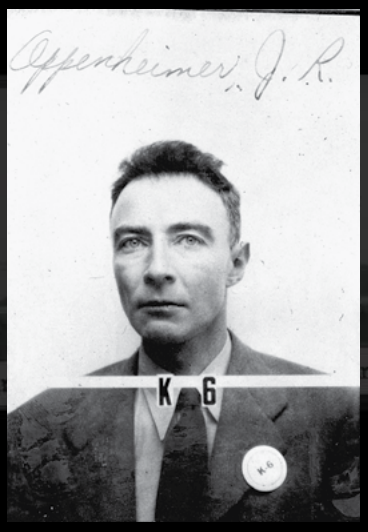
The NSRC's first large-scale photo preservation saves artifacts and creates a model for future projects.

Oppenheimer Before



Oppenheimer After

If a picture is worth a thousand words, a recent large-scale restoration project yielded about 1.4 million of them — not to mention a lot of refreshed faces.

The badge photos of more than 1,400 of the Lab's Manhattan Project workers, including our most-famous scientists J. Robert Oppenheimer, Emilio Segrè, and others had 75-plus years of built-up grime on them. Adhesive tape residue, bits of mounting materials, and environmental filth, like dust, caused many of these historic images to discolor.

So, the Lab's National Security Research Center (NSRC) executed its first large-scale restoration project to repair and further preserve these valuable pieces of history. Otherwise, the badge photos would have continued to deteriorate.

The photos are part of the collections in the NSRC, which houses many unclassified pieces of the Lab's history curated by a team of specialists.

"These photos are an important part of the Lab's past," said NSRC Senior Historian Alan Carr. "The Manhattan Project was the start of the Lab we know today. Plus, that workforce was the first to dedicate themselves to our national security mission."

NSRC Director Riz Ali added, "This project is just one example of our preservation work. The NSRC has millions of materials in almost every medium imaginable, so whether it's pictures of staff, films of test shots, or blueprints of engineering drawings, we're working to ensure the Lab's legacy materials are accessible now and always."

Restoring, preserving

The badge photos were taken in batches to a conservator, Roger Joyce, in Santa Fe. Joyce cleaned each photo, removed stains, and then placed it in protective archival sleeves. It takes anywhere from about 10 to 30 minutes to clean each badge photo, most of which are about 1-and-a-half inches by 1 inch.

The most-transformed badge photo was of Emilio Segrè, the Nobel Prize-winning physicist and Manhattan Project Group Leader. Part of Segrè's forehead was torn off and stuck to a piece of tape. Joyce repaired it to its near-original state. The badge photos will now be protected indefinitely from future damage.

High standards, proven protocol

This photo restoration project will serve as a model going forward for other valuable materials that may need to be restored, preserved, and used by the Lab, Ali said.

The NSRC houses the world's most comprehensive collection of nuclear weapons and national security materials dating back to the Manhattan Project. The tens of millions of materials are in a variety of media, including microfiche, microfilm, videos, cassettes, and notebooks. Staff makes them accessible to Lab researchers in support of their mission work.

"We want to ensure our history doesn't literally disappear," Ali said, "be it badge photos or weapons data."

Meanwhile, the next time you see Segrè, Oppenheimer, or others from the original staff, they will look better than they have in decades.

Segrè Before **Segrè After**

By Mott Linn, Chief Librarian, National Security Research Center

RELICS

THREE SHORT STORIES ON FASCINATING ARTIFACTS FROM LOS ALAMOS HISTORY

Some of history's best stories are right here.

Among the vast amount of classified documents, notebooks, films, photographs, and other media related to the development, testing, and production of nuclear weapons, there are also stories about fascinating people and extraordinary things from Los Alamos National Laboratory.

J. Robert Oppenheimer's wartime director's chair. A "Secret City" birth certificate. The step-by-step manual to build a Fat Man bomb.

The National Security Research Center encapsulates these stories – and, quite literally, millions more. Read about and listen to three of them.

OPPENHEIMER'S CHAIR

Even the father of the atomic bomb had to sit down somewhere.

It's hard to believe that Los Alamos's legendary first Lab director and brilliant physicist J. Robert Oppenheimer did something as ordinary as using a chair at work like the rest of us do.

However, aside from a recently gifted book, this chair from the 1940s is the only Oppenheimer possession that the Lab has. And Oppie fans love it.

As it turns out, though, the fascination may be more about the man who used it.

The chair comes from the Lab's earliest days in 1943 – three-and-a-half years into World War II and following the Japanese attack on Pearl Harbor.

Army Gen. Leslie Groves was in charge of the Manhattan Project, which included a secret lab in Los Alamos called Project Y. Its purpose: To create the world's first nuclear weapons.

Oppenheimer and his team did just that. In only 27 months, the Lab accomplished one of the greatest scientific achievements of all time and helped end WWII weeks later.

Perhaps Oppenheimer had his moments of scientific breakthrough while seated in his office.

J. Robert Oppenheimer's office chair was a Bank of England style and made from wood. He was the Lab's first director from 1943 – 1945, when Los Alamos scientists secretly created the world's first atomic weapons. Today, the chair is just one of two of Oppenheimer's possessions that the Lab has.

SECRET CITY BABIES

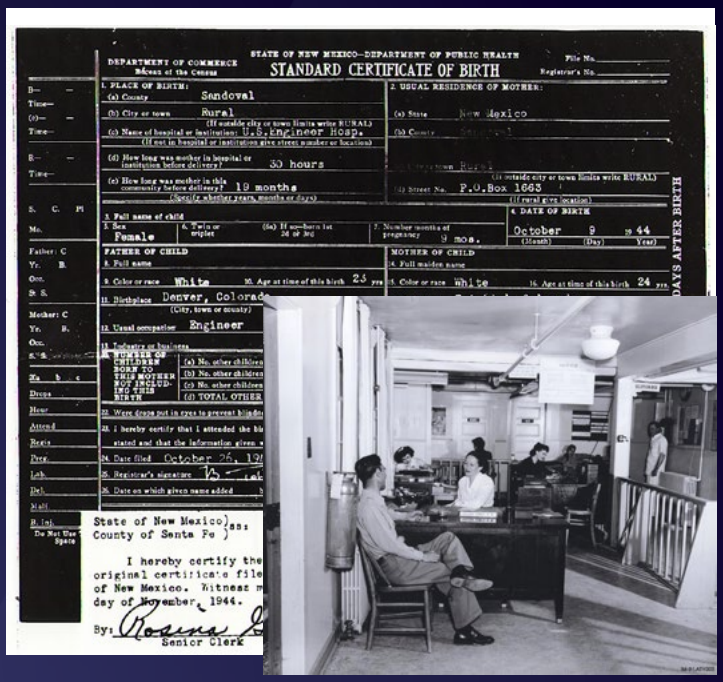
In the Lab's beginning, Los Alamos was so secret that in some cases it didn't even exist.

Official documents like driver's licenses, death certificates, incoming mail, and about 300 birth certificates of the babies who were born here during the Manhattan Project era just listed an address: P.O. Box 1663.

A copy of one of these unique birth certificates is part of the collections in the NSRC. It is a reminder that while Lab staff were making history, they were also living their lives.

Between 1943 and 1945, hundreds of young couples had moved to Los Alamos. They were among the thousands of scientists, engineers, military members, and other staff creating the world's first atomic bombs under the top-secret Manhattan Project.

Unusual paperwork was just one of many quirks of living in a secret city.


STATE OF NEW MEXICO—DEPARTMENT OF PUBLIC HEALTH

STANDARD CERTIFICATE OF BIRTH

1. PLACE OF BIRTH: (a) County Sandoval; (b) City or town Rural; (c) Name of hospital or institution: U.S. Engineer Hosp.; (d) How long was mother in hospital or institution before delivery? 30 hours; (e) How long was mother in this community before delivery? 19 months

2. USUAL RESIDENCE OF MOTHER: (a) State New Mexico; (b) County; (c) Street No. P.O.Box 1663

3. Full name of child; 4. Sex Female; 5. Twin or triplet; 6. If born out of wedlock; 7. Number months of pregnancy 9 mos.; 8. DATE OF BIRTH October 9 1944

FATHER OF CHILD: 9. Color or race White; 10. Age at time of this birth 25 yrs; 11. Birthplace Denver, Colorado; 12. Usual occupation Engineer

MOTHER OF CHILD: 14. Color or race White; 15. Age at time of this birth 24 yrs

State of New Mexico } ss:
County of Santa Fe }

I hereby certify the original certificate file of New Mexico. Witness my day of November, 1944.

By: Senior Clerk

Foreground: A look inside the reception area of the Los Alamos hospital in the 1940s. The town's facilities were constructed quickly as the population swelled to thousands of staff and their families. Background: A copy of a Secret City birth certificate.

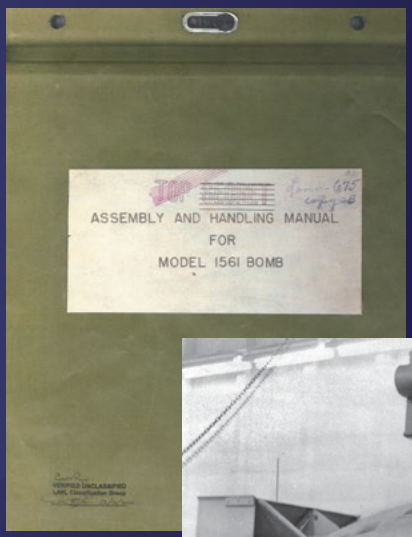
HOW TO MAKE A FAT MAN

It helped end the world's deadliest war and is one of the greatest scientific achievements ever.

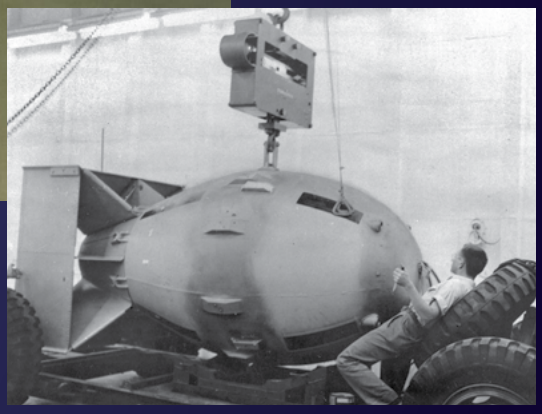
"Fat Man" was the codename for the atomic bomb detonated above Nagasaki, Japan, on Aug. 9, 1945. Los Alamos staff from all over the world led by Gen. Leslie R. Groves and physicist J. Robert Oppenheimer secretly created the scientific phenomenon – an implosion-type, plutonium nuclear weapon – in just 27 months.

On July 16, 1945, the Trinity test in the New Mexico desert unequivocally proved a Fat Man-type weapon would be successful in war. It also marked the dawn of the Atomic Age.

Just recently, a little more than 75 years later, a step-by-step manual on how to assemble Fat Man was rediscovered in the safe of a retiring Laboratory scientist. Authored by a group of scientists after World War II ended, this 149-page classified manual, complete with detailed drawings, it is the only known copy of this book in existence and is now part of the NSRC collection.



The Lab's National Security Research Center recently added to its collections a manual for building a Fat Man-type weapon (below). It is the only known copy of this book in existence; the contents are classified, but the cover, left, is not. The NSRC is the Lab's classified library.



By Brye Steeves, Communications Specialist, National Security Research Center

Visit discover.lanl.gov/podcasts to listen to more stories.

TITAN ON THE RED

Think Alexa or Siri, but meet Titan on the Red.

LANL Weapons scientists and engineers who long for an automated research assistant will soon have that support when it comes to poring through millions of records and immense data. The National Security Research Center (NSRC) plans to implement artificial intelligence/machine learning (AI/ML) on its red network and as a part of its processes to make digitized documents easier for researchers to find.

This AI/ML system is called Titan on the Red and will ensure faster, more efficient results for the Lab's Weapons Program researchers, as well as the classified library's collections management, said Mott Linn, the NSRC's Chief Librarian.

"We see artificial intelligence as a tool to help us go through the monumental tasks we have in digitizing, cataloging, and searching our collections," Linn said. "After completing a successful six-month test run with unclassified materials, we're confident AI/ML will save the Lab a lot of time and even more money when it comes to our research efforts."

What is AI/ML?

In addition to digital assistants, other examples of AI include chatbots, smart thermostats, and preferences in the things you read and watch. AI involves developing computers to mimic human cognition. Meanwhile, ML is a type of AI that uses sophisticated algorithms to perform specific functions.

"Although AI/ML is a relatively new advancement, it's proven," Linn said. "It will really be a gamechanger for the way the NSRC operates, and more importantly, the way we help the Lab meet its national security mission."

How does it work?

The goal of Titan on the Red is to extract metadata from the Lab's various digital data repositories, such as the Online Vault, PDMLink, shared drives, and SharePoint sites. The software then presents researchers with a natural-language enhanced, AI/ML-based interface to search through the NSRC's entire digitized collection in an intuitive manner. In short, it helps users conduct exploratory-style research for documents, regardless of their original location.

"One of the greatest assets at LANL is the information that we have generated in over 75 years of nuclear weapons work," said Charlie Nakhleh, the Associate Laboratory Director for Weapons Physics. "This is what distinguishes us from any other weapons laboratory in existence. The Titan on the Red system will make this valuable information discoverable."

These collections contain information on nuclear weapons modeling and simulation, weapons designs, and pit production, all of which are critical to the Lab's stockpile stewardship mission and pit production benchmarks, Nakhleh said. Researchers access NSRC materials on a daily basis, though it can be a cumbersome process that often requires a librarian to manually search records.

Implementing Technology to Improve Research

Titan on the Red also addresses a significant backlog in digitizing materials that are not yet searchable, said Nanette Mayfield, who leads the NSRC's Digital Collections Team.

With tens of millions of materials in its collections, the NSRC is one of the largest research libraries in the United States. However, less than 10 percent of these holdings have been digitized, and less than 10 percent of those have been cataloged. This affects the speed at which the NSRC is able to provide researchers with materials.

These materials would become accessible in a matter of months once the system comes online, rather than in double-digit decades if the NSRC were to continue work without AI/ML software. The NSRC has 2.4 million digitized documents that are not yet searchable. It would take NSRC staff more than 400 years at the current rate to catalog these files.

"This advancement is really the only solution to making the Lab's vast collections searchable to our researchers," Mayfield said. "Investing in AI/ML saves countless manpower hours and money, while directly contributing to the Lab's mission success."

By Rizwan Ali, Director, National Security Research Center

ANNUAL WEAPONS ASSESSMENT GIVEN TO U.S. PRESIDENT

National Security Research Center's collections are the foundation to stockpile confidence

It's for the President of the United States, from Los Alamos National Laboratory.

One of the most important accomplishments every year at LANL is a letter sent by the Laboratory Director that ultimately reaches the President of the United States. The subject is the current state of the weapons for which the Lab is responsible. Known as the Annual Assessment letter, it is a culmination of nearly 14 months' worth of work and the contributions of more than 1,000 Lab staff members. Its classified contents come from the Lab's Annual Assessment, which is an approximately 100-page document evaluating the safety, security, and effectiveness of the stockpile.

The scientific work underwriting the Director's letter takes heavy advantage of the nearly 80 years of nuclear weapons research, engineering, design, and testing archived in the National Security Research Center (NSRC), said Charlie Nakhleh, Associate Laboratory Director for Weapons Physics.

Nakhleh leads the Weapons Physics Directorate, which includes the NSRC – the Lab's classified library that houses nuclear weapons information dating back to the start of the nuclear enterprise. The collections contain tens of millions of records, including test shots, scientific datasets, and engineering processes. In many cases, the materials do not exist anywhere else.

"The NSRC is the starting point every year for our Annual Assessment," said Kevin Smale, the Lab's Annual Assessment coordinator. "The contents of the assessment and its letter are based on data from the NSRC – everything we need, it's all captured in the data."

The assessment reports and letters come from the Los Alamos, Sandia, and Lawrence Livermore national laboratories, as well as the Department of Defense's United States Strategic Command. They are provided to the Secretaries of Energy and Defense, who give them unaltered to the President of the United States, along with comments or conclusions, every February.

In March, the President forwards the Secretaries' reports, the annual assessment letters, and any of his comments to Congress.

"Every year, the Lab is able to provide the nation's highest levels of leadership with confidence in the health of the U.S. nuclear stockpile," Smale said. "That certainty comes from the information the Lab has in the NSRC. Those data are the life of today's nuclear weapons and the proof is in all that history."

Confidence in the absence of testing

In the past, assurance that our nation's nuclear stockpile was effective came in large measure from weapons testing, said Michael Bernardin, a LANL Associate Scientist and retired Associate Laboratory Director of the Weapons Physics Directorate.

"Today – and for the past 26 years – that confidence in the safety and reliability comes from the Annual Assessment," Bernardin said.

The Annual Assessment program began in the 1990s along with the DOE's establishment of the Stockpile Stewardship Program, or science-based surety of the country's nuclear weapons in lieu of testing. The United States has not conducted a full-scale, underground nuclear weapons test since Sept. 23, 1992. This final test, called Divider, was a Los Alamos-designed weapon and took place at the Nevada Test Site.

Divider was the nation's 1,054th nuclear test over a 47-year period. The dawn of the Atomic Age began with the Lab's Trinity test on July 16, 1945. Just weeks after the Trinity test,

the Los Alamos-created Little Boy and Fat Man nuclear weapons were released above Japan days apart in August 1945, helping to bring an end to World War II shortly thereafter. Little Boy and Fat Man were the only two nuclear weapons to ever be used in combat.

Decades later, as Cold War tensions thawed, Congress established in 1994 the science-based Stockpile Stewardship program in lieu of weapons testing. In 1995, then-President Bill Clinton announced the Comprehensive Test Ban Treaty (CTBT) to eliminate weapons testing, but with the right to resume under reasons of supreme national interest.

The Stockpile Stewardship program was initiated to enable the United States a foundational basis necessary to ensure it still has a safe, effective nuclear deterrent. As such, a continual assessment of the weapons' safety, reliability, and performance would be conducted and an evaluation would be produced annually. Data from the days of testing are critical to conducting these evaluations. Much of these data come from the Lab's classified library.

"Our nation has spent billions of dollars developing and testing nuclear weapons, the details of which are maintained by the NSRC," said Riz Ali, Director of the National Security Research Center. "The NSRC's collections are essential in helping the Lab's senior scientists and engineers determine the viability of our nuclear stockpile. It is this information that allows the Lab Director to present the President of the United States with an accurate assessment of the health of our nation's nuclear deterrent year after year."

Weapons continuously age and are not designed to last indefinitely. To assess the aging of weapons, and to design and certify weapons alterations or life extensions, the Lab's weapons designers and engineers rely on scientific and engineering capabilities. These include the use of existing or emerging experimental facilities, the use of weapons modeling and simulation, and the use of historic nuclear-explosive and non-nuclear-explosive test data, Bernardin said.

"Stewardship of the nuclear stockpile is our primary mission as a nuclear weapons laboratory," Bernardin said. "Today's confidence in our stockpile comes from stockpile surveillance, new experiments, ever-advancing theoretical work and detailed simulations, and a deep understanding of our rich history."

Role of the NSRC: assistance, services, collections access

The NSRC is the principal repository for the Laboratory's classified nuclear weapons research, data, and reports. The collections span

Annual Assessment at a glance:

What is the Annual Assessment?

A yearly process in which the Lab, among other entities in the Department of Energy's National Nuclear Security Administration and the Department of Defense, evaluate the safety, reliability, performance, and effectiveness of the U.S. Nuclear Weapons Stockpile.

What is the Annual Assessment letter?

The lab directors at Los Alamos, Sandia, and Livermore write a letter that outlines their evaluations of each nuclear weapon system in the stockpile. There are seven nuclear weapons systems in the U.S. stockpile and five were designed by LANL: the B61 gravity bomb, the W80 cruise missile warhead, and the W76, W78, and W88 ballistic missile warheads. Today, LANL provides assessments for the B61, W76, W78, and W88.

Who receives the Annual Assessment letter?

The President of the United States, via the Secretaries of Energy and Defense, who are required to submit the letter unaltered along with any conclusions they may have. The President has until March 15 to forward this yearly letter and any comments to Congress.

What does the letter include?

The letter addresses four items:

- The health of each weapons system for which each lab has design responsibility.
- Whether the labs have identified a critical need to return to nuclear testing.
- The adequacy and needed advancements of the science-based tools that provide a key portion of the foundation for these assessments.
- The efficacy of the nuclear weapons production complex, and readiness to conduct nuclear testing.

Why does the Annual Assessment exist?

The assessment verifies that our country maintains a credible nuclear deterrent in the absence of nuclear testing, which stopped on Sept. 23, 1992, following the U.S. execution of the Divider test (a Los Alamos-designed nuclear

more than seven decades of nuclear weapons history, beginning with the foundation of the Laboratory in 1943.

The Lab's Weapons Program scientists and engineers are continually adding to and drawing upon this vast collection of information to support analyses and assessments, specifically the NSRC's electronic repositories for weapons physics and weapons engineering-related research, said Chris C'de Baca, Group Leader for the NSRC.

For example, the NSRC houses nuclear test shot folders on the nation's underground and atmospheric nuclear tests as well as the numerous non-nuclear hydrodynamic tests (which use high-speed instrumentation) and subcritical tests (where no nuclear yield is generated). These folders contain drawings of parts, nuclear-device assemblies, the diagnostic spread, test-stand rack layouts, and documentation on all of the acquired nuclear-test data. For atmospheric tests, there are films, and in some cases, extensive measurements of nuclear weapons effects.

"If a researcher needs something in our collections, we'll find it for them," he said. "If it exists elsewhere in the Nuclear Security Enterprise, we'll connect them to it."

Prior to the onset of the COVID-19 pandemic in 2020, it was common for more than 100 of the Lab's weapons scientists and engineers to access daily the NSRC's records in support of their research, including for Greg Archbold and his team.

Archbold, who is the Deputy Division Leader of X Theoretical Design (XTD), said, "The Lab would be unable to effectively conduct Annual Assessment activities without the NSRC, its collections, and our partnership with the staff. All these resources inform the models and simulations employed in the Annual Assessment process."

XTD staff, he said, look to the NSRC for design history, test and experiment configurations and data, and technical reports from previous work, which inform the models and simulations employed in the Annual Assessment process.

"The aggregate of all those materials in the NSRC," Archbold said, "is why we are confident in the surety of our nation's stockpile."

Smale agrees.

"A deterrent is only credible if it is effective," he said. "The Annual Assessment letter that the Lab provides the President of the United States assures him – and the world – that America's nuclear stockpile remains safe, secure, and effective. We need the NSRC to do that."

explosive). In the absence of testing, it is still necessary to ensure the nation has a safe, effective nuclear deterrent. A national stockpile stewardship and management program supports the Annual Assessment. At the core of this program is science-based experimentation and simulation, a part of LANL's national security mission.

Why is the assessment conducted yearly?

Weapons age as a result of intrinsic radiation, chemical reactions, and operational environments, such as transportation vibrations and temperature swings. As such, they must be evaluated annually.

Who at Los Alamos has a role in the Annual Assessment?

Although the Annual Assessment letter comes from the Director's Office, a large portion of the Lab contributes in some way, ranging from Weapons Program teams who perform the hands-on work to staff in the NSRC (the Lab's classified library) who manage nearly 80 years of nuclear weapons research and testing data.

"The NSRC's collections are essential in helping the Lab's senior scientists and engineers determine the viability of our nuclear stockpile. It is this information that allows the Lab Director to present the President of the United States with an accurate assessment of the health of our nation's nuclear deterrent year after year."

— Riz Ali, NSRC Director

By Brye Steeves, Communications Specialist, National Security Research Center

CELEBRATING

BLACK HISTORY

LAB HISTORIAN TALKS WITH MEMBER OF FIRST BLACK FAMILY TO LIVE IN LOS ALAMOS

Clayborne Carson Jr. was a member of what is thought to be the first Black family to live in Los Alamos. He was a young boy when his father, Clayborne Carson Sr., accepted a job in December 1947 with the Atomic Energy Commission (AEC) as a security inspector. The Carson family moved to Los Alamos shortly thereafter. Later, as a teenager, Carson Jr. worked at the Lab during the summers.

Just after World War II, the AEC managed the town, which was still fenced following the Lab's secret wartime efforts and not open to the public. AEC regulations prohibited racial segregation; schools were integrated and housing was government owned and assigned based on job and family size.

Today, Carson Jr. works as a historian and founding director of Stanford University's Martin Luther King Jr. Research and Education Institute.

There are no known records of Black employees at Los Alamos during its first few years. It may be that the first Black families didn't move here until after World War II ended in 1945. Nevertheless, Black employees began playing important roles at the Lab early on.

Historian Madeline Whitacre, who is part of the National Security Research Center, recently interviewed Carson. You can listen to "A Conversation: Los Alamos + Black History" at **https://bit.ly/3zB9Mi4**

These three photographs from the collections of the Lab's National Security Research Center offer a snapshot of Los Alamos in the early 1940s.

Visit discover.lanl.gov/podcasts for more Los Alamos stories.

MIRIAM WHITE CAMPBELL & LITTLE BOY

Women's Army Corps (WAC) officers being sworn into the U.S. Army at Fort Des Moines Army Base in Iowa on September 1, 1943.

Give her a pencil and paper, and Miriam White Campbell could draw anything — even the plans for a top-secret atomic bomb.

She worked at Los Alamos in the 1940s when it was a clandestine lab racing to create the world's first nuclear weapons to help end World War II. Campbell drew the designs for the internal workings of the gun-type uranium bomb, known as Little Boy, which was detonated over Hiroshima on Aug. 6, 1945.

Campbell was more than a talented artist. She was trained in architecture, experienced in technical drawing, and served in the military. And, perhaps most notable, she was a member of the first staff at Los Alamos and made valuable contributions to the Lab's original national security mission at a time when women were limited in both educational and professional opportunities.

FROM THE MIDWEST TO THE MOUNTAINS

Before WWII broke out, Campbell studied architecture at the University of Illinois and, later, engineering at Purdue University in Indiana. As an architecture student, she worked as a technical draftsman, which required her to graphically represent equipment structures, machines, and other components. Craftsmen would use her drafting to visually reference technical designs as they built equipment.

In December 1942, she joined the Women's Army Corps (WAC) in the hopes of contributing to the U.S. war effort. By August 1943, Campbell was transferred from her initial assignment at Fort Des Moines Army Base in Iowa to a special, secret project.

Decades later, she recounted in an oral history interview, "We were told absolutely nothing and we didn't know where we were going. We knew nothing, but you accepted it. [In] wartime, you accept a lot of things." Once in Los Alamos, Campbell was unsure why she was chosen for this assignment, but it quickly became clear that she possessed a valuable skill set.

WARTIME WORK

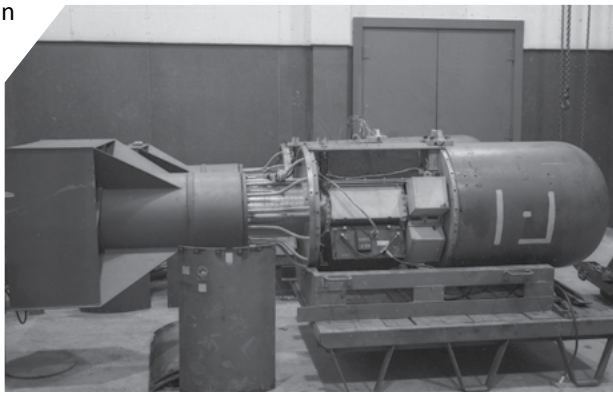
In the 1940s, it was still quite uncommon for a woman to pursue any education or career in the field of engineering. As the United States became increasingly involved in WWII, men were drafted into the military at the same time as production began increasing for armaments. This sudden shortage of engineers catapulted women into roles that otherwise would not have been available to them.

At the Lab, Campbell was assigned to the Lab's Ordnance Division to work on what would be known as Little Boy.

"I not only drew it, I cut out drawings, isometric drawings, and cut it out so you could see everything in the bomb," she later recalled in the oral history interview. The isometric cutout perspectives were unique because they displayed both the exterior and interior components of the bomb. The cutouts allowed the craftsmen to remove pieces and view different components of the bomb's interior.

LIFE IN LOS ALAMOS, POST-WAR

In addition to her work, Campbell enjoyed life in Los Alamos. She was given permission for her dog, Mack, to be shipped from Illinois to New Mexico after arguing that her parents were unable to feed him and that the mess hall in Los Alamos was wasting enough food for her to keep him well-fed. Mack was shipped in a crate by rail and delivered to P.O. Box 1663, the now-famous Santa Fe mailing address that was used for the entire town of Los Alamos during the war. Mack accompanied Campbell to work, napping in the hallway and forcing the officers and scientists to step over him.



Little Boy is the uranium gun-type atomic weapon developed at the Los Alamos Laboratory. The weapon was 9,700 pounds, 10-feet long, and just over 2-feet in diameter.

By the time the atomic bombs were used in combat, Campbell and Mack were no longer living in Los Alamos. She remembers hearing of the bombings on Japan and recalls having mixed feelings. She lamented the loss of life, but also felt relief that the world's bloodiest war had finally ended. In the following years, Campbell completed her degree in architecture and finished a master's degree in city planning, a field in which she worked for 31 years.

In 2006, Miriam White Campbell died at the age of 88 in San Diego, California.

By Laura McGuiness, Archivist, National Security Research Center

WHO ARE THEY?

Expert staff in the NSRC partner with researchers to meet mission needs

NORMA BACA, RESEARCH LIBRARIAN

Preserving our valuable, one-of-a-kind records is what Norma Baca says is the best part of her work day. Her job doesn't involve just preservation, though – she also hunts for treasure. As a research librarian at the NSRC, Baca performs technical information research and retrieval from a wide variety of collections. Those classified and unclassified collections include Manhattan Project data, technical reports, and legacy records.

"My work allows me to meet the information needs of Laboratory staff working on weapons-related research in support of our National Nuclear Security Administration's Labs and sites as well as our partners in the Department of Defense," Baca said.

Baca arrived at the Lab in March of 2011 after working for the New Mexico State Records Center and Archives, where she managed records and microfilm for state agencies, municipalities, courts, and other entities. Her extensive record and archival management experience have made her a great fit for the NSRC.

"I'm very proud of accessioning and cataloging irreplaceable legacy records," Baca says. "These materials date back almost 80 years to the Lab's beginning and are the foundation of our weapons work today. Scientists and engineers rely on our collections – and us – to meet today's mission needs."

HADLEY HERSHEY, ARCHIVIST

With 10 years of experience as a librarian, digitizer, and archivist, Hadley Hershey brought an exceptional set of qualifications when they joined the NSRC in 2020.

Among Hershey's numerous duties is helping protect and share the valuable collections that scientists, engineers, and researchers rely on to meet work goals and safeguard our nation's security.

"This is my dream job," they said. "I always wanted to work in an institution that combined my fascination with history with my passion for protecting and sharing information resources."

Hershey contributes a unique perspective through combined experience in libraries and in theater, where they worked as a lighting designer, production manager, technical director, and stage manager.

"I learned how to work through technical and logistical challenges, often with limited resources and time," they said. "My experience has allowed me to gain experience working with a variety of media types and has given me experience in many different kinds of work environments."

Hershey's skills and background help successfully navigate duties that are never the same from day to day.

What makes this dream job even better? "I get to be a part of a team of people that are just as passionate as I am about safeguarding the irreplaceable media in the NSRC's collections," Hershey said.

By Renae Mitchell, Communications Specialist, National Security Research Center

LAURA MCGUINESS, ARCHIVIST

"They're so beautiful!" Those were Laura McGuiness's first words on her first day of cataloging library materials. Her boss asked if she was talking about the books. McGuiness replied, "No, the records!"

So began McGuiness's career in libraries 10 years ago. Her love of cataloging and recordkeeping led her in 2020 to the NSRC, where she digitizes and creates metadata (data that describe and give information about other data) for the physical collections and ensures the readability of digitized materials through quality-control practices. Her work allows scientists, engineers, and researchers to find and access materials vital to their national security work.

Balancing speed and accuracy are both McGuiness's biggest challenge and greatest achievement as she manages the tens of millions of items in the NSRC. This balance is also why McGuiness says she loves her job: she contributes to work that is important not only to the Lab and to the country, but also to research and security on a global scale.

"It is nice to know that I am consistently contributing to a larger purpose," McGuiness said.

Meanwhile, she is working to employ her expertise in metadata to improve document discoverability in the NSRC.

"By populating accurate metadata as well as bridging gaps in any existing metadata, we are ensuring materials are digitally archived in such a way that perpetuity is ensured," McGuiness said. "Ensuring accessibility for specific users to find and view these materials can ultimately aid in the Los Alamos mission of furthering scientific innovation."

BRYE STEEVES, COMMUNICATIONS SPECIALIST

Her title is Communications Specialist, but Brye Steeves says her job is a blend of a little bit of everything.

"Really, I'm a storyteller," she said. "I share strategic messages on behalf of the NSRC and the Lab that are woven through written stories, website content, social media posts, podcasts, books, short videos, long documentaries, events, speeches, presentations, photography, and graphic design. I also often fulfill editor and communications manager roles to ensure consistent messages and high-quality published products."

Her success at accomplishing numerous roles on a daily basis stems from her particular experience and education. With a resume that includes a bachelor's degree in journalism and a master's degree in international relations, which informs her understanding of weapons and their role in the world, and her work experience at the Department of Defense, Federal Reserve, and as a newspaper reporter and magazine editor, Steeves thinks her job at the NSRC is the perfect fit.

"I value being able to work somewhere with such an important mission," she said.

Much like seeing her byline on the front page early in her career, Steeves still feels the rush of gratification when the NSRC publishes its products.

"These are the result of working with incredibly talented people and under leadership that values outreach," she said, "not to mention nearly 80 years' worth of materials in the NSRC always make for fascinating subjects."

CHRIS C'DE BACA, NSRC GROUP LEADER

Even though he's worked with the Lab's classified collections since the late '90s, Chris C'de Baca is still surprised sometimes.

"My favorite part of the job is when we have a serendipitous discovery of incredible information," C'de Baca said. "Every now and then, one of the NSRC librarians will pull records for a researcher and, thumbing through the documents, they discover a one-of-a-kind report or memo authored by a famous LANL scientist that nobody knew we had."

As the NSRC's Group Leader, C'de Baca manages the librarians, archivists, historians, digitizers, and others who do the work to make the vast amount of nuclear weapons information discoverable and retrievable.

While juggling oversight of the funding, staff, and work scope needed to meet researchers' needs, C'de Baca has helped his team adapt to the strict security requirements of a classified setting as well as recent limitations brought about by the COVID-19 pandemic. He doesn't take all of the credit for this transition, though.

"Our unified effort is the cornerstone for the success of the NSRC," he said.

Looking ahead, C'de Baca said, "It is essential for me to do everything I can to make sure that future generations of LANL employees are aware of and can access the priceless nuclear weapons information that the Laboratory has curated since World War II."

Celebrating Native American Heritage:

AREA'S EARLIEST INHABITANTS BECAME VALUABLE PART OF LAB WORKFORCE

After World War II ended in 1945, San Ildefonso Pueblo hosted a celebration and invited Los Alamos Lab staff to attend. These photos, and many others showing the Native American influence on the Lab, are part of the collections in the National Security Research Center.

By the time the then-secret laboratory was established in Los Alamos in 1943, the nearby pueblos we know today were long-standing communities.

To complete its wartime mission to build the world's first nuclear weapons, the Laboratory needed many workers for all aspects of the project. As such, many Native Americans were hired to work at the Lab in various roles, such as technicians, researchers, machinists, and support staff.

By the end of the Manhattan Project in 1945, shortly after the end of World War II, many friendships had been forged between employees from the pueblos and other workers at Los Alamos. This was evidenced by gatherings, such as a post-war celebration at the San Ildefonso Pueblo, as well as individual relationships between Lab staff and pueblo residents.

Meanwhile, pueblo residents remained on as valuable members of the post-war Lab staff, with additional people hired as well.

Since the Lab's inception, Native Americans have made significant contributions to the Los Alamos mission and its cultural enrichment.

FLOY AGNES LEE

When Floy Agnes (Naranjo Stroud) Lee wasn't working as a blood technician at the wartime Los Alamos Lab, she played tennis.

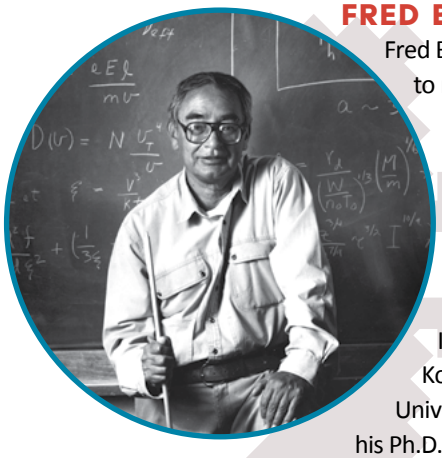
Her regular opponent, whom she nearly always beat, was Enrico Fermi — though she didn't know the Nobel Prize-winning physicist was someone other than just another Lab employee.

It was this tennis partner who encouraged Lee to pursue a degree in science. Not long after WWII ended, Lee left Los Alamos for the University of Chicago, where she earned her Ph.D. in zoology. In time, she eventually made her way back to her home state.

Lee grew up at the now-closed Albuquerque Indian School, where her parents both taught. Lee's father was from the Santa Clara Pueblo, and she visited the pueblo often. She studied biology at the University of New Mexico and was recruited to the Los Alamos Lab in 1945 to work in hematology.

After completing her studies in Chicago, Lee worked as a senior scientist at the Jet Propulsion Lab in Pasadena, California, before she returned to Los Alamos to work for the Health Research Laboratory in the 1970s. She also was a founding member of the American Indian Science and Engineering Society as well as other science groups.

Lee continued to live in New Mexico until her death in 2018 at age 95.



FRED BEGAY

Fred Begay was the first member of the Navajo Nation to receive a Ph.D. in physics in 1972.

Begay (Clever Fox), who changed his name from Frederick Young, was born in Colorado on the Ute Mountain Indian Reservation. His parents were Diné (the name for the Navajo people) and Ute.

In 1951, Begay joined the U.S. Army to serve in the Korean War, and when he returned, he attended the University of New Mexico to study physics. After earning his Ph.D., Begay joined the Lab in the early '70s as a staff physicist and much of his work at Los Alamos was focused on laser research.

Begay was committed to helping the Navajo Nation and other Native American communities through his work as a scientist. In 1977, Begay, as chairman of the Navajo Science Committee, attended the Navajo Energy Conference. The conference was organized to help the Navajo Nation solve and discuss energy challenges, addressing both solar and geothermal energy.

After he retired from LANL in 2006, Begay served as the president of Seaborg Hall of Science, a nonprofit education and research institution. In this position, Begay was able to provide science-related services to the Navajo community. He died in 2013 at 80 years old.

OUR AREA'S HISTORY

Today, the Pajarito Plateau is home to Los Alamos National Laboratory and the communities of Los Alamos and White Rock. However, the area was first inhabited by Native Americans. The archeological record on the plateau dates back to the Paleoindian period, about 12,000 years ago.

The Ancestral Pueblo people (a prehistoric Native American civilization that existed from approximately 100 to 1600 C.E.) are generally considered by archeologists to be the earliest group that is clearly linked to modern Pueblos. During this period, four main communities were established.

- Tsirege, which means "bird place,"
- Tsankawi, which means "the village between two canyons at the clump of sharp round cacti,"
- Navawi, which means "from the garden," and
- Otowi, which means "gap where the water sinks."

The communities on the Pajarito Plateau were eventually abandoned during the 1500s due to drought. However, they were temporarily reoccupied during the Pueblo Revolt of 1680 by refugees fleeing the Spanish.

The Tsankawi Pueblo, shown here in the late 1950s, is one of the pueblos near Los Alamos National Laboratory.

POPOVI DA

Popovi Da worked as a machinist at the Los Alamos Lab during World War II, but may be better remembered for his art and his friendship.

Da (Red Fox), who changed his name from Antonio Martinez, was from San Ildefonso Pueblo and worked as part of the Special Engineering District at the Los Alamos Lab during the Manhattan Project.

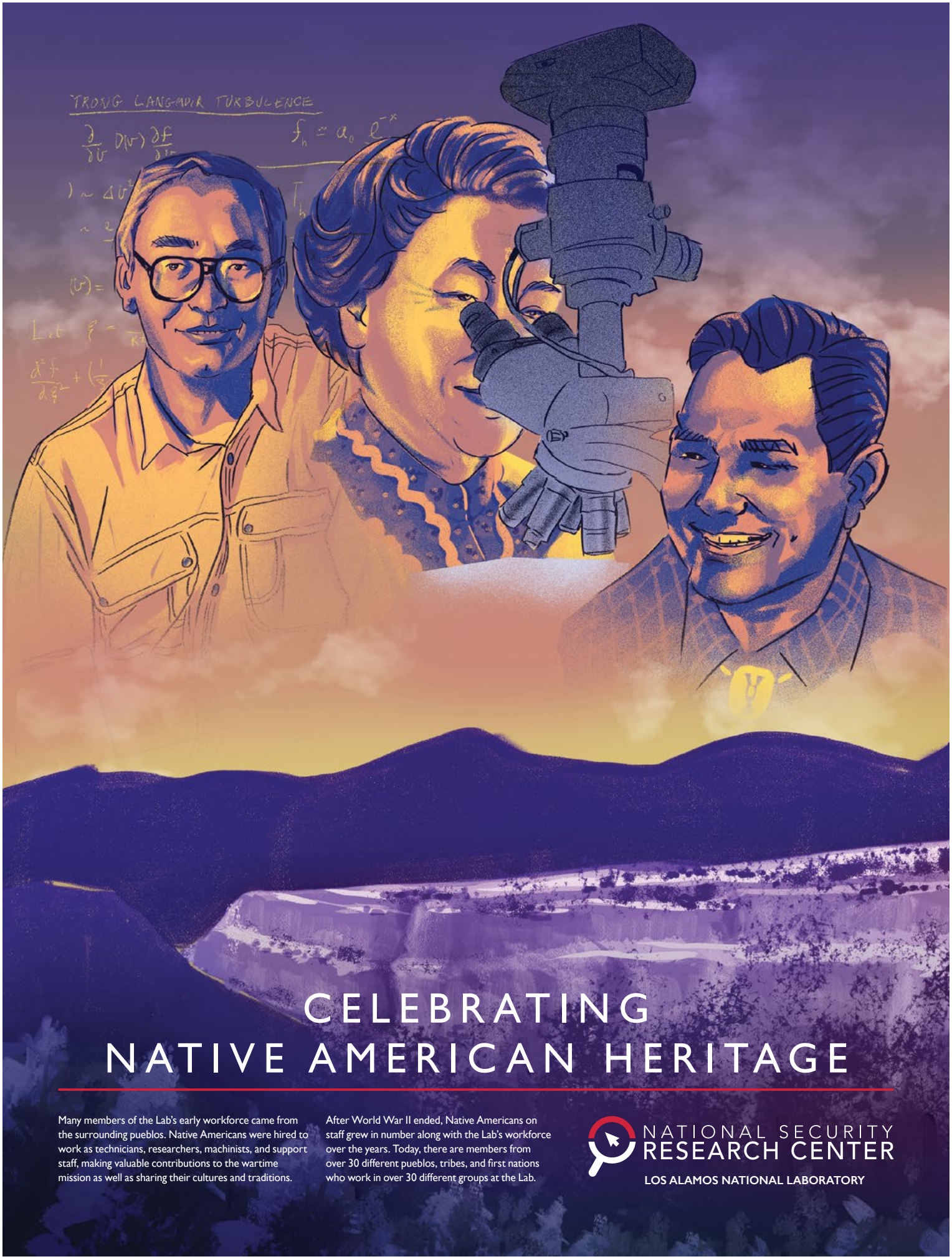
The Laboratory's third director, Harold Agnew, recalled in a 1992 interview that, "I struck up in the very beginning a close acquaintance with, I called him Po, Tony Martinez, Popovi Da, who was Maria's son ... We just got along fine together and we would picnic together with [Harold Agnew's wife] Beverly and his wife, Anita, and our little kids. The first deer I ever shot was with Po and that really made us part of the family of the region."

The son of renowned potter Maria Martinez and an accomplished artist himself, Da focused on his pottery and worked closely with his mother after WWII ended.

He became a prominent potter, reviving the tradition of polychrome ware at San Ildefonso and experimenting with various other techniques. Da died in 1971 at age 48.

Madeline Whitacre, Historian, and Amy Belotti, Archivist, National Security Research Center

Native Americans joined the Lab's first workforce in the early 1940s, bringing their culture with them. In this photo from the National Security Research Center, musicians perform a ceremonial song.



CELEBRATING NATIVE AMERICAN HERITAGE

Many members of the Lab's early workforce came from the surrounding pueblos. Native Americans were hired to work as technicians, researchers, machinists, and support staff, making valuable contributions to the wartime mission as well as sharing their cultures and traditions.

After World War II ended, Native Americans on staff grew in number along with the Lab's workforce over the years. Today, there are members from over 30 different pueblos, tribes, and first nations who work in over 30 different groups at the Lab.

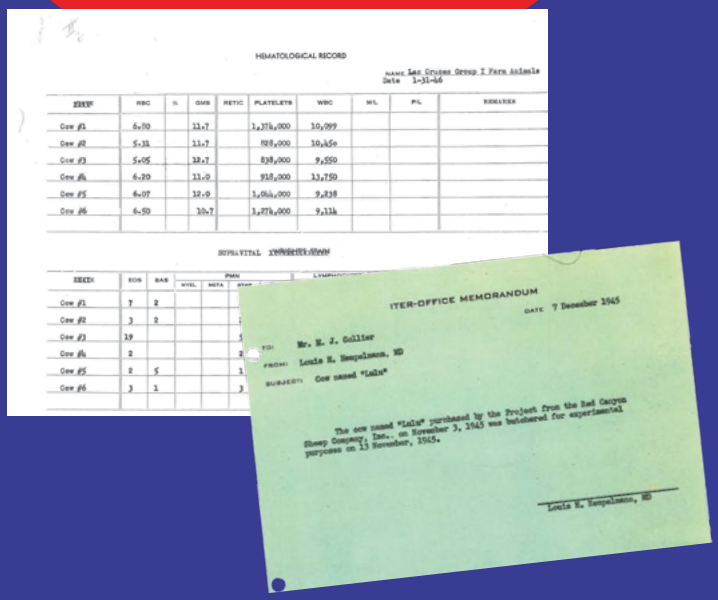
NATIONAL SECURITY RESEARCH CENTER
LOS ALAMOS NATIONAL LABORATORY

VOYAGE OF DISCOVERIES

Films, records, photos, and nearly every other type of media in the National Security Research Center preserve materials from history's greatest scientific minds that researchers rely upon today.

A step-by-step manual on how to assemble a Fat Man atomic bomb. Patent applications for the world's first nuclear weapons. Classified notebooks of Nobel Laureates.

Fascinating finds are down every aisle and around every corner of the Lab's classified library. Too great in number to list in their entirety, here are just a few highlights in the NSRC.



HEMATOLOGICAL RECORD

	RBC	%	GMS	METIC	PLATELETS	WBC	M/L	P/L	REMARKS
Cow #1	6.70		11.7		1,376,000	10,099			
Cow #2	5.31		11.7		828,000	10,450			
Cow #3	5.05		12.7		838,000	9,550			
Cow #4	6.20		11.0		918,000	13,750			
Cow #5	6.07		12.0		1,044,000	9,238			
Cow #6	6.50		10.7		1,276,000	9,114			

SUPRAVITAL

	EOS	BAS	MYEL	META	STAB	SEG	LYMPH	MONO	EOS	BAS
Cow #1	7	2								
Cow #2	3	2								
Cow #3	19									
Cow #4	2									
Cow #5	2	5								
Cow #6	3	1								

ITER-OFFICE MEMORANDUM

DATE 7 December 1945

TO: Mr. K. J. Collier

FROM: Louis H. Hempelmann, MD

SUBJECT: Cow named "Lulu"

The cow named "Lulu" purchased by the Project from the Red Canyon Sheep Company, Inc., on November 3, 1945 was butchered for experimental purposes on 13 November, 1945.

Louis H. Hempelmann, MD

This memo to then-Los Alamos Lab Director Norris Bradbury is among the thousands of documents related to post-Trinity test health evaluations conducted following the detonation on July 16, 1945. Today, these records offer insight into early nuclear science, health physics, and weapons development.

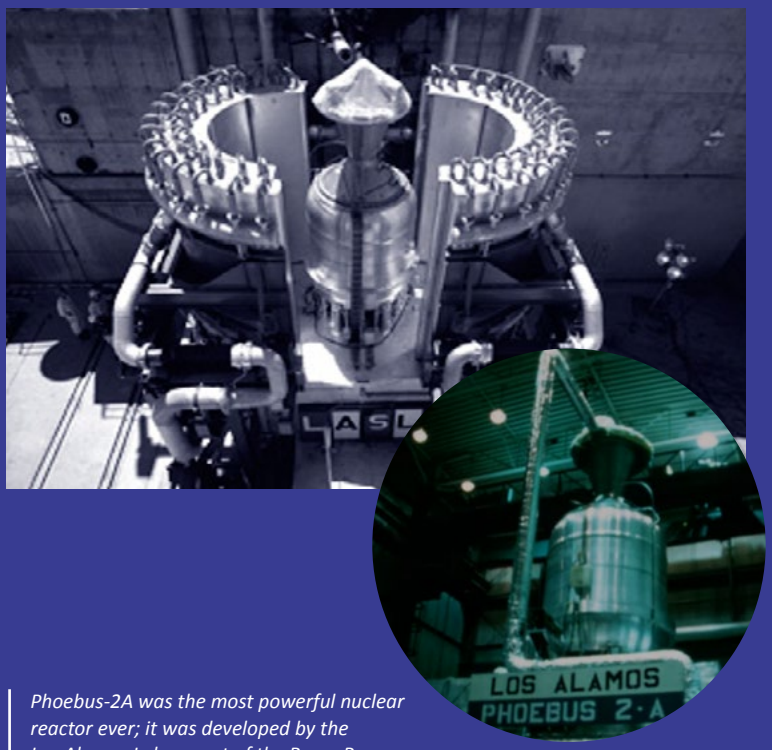
Records: Post-Trinity test health evaluations

What is this? Health physics reports on radioactive contamination following the Trinity test, which was the first-ever nuclear test and was conducted in the New Mexico desert on July, 16, 1945.

Thousands of pages of data and related documents, including evaluations from military personnel, interviews with residents near the test site, photos, handwritten notes, and analyses of cattle, grass, water, and soil, were recently given to the NSRC from Los Alamos National Laboratory's Occupational Medicine facility.

Why is it important? These records document how scientists worked to conduct the Trinity test safely and then documented radiation levels afterward, providing data collected in realtime. This information is an important aspect of early nuclear science, health physics, and weapons development, as well as the history of Los Alamos National Laboratory and the state of New Mexico.

The collection also includes interesting and, in some cases, new information. One document places the recently confirmed Los Alamos wartime spy Oscar Seborer in the main bunker during the Trinity test, alongside the Manhattan Project's top scientists, including physicist Sam Allison, who counted down to the atomic bomb's detonation.



Phoebus-2A was the most powerful nuclear reactor ever; it was developed by the Los Alamos Lab as part of the Rover Program. (Top photo courtesy of Dick Malenfant.)

Film: Overview of the Phoebus-2A Nuclear Rocket Engine

What is this? A 12-minute video overview of the Los Alamos-developed Phoebus-2A — the most powerful nuclear reactor ever created. Phoebus was part of the Lab's Rover Program (1955 - 1973). Unlike most nuclear reactors that generate thermal energy as a means to produce electricity, Phoebus-2A generated thermal energy as a means to produce thrust to be able to take astronauts to Mars. The program ended, though, before Phoebus-2A was flight tested.

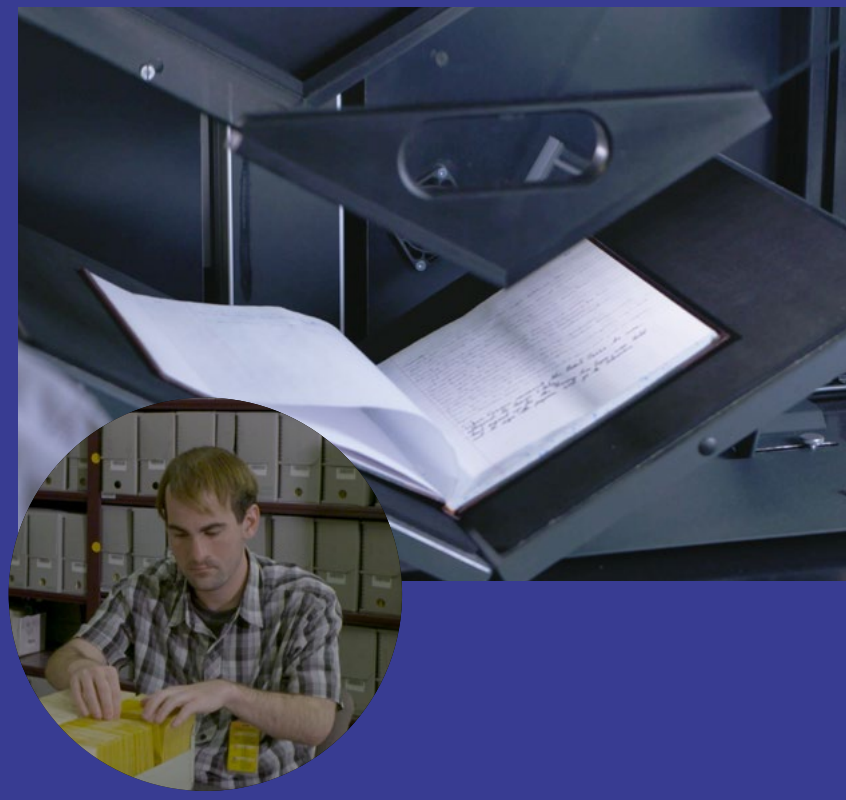
Why is it important? The goal of Project Rover was to develop a nuclear thermal rocket for space applications at what was then-called Los Alamos Scientific Laboratory (LASL). In a nuclear thermal rocket, the heat from a nuclear reactions replaces the chemical reactions of the propellants in a chemical rocket. Liquid hydrogen in Phoebus-2A was heated to a high temperature in a nuclear reactor and then expanded through a rocket nozzle to create thrust, producing an excess of 4,000 megawatts of thermal power.

Watch the footage: bit.ly/3b0NqvH

Materials: Lawrence Livermore National Lab experiments

What is this? Recently acquired digital copies of classified materials on a series of nuclear weapons experiments that Lawrence Livermore National Laboratory conducted in the 1990s. Only Livermore originally had this information, but the results are useful for Los Alamos researchers and their mission-critical national security work. The Los Alamos and Livermore national labs conducted their own experiments and tests in the past, but today researchers at both labs may need information on experiments and tests conducted by the other organization. The information is housed by the National Security Research Center (NSRC).

Why is it important? These classified materials are related to experiments that are vital to stockpile stewardship. Indicative of the strong partnership between the two national labs, they rely on one another for data unique to one lab. For example, Los Alamos often taps Livermore for information related to weapons systems, such as drawings and nuclear or hydrodynamic experiments and tests Livermore has conducted. In turn, Los Alamos shares similar legacy information on LANL tests, weapons systems, and reports. The two labs also exchange approved joint research documents. Staff at the NSRC ensure Los Alamos researchers can access the materials.



Los Alamos and Lawrence Livermore national laboratories often share data that are unique to one lab. The materials are related to stockpile stewardship and national security.

Three tower tests made up Operation Sandstone, which took place in the Pacific in 1948. The series focused on nuclear weapon advancement since the development of the plutonium-implosion device and the uranium gun-type device during World War II.

Photos, negatives: Operation Sandstone

What is this? Upwards of 1,000 photos and negatives from the Los Alamos Lab's 1948 Operation Sandstone. This post-World War II series of nuclear weapons tests were primarily testing new bomb designs as the Cold War was quickly developing. The series was made up of three tower tests in Enewetak Atoll in the Pacific and involved 10,200 personnel.

Why is it important? Operation Sandstone focused on weapons advancements after the successful detonation of the Los Alamos-created nuclear weapons: the Fat Man plutonium implosion bombs and the Little Boy uranium gun-type bomb. Because of the successful tests of Operation Sandstone, components of the older weapons became obsolete. Today, data from these tests are important to the Stockpile Stewardship program, which is the science-based assessment of the safety and reliability of nuclear weapons in the absence of testing.

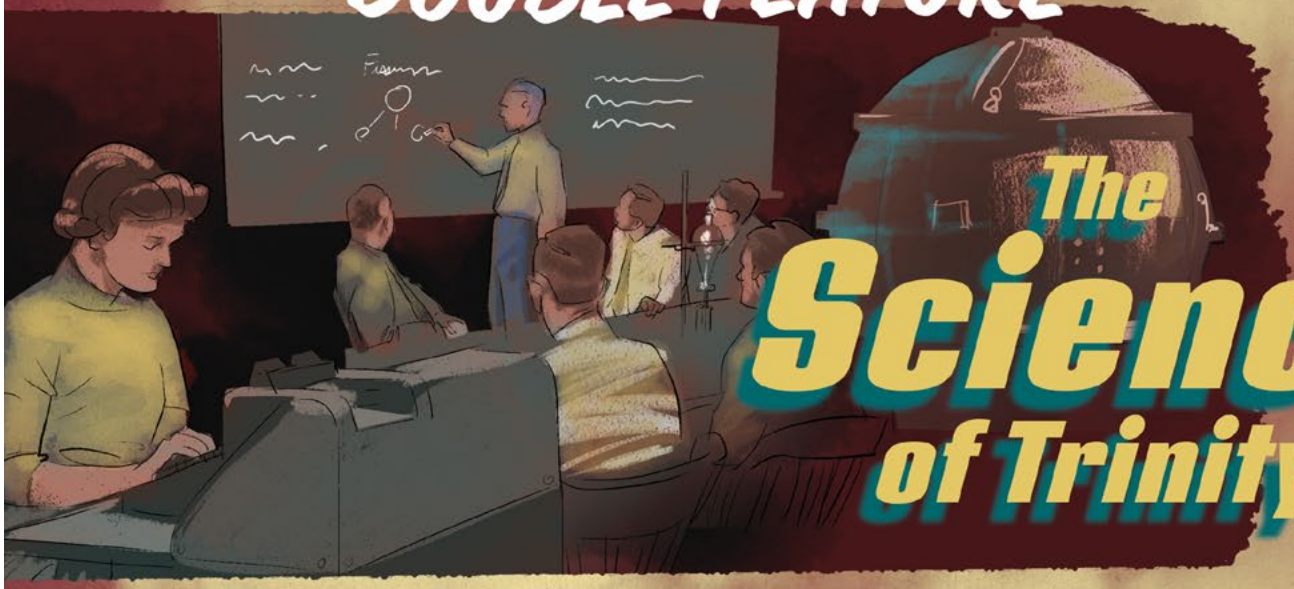
More than 10,000 personnel participated in Operation Sandstone, which took place on Enewetak Atoll in the Pacific.

Because of the successful tests of Operation Sandstone, components of the older weapons became obsolete. More efficient use of fissionable material helped more than double the U.S. nuclear stockpile in one year's time with 169 weapons in June 1949.

The National Security Research Center Presents a

TRINITY TEST DOUBLE FEATURE

Scan to watch.



The Science of Trinity

PLUS...

Trinity and the BRITISH MISSION

Scan to watch.

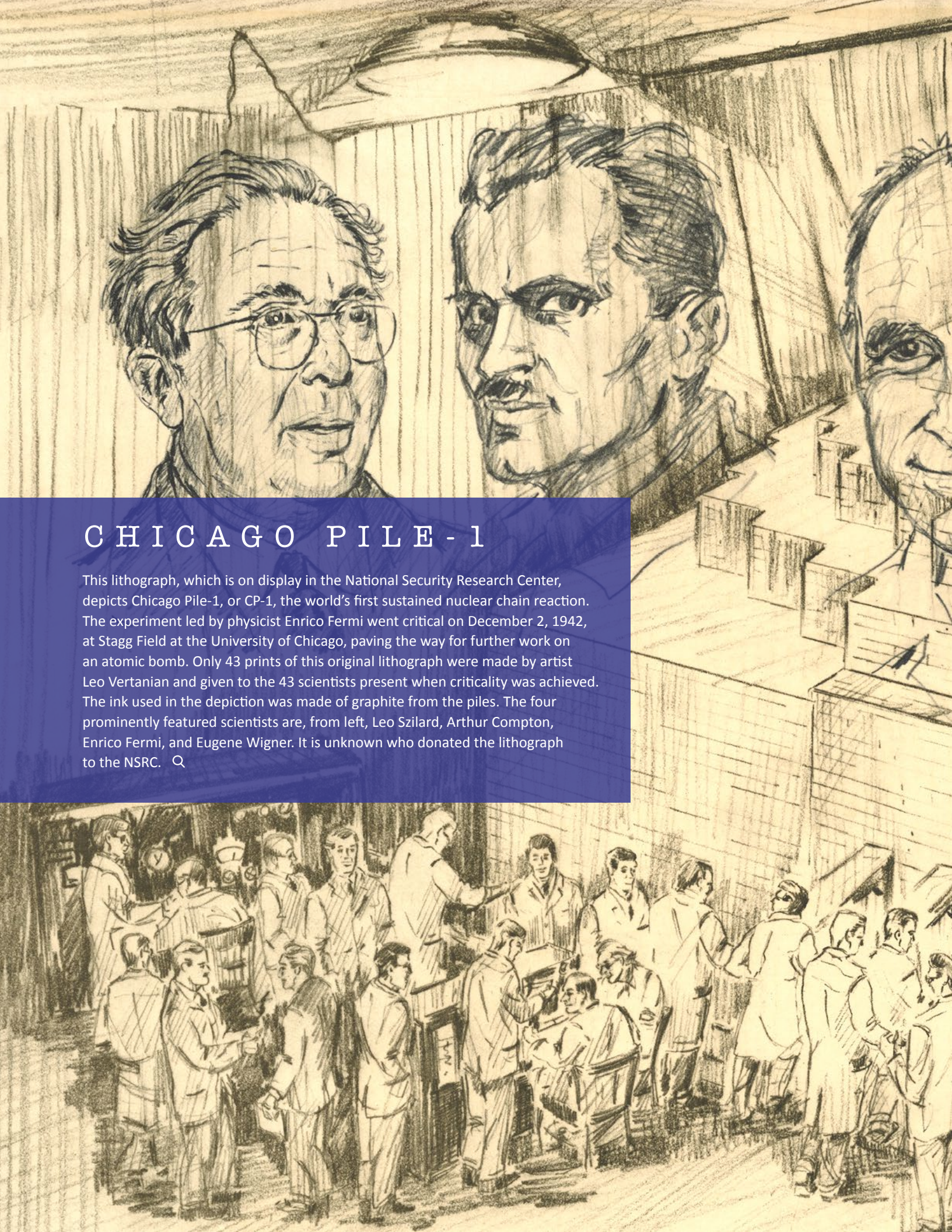
nsrc@lanl.gov

Watch an original documentary to learn how scientists conducted the test that weaponized energy from the atom — and changed the world forever.

Then, watch the enduring partnership of American and British scientists as they raced to develop atomic weapons at the Los Alamos Lab during World War II.

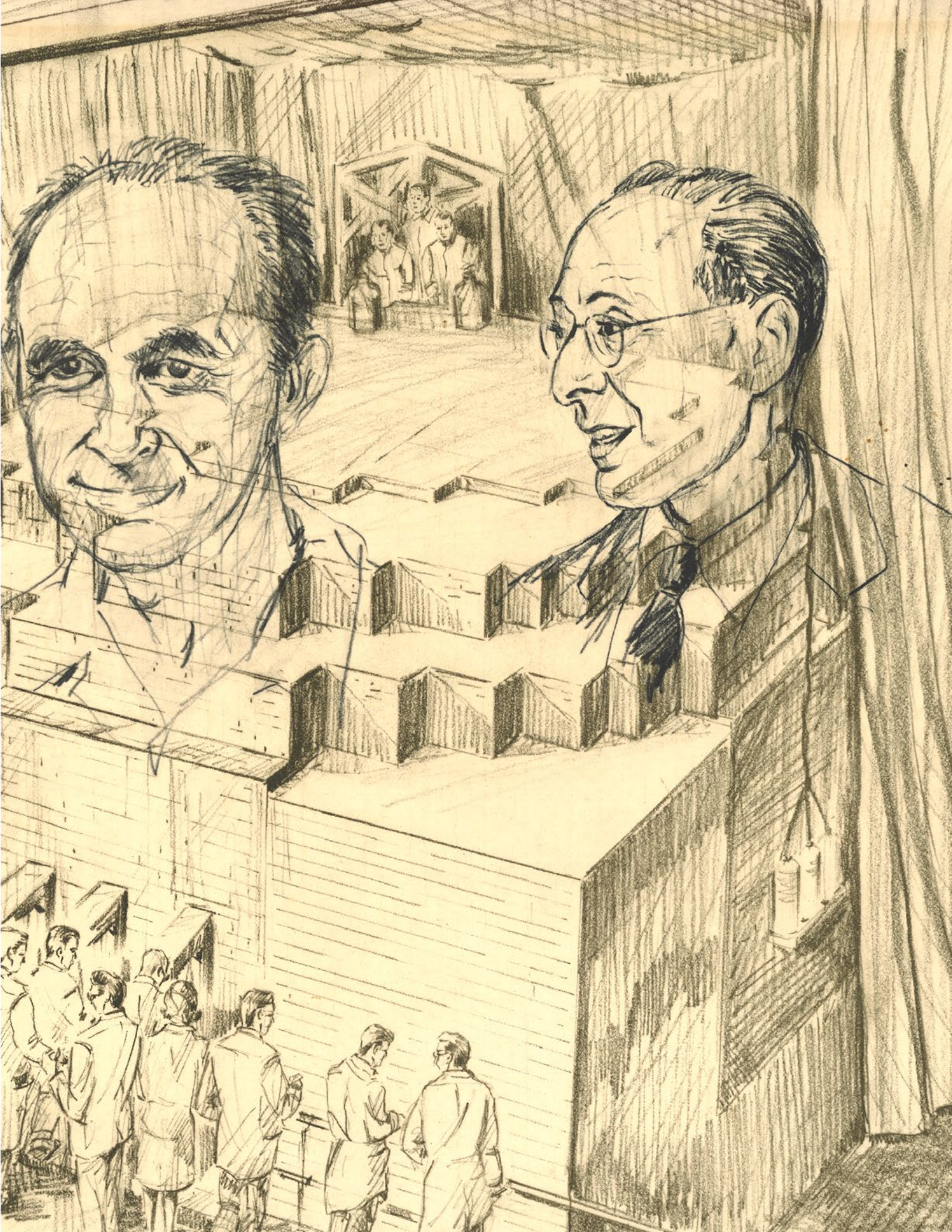
NATIONAL SECURITY RESEARCH CENTER

LOS ALAMOS NATIONAL LABORATORY



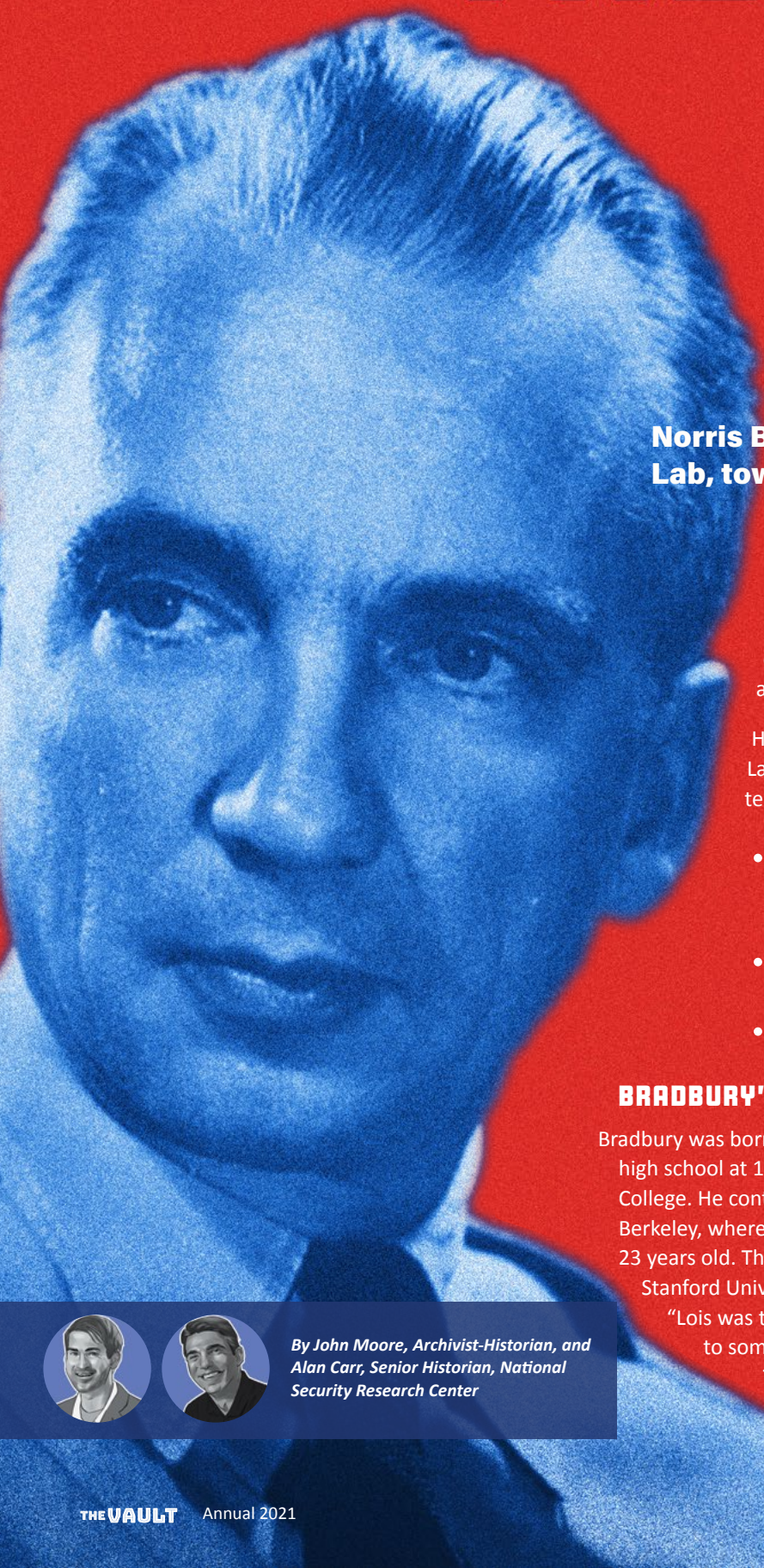
CHICAGO PILE-1

This lithograph, which is on display in the National Security Research Center, depicts Chicago Pile-1, or CP-1, the world's first sustained nuclear chain reaction. The experiment led by physicist Enrico Fermi went critical on December 2, 1942, at Stagg Field at the University of Chicago, paving the way for further work on an atomic bomb. Only 43 prints of this original lithograph were made by artist Leo Vertanian and given to the 43 scientists present when criticality was achieved. The ink used in the depiction was made of graphite from the piles. The four prominently featured scientists are, from left, Leo Szilard, Arthur Compton, Enrico Fermi, and Eugene Wigner. It is unknown who donated the lithograph to the NSRC.



LAB'S LONGEST-SERVING DIRECTOR TOOK

THE HELM 75 YEARS AGO



Norris Bradbury is credited with saving the Lab, town from post-war decline

He diversified the Laboratory from its Manhattan Project mission after World War II and was known as both the savior of Los Alamos and the architect of our Lab today.

Initially agreeing to become the Los Alamos Lab's second director for a six-month interim period, Norris Bradbury assumed the helm 75 years ago on October 17, 1945.

He stayed for 25 years, becoming the longest serving of the Lab's 12 directors. Other notable accomplishments during his tenure include:

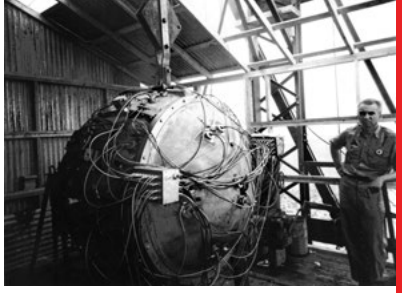
- helping assemble the Trinity test's nonnuclear components as well as procedures for transporting and assembling the Gadget;
- witnessing the nation's stockpile increase from two to more than 31,000 weapons between 1945 and 1967;
- overseeing much of the Lab's post-WWII infrastructure.

BRADBURY'S EARLY YEARS

Bradbury was born in California on May 30, 1909. He graduated from high school at 16 and studied chemistry and physics at Pomona College. He continued his education at the University of California – Berkeley, where he earned his Ph.D. in physics in 1932 when he was just 23 years old. Three years later, Bradbury joined the physics faculty at Stanford University. Bradbury married Lois Platt in 1933, later explaining, "Lois was the sister of my roommate in college. She was engaged to someone else. The engagement fell apart and I moved in." The couple had three sons together and were married for 64 years.

By John Moore, Archivist-Historian, and Alan Carr, Senior Historian, National Security Research Center

MILITARY SERVICE, SECRET SCIENCE



Commissioned to the Navy Reserve in 1941, Bradbury was stationed at the Naval Proving Ground in Dahlgren, Virginia, until 1944. It was then that Bradbury joined the Manhattan Project in Los Alamos, where he was appointed to lead the implosion field test program.

At the Trinity test site, which today is White Sands Missile Range, Bradbury was placed in charge of the assembly of all nonnuclear components of the world's first nuclear weapon called the Gadget (pictured above).

The Gadget's successful detonation was July 16, 1945, with the bombings on Hiroshima and Nagasaki just weeks later on August 6 and 9, respectively. The Japanese surrendered on August 14, 1945, and WWII officially ended on September 2, 1945.

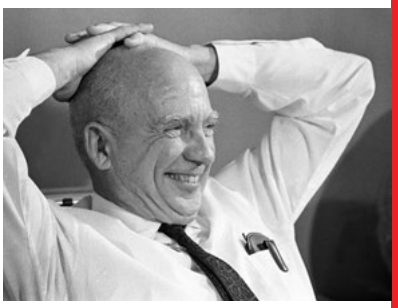
A SUCCESSOR

Shortly thereafter, J. Robert Oppenheimer resigned as the Lab's director, though both Oppenheimer and Gen. Leslie Groves, the Manhattan Project director, felt that the Lab's national security work should continue.

While Oppenheimer believed that an individual with a scientific background would best meet the criteria to succeed him, Groves wanted a person who had a military background to run the institution. Discussing this, the two thought the best candidate for the job was none other than Bradbury.

At the time he accepted the position, Bradbury thought he could have been Los Alamos's last director — the wartime mission of Laboratory was complete and many of the scientists and other staff had left the mesa. Bradbury said the first few months as director were uncertain and undeniably tough.

POST-WWII LAB, COMMUNITY



Bradbury began to reshape the Laboratory by shifting the primary mission to the production and development of nuclear weapons until further instructed by the federal government. He transformed the organization from a nuclear weapons laboratory to a nuclear sciences laboratory. While nuclear weapons remained the main priority, the Laboratory would venture into other areas of nuclear science, such as nuclear propelled rockets for space exploration and the research of nuclear science in the medical field.

Bradbury also reshaped the community of Los Alamos. Many of the Manhattan Project Laboratory facilities were demolished and the Laboratory was relocated to its present-day location. New homes, apartment complexes, and local businesses would be built for the Lab staff and their families for their lives on the mesa.

In 1970, Norris was bestowed the Enrico Fermi Award, which is the government's oldest science and technology award and honors a lifetime of achievement. This same year, Bradbury retired from the Lab and Harold Agnew (pictured above with Bradbury) succeeded him as the third director.

The Lab's museum and science hall were renamed in Bradbury's honor. Bradbury and his wife continued to live in Los Alamos. Bradbury died at the age of 88 in August 1997 and Lois died in January 1998.

What Bradbury said:

"For me to say I had any deep emotional thoughts about Trinity (the first nuclear weapons test)… I didn't. I was just damned pleased that it went off."

On what he considered a necessary but temporary evil: "Nobody likes atomic bombs; I hate them. But it has to be done ..."

"To bring peace by threatening war is possible; to bring peace by requesting and promising cooperation seems more dignified. But the request and the promise, and surely the threat, are both fortified by weaponeering now."

"One hopes that weapon emphasis will decrease with time. We are not a warring nation – the mere possession of weapons does not bring about war."

"I, myself, with considerable knowledge of nuclear things, with some knowledge of their military use, but with only a plain citizen's feelings about people and nations and hopes and fears would prefer to try to follow the path of hope."

What others said about Bradbury:

"He lived as though he were killing snakes every minute of the day."

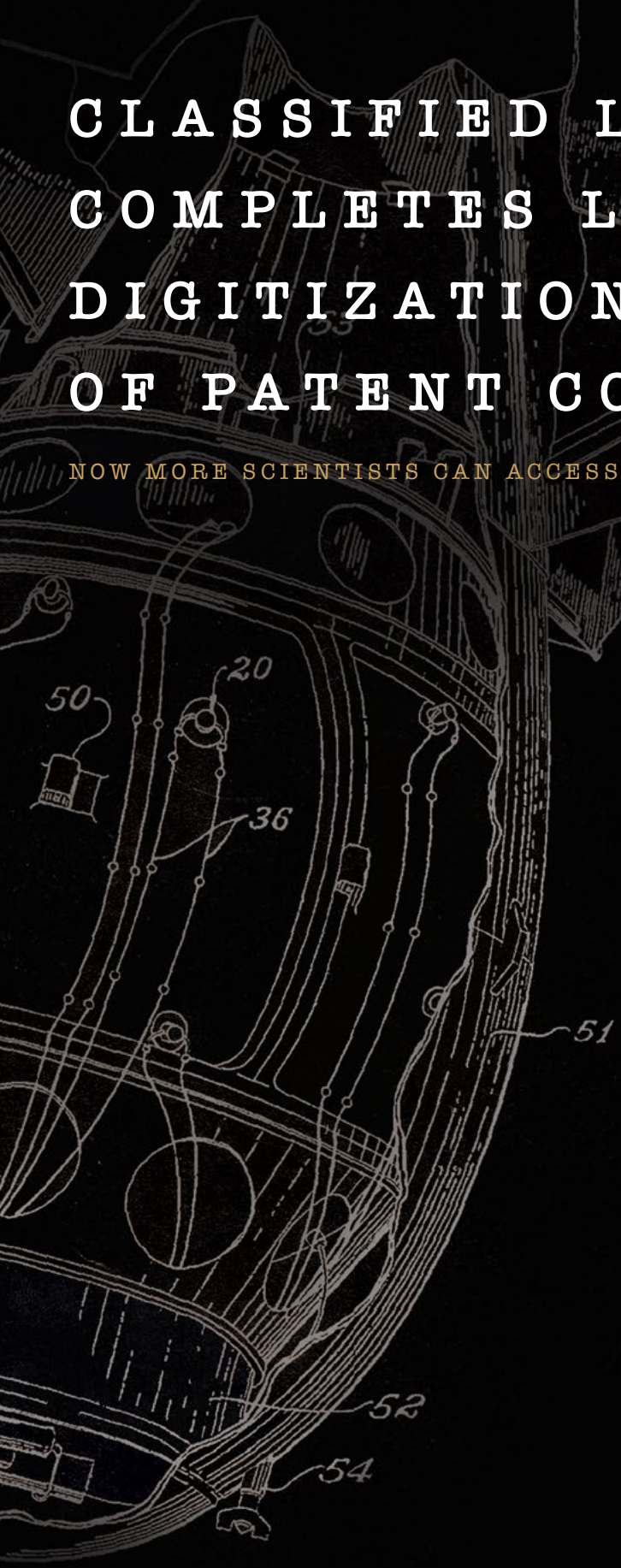
"Whatever he was doing, it was always zip, zip, zip."

"His office door was open all day, except when he was in conference. He answered his phone himself unless he was already on the line."

"He was a nice man; both fair and honest."

CLASSIFIED LIBRARY COMPLETES LARGE DIGITIZATION PROJECT OF PATENT COLLECTION

NOW MORE SCIENTISTS CAN ACCESS EARLIEST WEAPONS RECORDS



Many of us regularly enjoy the online resources provided by the National Security Research Center (NSRC). However, you may not be aware of all the work that goes on behind the scenes to digitize articles, reports, photographs, and correspondence. This process not only preserves documents, many of which date back to the Manhattan Project era, but also ensures they are searchable and accessible for today's national security work.

You also may not be aware that a vast majority of the Laboratory's information holdings have not yet been digitized. And by vast majority, I mean perhaps 90% of the millions of holdings in the NSRC is only available in hard copy.

But recently, the NSRC team successfully completed the digitization of one of my favorite collections: the Patent Collection. These patents formally record the intellectual foundation of the Weapons Program, and they record the Laboratory's unsurpassed history of innovation.

The Patent Collection is made up of 25 patents, which is more than 5,300 mostly classified paper documents from 1944 - 1946, including official forms, handwritten notes, and drawings. This collection shows Los Alamos has an unsurpassed – and legally documented – history of technical innovation in the nuclear weapons field. When consulting the patents, today's researchers can see the technology evolve by reading the notes of the inventors.

Chris C'de Baca, the NSRC's Group Leader, said, "The Patent Collection is one of countless examples of our interesting and rare historical materials that is pertinent to the present and future mission of the Laboratory."

Lenny Martinez, an archivist in the National Security Research Center (NSRC), recently completed scanning the Lab's Patent Collection. This collection contains more than 5,300 documents, including official forms, handwritten notes, and drawings related to the development of the first nuclear weapons.

PATENTS OFFER INSIGHT INTO EARLY WEAPONS DEVELOPMENT

It comes as a surprise to many that early nuclear weapons designs were patented (feel free to insert your lawsuit joke here), but they were. During the 1940s, this was a way for the U.S. government to try to control atomic energy.

Today, the NSRC owns many of the originals, and this truly unique collection is regularly accessed by Lab researchers. For instance, questions pertaining to the development of thermonuclear weapons, commonly called hydrogen bombs or H-bombs, is still debated in the open literature, and the original patent documentation helps offer insight into that important and fascinating history. Weapons Physics Chief Scientist Mark Chadwick said, "I think the process whereby we reconstruct the history of who gets credit for what is helped greatly by these patents."

As I've reviewed the patents, I've discovered that Manhattan Project era (1939 - 1946) scientists devised ideas for nuclear weapons that would not find their way into stockpiled designs until years later. It's also interesting to ponder what the Los Alamos wartime atomic spy and physicist Klaus Fuchs may have passed along to the Soviet Union, considering he is named as an inventor on some of the patents.

PRESERVATION THROUGH DIGITIZATION

I asked Nanette Mayfield, who oversees the NSRC's digitizers, how the materials in the NSRC collections are chosen for digitization. "Before we begin digitizing a collection, we take into account customer value, deterioration risk, collection size, and digitization complexity," she said. Nanette further explains, "We then assign skilled archivists who have demonstrated knowledge of equipment operation, archival standards, and digitization processes for the collection media type." In the case of the Patent Collection, the skilled archivist was Lenny Martinez.

Throughout the digitization process, Lenny worked closely with the NSRC's Lead Archivist Danny Alcazar. Partnering with an experienced archivist is essential to the process, considering the delicate and priceless nature of the patent documents.

As Danny informed me, "Technically, every time an image is exposed to bright light, a small amount of damage occurs. For this reason, it was critical to scan the documents with the highest attention to detail to both preserve the documents and to have enduring digital quality."

It takes a steady hand and absolute focus to work with these documents. Put another way: Wouldn't you be nervous if your job was to scan the U.S. Constitution, the Magna Carta, or a signed portrait of Michael Bolton?

I asked Lenny to tell me a little bit more about the job: "Well, I was very excited knowing that I was going to be working on a special historical assignment. It took longer to complete because I had to place one document at a time on the flatbed scanner in order to prevent documents from tearing or being damaged since the paper is quite old."

ACCESSING CRITICAL INFORMATION

Now the patents are searchable and accessible via our classified digital repository called the Online Vault.

As for the original documents, the patents will continue to be maintained at the NSRC in compliance with the highest industry standards.

And what can you expect in the future from LANL's classified library? The NSRC will of course continue digitizing collections critical for today's mission work. NSRC Director Riz Ali said, "For the Lab's technical staff, digitization projects like the Patent Collection allow an even clearer picture of early weapons work. As a partner to weapons scientists and engineers, we'll continue our efforts to provide them with the assistance they need to be successful."

By Alan Carr, Senior Historian, National Security Research Center

THE WELLNITZ CENTER

The Lab has millions of materials in its classified library, but only one collection is named after a person

For 40 years, a Weapons Program secretary steadily collected documents. Project records, notes, memos, data, photographs – Beverly Wellnitz had an inkling that they were important.

Today's weapons scientists, engineers, and research staff know she was right.

Wellnitz began working at the Lab a couple years after the end of World War II. The original mission to create the first nuclear weapons had been fulfilled, so the Lab was then charged with safeguarding our national security as countries raced to develop their own weapons.

To ensure that data remained accessible, and on her own initiative, Wellnitz created shot folders of information on early nuclear tests. As the Lab performed more and more tests, Wellnitz's collection of shot folders grew substantially through the years, said Alan Carr, Senior Historian in the National Security Research Center (NSRC).

"Beverly didn't actually have formal technical training, but she learned a considerable amount of physics over the years," Carr said. "She recognized the importance of the records she maintained."

From 1947 until her retirement in 1987, Wellnitz amassed hundreds of thousands of materials, aptly referred to

as the Wellnitz Collection, said Michael Bernardin, Laboratory Associate and retired Associate Lab Director for Weapons Physics.

"Beverly meticulously processed and cataloged all the trackable classified documents passing across her desk during her tenure at the Lab, eventually setting up an elaborate filing system, which is today's Wellnitz Collection," he said.

More materials have been added to the collection through the years and in 2006, 14 years after Wellnitz's death, the Weapons Data Vault was renamed the Wellnitz Center in her honor, Bernardin said.

"Over time, the shot folders became one of the most valued classified collections at the Laboratory."

— Michael Bernardin, LANL Associate and retired Associate Lab Director for Weapons Physics

What is the Wellnitz Center?

The Wellnitz Center consists primarily of classified weapons physics data, says NSRC Research Librarian Andrew Gordon, including

- legacy weapons engineering drawings,
- all U.S. nuclear tests,
- the Nevada National Security Site vault collection (transferred to LANL in 2007),
- the Lab's field-testing collection (hundreds of thousands of papers and tens of thousands of photographs), and
- a series of interviews Wellnitz conducted with weapons designers.

The Wellnitz Center is located within the NSRC, which is in the Lab's National Security Sciences Building. There, a staff of highly trained, specialized librarians and archivists curate the mostly-classified collections and assist researchers in accessing them. A significant portion of the Wellnitz Collection is also available electronically via the Lab's Online Vault.

Who was Beverly Wellnitz?

Wellnitz was born on July 2, 1928, in Mitchell, South Dakota. She arrived in Los Alamos in 1947, according to her death notice. At the time of her retirement in 1987, she was the longest employed woman at the Lab.

Outside of work, Wellnitz enjoyed pistol competitions, needlepoint, photography, fishing, and cooking. She and her husband Robert Wellnitz, who preceeded her in death in 1986, were founding members of the Los Alamos Geological Society. Robert also was employed at the Lab in various areas, ultimately working in the audio and video group.

She died on October 2, 1992, at age 64.

Though smaller collections are descriptively named after their primary authors, the Wellnitz Collection is the only one in the NSRC named after a person for honorary purposes.

By Brye Steeves, Communications Specialist, National Security Research Center

The Wellnitz Collection is mostly made up of classified weapons physics data, including information on U.S. nuclear tests. Both the collection and the center are named after long-time Lab employee Beverly Wellnitz.

GADGET PIT MAIN INVENTOR

On July 16, 1945, the Trinity test was conducted in the desert of southern New Mexico.

The test was a remarkable achievement.

It was an amalgamation of numerous scientific discoveries and inventions, and it brought the war-torn world into the Atomic Age.

Most importantly, it proved the feasibility of the plutonium implosion weapon design, which would be subsequently used in the Fat Man device deployed over Nagasaki on August 9, 1945, helping end World War II.

Robert Christy (pictured above), a young scientist originally from Canada who worked in the Theoretical Implosion group (T-1) during the Manhattan Project, has long been tied to the Trinity Gadget.

In late 1944, Christy proposed a novel design of the plutonium pit.

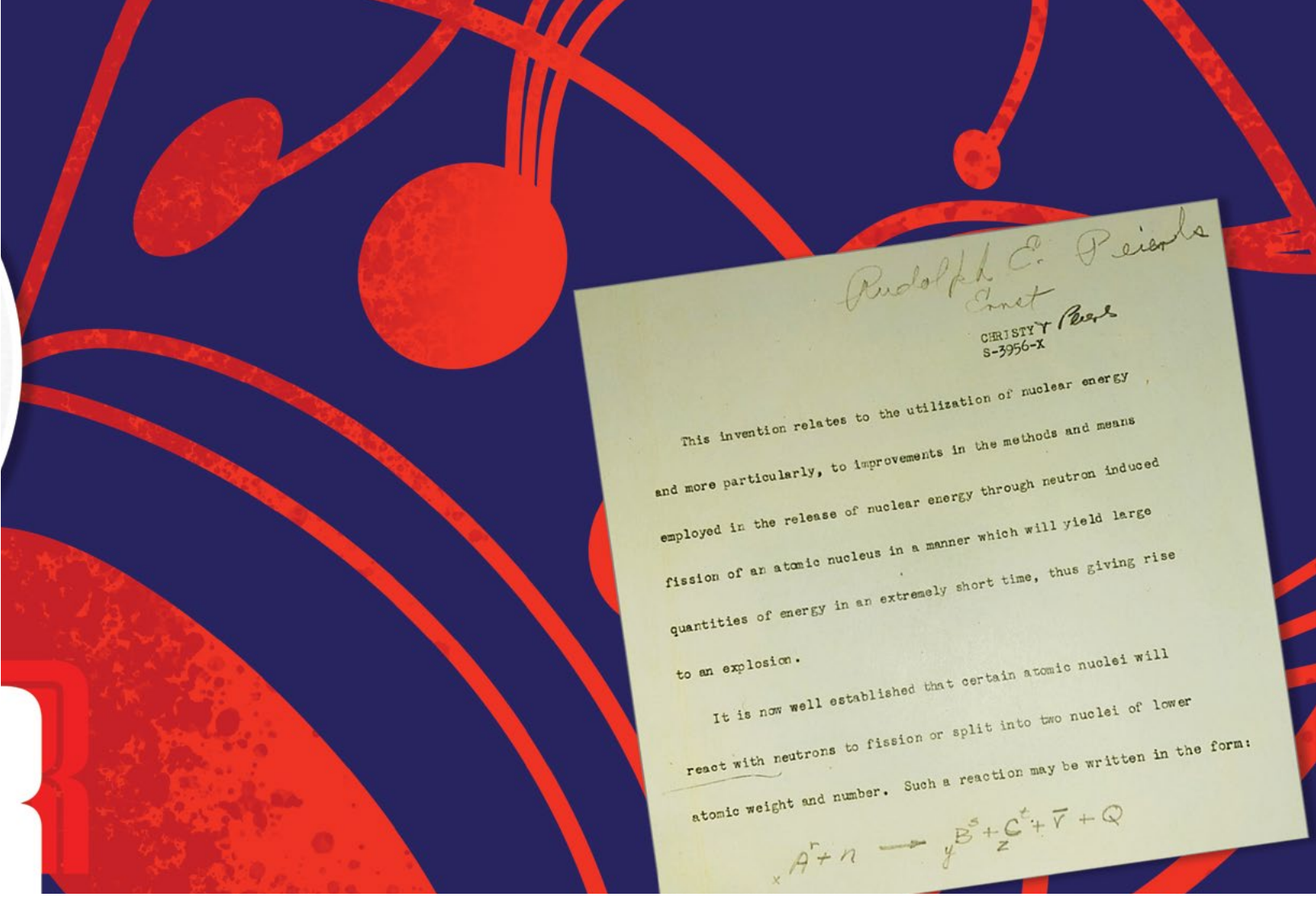
The new design was adopted and used in the Trinity test as well as in Fat Man released in war. Thus, the Trinity device was nicknamed as the "Christy Gadget."

DISPUTED CREDIT

Though Christy's name has become synonymous with this novel design, many different sources give credit for this invention to other scientists.

In her book *Britain and the H-Bomb,* historian Lorna Arnold states design was actually invented by Rudolph Peierls (pictured right), the brilliant Theoretical Implosion group leader and a member of the British Mission to Los Alamos. (The British Mission was made up of scientists from Britain who contributed to the Manhattan Project; many were actually refugees from European countries.)

Peierls shares credit for the invention on the official patent. Additionally, Arnold's claim is repeated by Oxford physicist Frank Close. In his book, *Trinity: The Treachery and Pursuit of the Most Dangerous Spy in History*, Close claims the "authoritative histories" attribute the invention to Peierls.



Even figures like physicist Edward Teller, one of the key inventors of the hydrogen bomb have been credited with inventing the design.

NEWLY DISCOVERED DOCUMENTS, TAPES

The National Security Research Center (NSRC) contains previously untapped, but convincing evidence that Christy is the principal inventor of the design. Even though the finalized patent, entitled "Method and Apparatus for Explosively Releasing Nuclear Energy," is filed jointly under Peierls and Christy, NSRC Archivist Danny Alcazar and the Lab's Weapons Physics Chief Scientist Mark Chadwick recently discovered that the original handwritten draft of the patent was in Christy's name alone.

There also is an early typed copy of the patent that was edited by Peierls, in which Peierls made the handwritten addition "and Rudolf Peierls." Additionally, the NSRC has tape recordings from a 1986 interview with both Peierls and Christy that offer implicit credit to Christy.

Outside the NSRC, there are additional sources that attribute the design idea to Christy. Hans Bethe, the Theoretical Division leader during the Manhattan Project, points to Christy, whereas Teller's *Memoirs* credits Christy with "pointing out" a new design.

"Prominent historians have challenged that the basic design of the wartime implosion system's pit was largely conceived by physicist Robert Christy, " said the NSRC's Senior Historian Alan Carr. "However, recently uncovered records in the National Security Research Center demonstrate that he is, in fact, the primary architect of the design. This case is the perfect example of how valuable the Lab's national security collections are to verifying history."

As such, it is with validation that the nickname the "Peierls Gadget" never caught on and that "Christy Gadget" was used. Q

By Thomas Chadwick, Intern, National Security Research Center

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Three podcasts from Los Alamos National Laboratory detail nuclear history and cutting-edge science and technology. Available on your favorite podcast platform or at **discover.lanl.gov/podcasts**.

LATEST EPISODE

The fourth atomic spy: NSRC Senior Historian Alan Carr discusses Oscar Seborer, a recently confirmed spy.

LATEST EPISODE

Searching for signs of life on Mars: Billions of years ago, Mars was warmer and wetter. Could a dried up lake bed harbor secrets of past life?

LATEST EPISODE

How to make a Fat Man: A recently rediscovered manual details how to assemble the atomic bomb released above Nagasaki during World War II.

Scan to listen.

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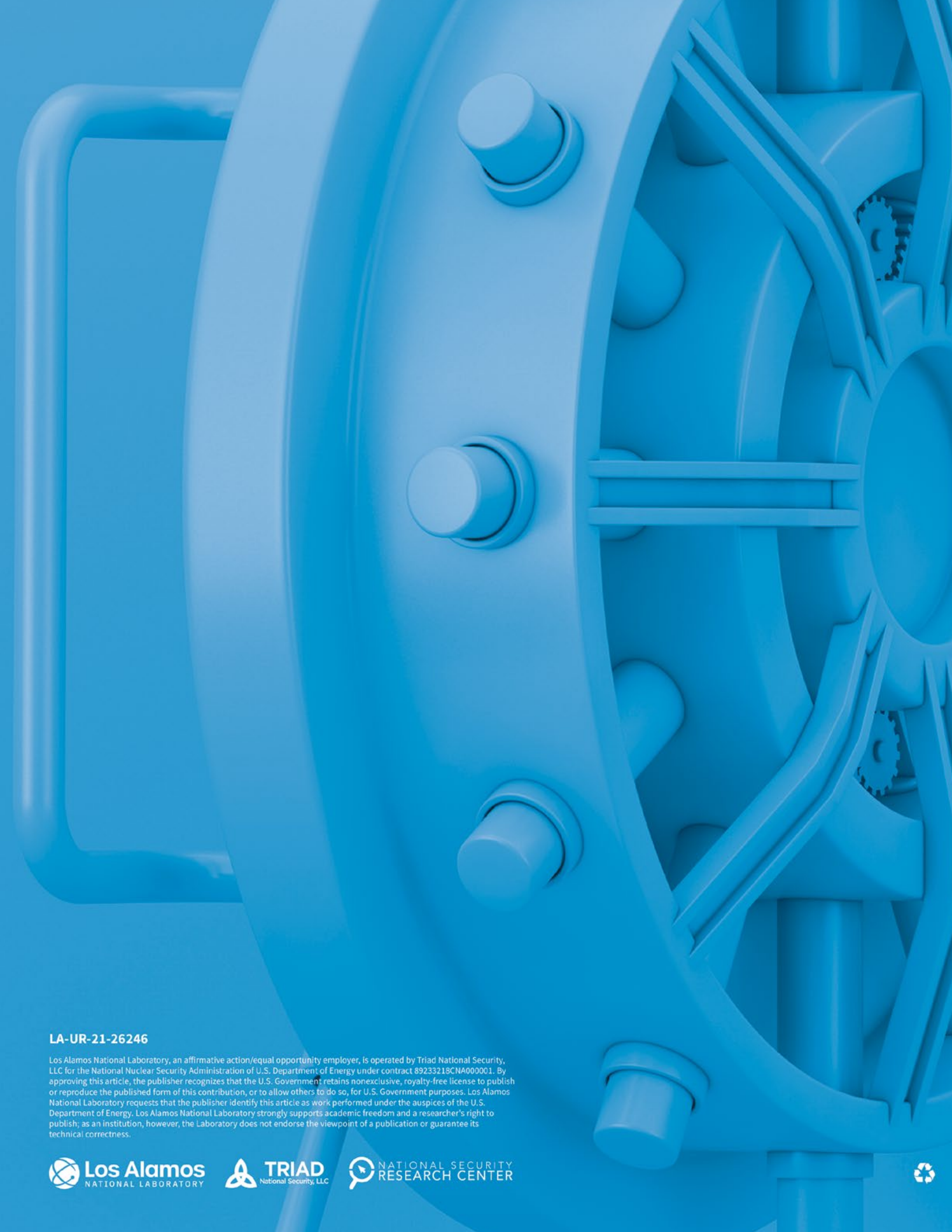

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