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# Project VENONA: Breaking the Unbreakable Code

An Honors Thesis submitted in partial fulfillment of the requirements for Honors in History.

By

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Under the mentorship of Dr. Bill Allison

#### **ABSTRACT**

Project VENONA was a top-secret counterintelligence program initiated by the United States Army Signals Intelligence Service during World War II. VENONA was established to decipher intercepted Soviet communications and break the "unbreakable" Soviet code system. Examining Project VENONA and its discoveries is vital to understanding the history of the early Cold War.

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## Introduction

Project VENONA was a top-secret counterintelligence program initiated by the United States Army Signals Intelligence Service during World War II. The purpose of VENONA was to break the "unbreakable" Soviet code system and decipher intercepted Soviet communications. These intercepted communications dealt with both diplomatic and espionage matters transmitted between the various Soviet intelligence agencies during the Second World War and well into the Cold War. Project VENONA had a profound impact on the early Cold War, yet most Americans were unaware of its existence. Due to its top-secret nature, the success of VENONA was unknown to the public. Before being declassified, the general public knew of some of the many Soviet spies captured in the United States, but how the spies were caught or where the incriminating evidence came from remained a closely guarded secret. Thus, VENONA is part of an incomplete picture of the inner workings of the Cold War on the American homefront. Shedding light on Project VENONA is critical to understanding the history of the early Cold War.

The story of the men and women behind VENONA and how they broke the Soviet Union's supposedly unbreakable code needs to be told. To understand the importance of VENONA and to explore how these men and women contributed to the project, several questions must be addressed. What was the VENONA Project and why was it created? How did the VENONA team break the "unbreakable" Soviet code system? How did VENONA discoveries influence the Cold War and why is Project VENONA important? Who were these VENONA codebreakers?

Research sources on VENONA include published research on the topic, online archives, oral history interviews, and declassified VENONA documents. Primary sources include selected

VENONA messages from the National Security Agency (NSA) and Central Intelligence Agency (CIA) online archives, oral histories from the NSA and CIA online archives, and additional information on VENONA and on Arlington Hall, the Virginia location where much of the VENONA decrypting was done. Additionally, the NSA's historian, Dr. David Hatch, provided key information and guidance on finding credible sources on the history of VENONA and the team of code breakers.

The history of the VENONA Project and its successes are written about in a myriad of ways, varying from a history on the operation as a whole to the role VENONA played in the trials of Komitet Gosudarstyennoy Bezopasnosti (KGB) spies in Cold War America. <sup>1</sup> These histories are written by a range of authors, varying from scholars who have no connection to the program, and authors who are retired intelligence agents who worked on VENONA. Such works include Robert Louis Benson's An Introductory History of VENONA and Guide to the Translations and The VENONA Story, Robert Louis Benson and Michael Warner's Venona: Soviet Espionage and the American Response 1939-1957, John Earl Haynes and Harvey Klehr's Venona: Decoding Soviet Espionage in America, and Stephen Budiansky's Code Warriors: NSA's Codebreakers and the Secret Intelligence War Against the Soviet Union. Jerrold Schecter and Leona Schecter's Sacred Secrets: How Soviet Intelligence Operations Changed American History and Nigel West's Mortal Crimes: The Greatest Theft in History: Soviet Penetration of the Manhattan Project also discusses the origins of Project VENONA and its findings.

Much of the history of VENONA focuses on its role in the infamous 1951 trials of Soviet KGB spies Julius and Ethel Rosenberg and Morton Sobell. This history has been published in

<sup>&</sup>lt;sup>1</sup> Komitet Gosudarstyennoy Bezopasnosti, or KGB, was the National Security Agency /Committee for State Security of the Soviet Union. It operated from 1954 to 1991 and was an active player in Cold War Espionage. Paul Reuvers and Marc Simon, "Index of Intelligence Agencies," Cryptomuseum.com, Last modified April 8, 2014, Accessed March 7, 2020,

https://web.archive.org/web/20140415211347/http://www.cryptomuseum.com/intel/index.htm#7.

many books, including John Earl Hayes, Alexander Vassiliev, and Harvey Klehr's *Spies: The Rise and Fall of the KGB in America*, Allen Weinstein and Alexander Vassiliev's *The Haunted Wood: Soviet Espionage in America – The Stalin Era*, Ronald Radosh and Joyce Milton's *The Rosenberg File: A Search for the Truth*, Walter and Miriam Schneir's *Final Verdict: What Really Happened in the Rosenberg Case*, and Jake Kobrick's *The Rosenberg Trial*. Numerous journal articles also describe the role Project VENONA played in the Rosenberg court case, including Bernice Schrank's "Reading the Rosenbergs after Venona," John Earl Haynes and Harvey Klehr's "Alexander Vassiliev's Notebooks and the Documentation of Soviet Intelligence Activities in the United States during the Stalin Era," and Steven T. Usdin's "The Rosenberg Ring Revealed."

There is significantly less written about the men and women who spent years sorting Soviet messages by date and category, painstakingly going through the collected messages trying to find somewhere the Soviets could have slipped up, trying to find a way to break the code and decipher the messages.

Many authors use the code breakers as a way to introduce the VENONA Project and to progress the story of how the Soviet code systems were broken, yet the discussion of the code breakers themselves is often cut short to dedicate more time to the project itself. This failure to more extensively examine the code breaker's experience limits the human element of the story.

In her article "CODE NAME: VENONA," historian Liza Mundy told the stories of women who worked on Project VENONA.<sup>2</sup> Mundy discusses Gene Grabeel's task of initiating VENONA, as well as other women who contributed to the project, such as Angeline Nanni, Carrie Berry, Josephine Miller, and Gloria Forbes. Mundy also wrote *Code Girls: The Untold* 

<sup>&</sup>lt;sup>2</sup> Liza Mundy, "CODE NAME: VENONA," *The Smithsonian* 49: 5 (September 2018): 30-39.

Story of the American Women Code Breakers of World War II, which chronicles the story of numerous women working in the United States Army and Navy signals intelligence programs, such as MAGIC and ULTRA, to decipher Japanese and German codes during the Second World War.<sup>3</sup> Code Girls also provides an informative backdrop for the cryptological programs that produced Project VENONA. Aside from "CODE NAME: VENONA" and Code Girls, there remains very little scholarship available about these women and their code-breaking feats, particularly those that took place during the Cold War. Mundy's efforts in preserving and emphasizing the vital work these women conducted immensely contribute to the historiography of United States cryptography and the role women have played in it.

As one of the leading historians of Project VENONA, Robert Louis Benson, an NSA officer and retired Air Force officer, has two separate works on the history of the VENONA Project, Introductory History of VENONA and Guide to the Translations and The VENONA Story. Introductory History of VENONA is a good starting place for the general background of the project. The Venona Story outlines in more detail the purpose and results of the project and also discusses the technical processes behind cryptanalysis. Notably, The Venona Story chronicles the timeline of the program along with its successes. In varying degrees of depth, both of Benson's works discuss how the major VENONA breakthrough occurred. The Venona Story specifically breaks down the different messages intercepted by the Army Signals Intelligence Service into separate categories, based on the year in which they were collected. Benson further discusses important related events that happened during the specific time frames of a given category. For example, the section designated for KGB messages sent in 1942-43 discusses the

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<sup>&</sup>lt;sup>3</sup> Liza Mundy, *Code Girls: The Untold Story of the American Women Code Breakers of World War II* (New York: Hachette Books, 2017).

<sup>&</sup>lt;sup>4</sup> Robert Louis Benson, *Introductory History of VENONA and Guide to the Translations* (Fort George G. Meade, MD: National Security Agency, 1996). Robert Louis Benson, *The VENONA Story* (Fort George G. Meade, MD: Center for Cryptologic History, 2011).

KGB organization in the United States and which cryptographic systems were being used by the Soviets during that time period.<sup>5</sup> Benson also talks about the various people who worked on the project, including Lieutenant Richard Hallock, Meredith Gardner, Cecil Phillips, Federal Bureau of Investigation (FBI) Special Agent Robert Lamphere and briefly, Gene Grabeel.

Steven Budiansky's *Code Warriors: NSA's Codebreakers and the Secret Intelligence War Against the Soviet Union* details what the "Russian problem" was and how the code breakers went about trying to solve it through VENONA. Located in the back of one of the wings of B Building in Arlington Hall, the Army Signals Intelligence Service headquarters in Virginia, where a fifty-by-fifty foot area had been blocked off from the rest of the wing with plywood screens, a few dozen people worked to break and decipher Soviet codes. These codebreakers included Gene Grabeel, Richard Hallock, Frank Lewis, Genevieve Grotjan Feinstein, and Cecil Phillips.

Budiansky also covers what is to be considered one of the most important sources of enciphered Russian messages available to the United States for many years: a teleprinter located in Arlington Hall. Negotiations between the United States Army and the Soviet Union government in June 1944 led to an agreement that would create a direct radio teleprinter link from the Pentagon to Moscow through an American radio station located in Algiers. Both governments shared usage of the channel and operated independent teleprinter terminals in their respective countries. According to Budiansky, the purpose of this shared radio channel was to improve the unreliable nature of the radio link cable companies would operate between the two capital cities. What the Soviet Union did not know, however, was that Arlington Hall had a

<sup>&</sup>lt;sup>5</sup> Benson, *The Venona Story*, 22-29.

<sup>&</sup>lt;sup>6</sup> Stephen Budiansky, *Code Warriors: NSA's Codebreakers and the Secret Intelligence War Against the Soviet Union* (New York: Alfred A. Knopf, 2016).

<sup>&</sup>lt;sup>7</sup> Budiansky, *Code Warriors*, 15-16.

teleprinter installed that automatically copied everything passed over the shared radio link. This copying teleprinter served as an invaluable source of information for American codebreakers for years.<sup>8</sup>

John Earl Haynes and Harvey Klehr, along with other collaborating authors, have also contributed to the literature available about Project VENONA. Their book *Venona: Decoding Soviet Espionage in America*, provides a comprehensive introduction to how VENONA came about and what it accomplished. Additionally, Haynes and Klehr's article from the *Journal of Cold War Studies*, "Alexander Vassiliev's Notebooks and the Documentation of Soviet Intelligence Activities in the United States during the Stalin Era," discusses Alexander Vassiliev, a retired KGB agent, and his notebooks that contained transcriptions, excerpts, and summaries from KGB archive files. The article also discusses how Vassiliev's notes correlated to and corroborated VENONA findings. 10

There is a historiographical gap when it comes to telling the stories of the women and men of VENONA who worked on the Russian problem in Arlington Hall. Aside from Meredith Gardner, Cecil Phillips, Special Agent Robert Lamphere, Gene Grabeel, and a few other men and women regularly mentioned, history does not present all the names of those who worked to break the codes and decipher Soviet messages. While there is information available regarding women code breakers and their cryptanalysis work during World War II, such as MAGIC and ULTRA, there is significantly less known about the women who went on to work with Russian decryptions during the Cold War. A large part of why there is a lack of available information on

<sup>&</sup>lt;sup>8</sup> Budiansky, *Code Warriors*, 23.

<sup>&</sup>lt;sup>9</sup> John Earl Hayes and Harvey Klehr, *Venona: Decoding Soviet Espionage in America* (New Haven, Conn.: Yale University Press, 1999).

<sup>&</sup>lt;sup>10</sup> John Earl Haynes and Harvey Klehr, "Alexander Vassiliev's Notebooks and the Documentation of Soviet Intelligence Activities in the United States during the Stalin Era," *Journal of Cold War Studies* 11:3 (July 2009):6-25.

these women is due to the secret nature of the work. During World War II, these women were required to take a secrecy oath before they could begin work. This oath swore them to silence and prohibited them from speaking anything about their top-secret work to anyone outside the work premises. Interviews with some of the VENONA women reveal that they were told that to speak about the project was considered an act of treason. These women were warned that should they break their oath of secrecy, they were likely to be given the same sentence as traitors and spies—execution. Even after the project was declassified, they felt they could not discuss their work with anyone. The notion of eternal secrecy and the resistance to tell their stories accounts for the minimal amount of information available on women's contributions to VENONA. This also explains why so little is known about the VENONA analysts.

There are examinations that are critical of VENONA, many focusing on particular court cases, while others question the validity of VENONA's accuracy in deciphering messages. Focusing on VENONA and the Rosenberg trial, Walter Schneir and Miriam Schneir argue that the number of Russian messages that remain enciphered in their original code and the gaps in translated VENONA messages make the difficult hard to interpret. They also point out that a declassified memorandum from FBI Assistant Director Alan Belmont states that almost anything from a deciphered Russian message could be "radically revised" in the future. For these reasons and others, Schneir and Schneir argue that the VENONA translations are unreliable and the project's importance is over-emphasized.

To explain the importance of Project VENONA, it is vital to outline the background of the project, the notable codebreakers who made such a feat possible, and finally how the Soviet Union's "unbreakable" code was broken.

<sup>&</sup>lt;sup>11</sup> Walter Schneir and Miriam Schneir, "Cables Coming in From the Cold," *The Nation* 269:1 (July 17, 1999): 25-30.

## **Background on Project VENONA**

VENONA's Predecessor

The genius behind the VENONA system was formulated from the existing code-breaking systems of World War II. During World War II, the United States set out to break enemy codes and exploit them for an Allied victory. Specifically, signals intelligence within the United States set their sights on German and Japanese codes, aiming to crack the underlying code in the German Enigma and Japanese Purple systems. The Japanese Purple cipher system was first partially broken in 1940 and Germany's Enigma code was cracked in 1941. The information gleaned from deciphered messages from these systems was a vital part of the Allied victory.

# A Cold War Cryptologic Breakthrough

The Army Signals Intelligence Service, which later became the NSA, used VENONA to target communications between Soviet intelligence agencies. Continuing into the Cold War, VENONA aimed to decipher intercepted communications and crack the Soviet's "unbreakable" code system. These deciphered messages would be used to benefit the United States. VENONA became one of the most significant cryptologic breakthroughs of the Cold War. VENONA's cryptanalysts worked thousands of laborious hours to crack the Soviet code, one of the most complex systems of the 20th century. The first break was not made until November 1943.

By 1978, the NSA evaluated the likelihood of finding additional matches of cover names to Soviet agents in the VENONA translations. The NSA determined that the analysis of VENONA messages had been completed as much as possible. They determined that many of the spies discussed in the messages were either not worth pursuing any further or were dead. This

led to the conclusion of Project VENONA October 1980.<sup>12</sup>

Project VENONA decrypted and translated a mass amount of communications from the Soviet Union. The messages covered a range of information, including recruiting proposals for Americans that would make good Soviet spies, reports on Soviet espionage against American aircraft, and the recruitment of Alfred Sarant, a spy under Julius Rosenberg's direction. Sarant became one of the major spies in the atomic bomb conspiracy.<sup>13</sup>

Though completed, Project VENONA remained classified until July 1995 when the translated VENONA materials were released to the public. In total, the VENONA codebreakers decrypted and translated roughly 2,900 messages between the start of the operation on 1 February 1943 until its close on 1 October 1980. Virtually all of the messages sent between Moscow, New York, and Washington between 1944 and 1945 that could have been cracked were successfully deciphered between 1947 and 1952.<sup>14</sup>

VENONA was the last in a series of arbitrary operation code names given to the counter intelligence project launched against the Soviet Union's communication systems. Other code names for this operation included JADE, BRIDE, and DRUG. <sup>15</sup> These names hold no real significance or direct meaning other than in their relation to the VENONA project itself.

Originally, the operational code name VENONA only applied to the translated and decrypted

<sup>&</sup>lt;sup>12</sup> National Security Agency, "VENONA: An Overview," Cryptologic Almanac 50th Anniversary Series, accessed March 8, 2020, <a href="https://www.nsa.gov/Portals/70/documents/news-features/declassified-documents/crypto-almanac-50th/VENONA">https://www.nsa.gov/Portals/70/documents/news-features/declassified-documents/crypto-almanac-50th/VENONA</a> An Overview.pdf

National Security Agency and Central Intelligence Agency, Selected Venona Messages, "3. New York 854 to Moscow, 16 June 1942. *Recruiting proposals*," Washington, DC, 1996, Accessed March 7, 2020, <a href="https://permanent.access.gpo.gov/websites/www.cia.gov/www.cia.gov/csi/books/venona/b3.gif">https://permanent.access.gpo.gov/websites/www.cia.gov/www.cia.gov/csi/books/venona/b3.gif</a>. NSA and CIA, Selected Venona Messages, "23. San Francisco 31 to Moscow, 17 January 1944. *Espionage against aircraft*," Washington, DC, 1996, Accessed March 7, 2020, <a href="https://permanent.access.gpo.gov/websites/www.cia.gov/www.cia.gov/csi/books/venona/b23.gif">https://permanent.access.gpo.gov/websites/www.cia.gov/www.cia.gov/csi/books/venona/b23.gif</a>. NSA and CIA, Selected Venona Messages, "32. New York 628 to Moscow, 5 May 1944. *Recruitment of Al Sarant*," Washington, DC, 1996, Accessed March 7, 2020,

https://permanent.access.gpo.gov/websites/www.cia.gov/www.cia.gov/csi/books/venona/b32.gif.

<sup>&</sup>lt;sup>14</sup> Benson, The Venona Story, 9.

<sup>&</sup>lt;sup>15</sup> Benson, *The VENONA Story*, 59.

KGB and Glavonoye Razvedyvatel'noye Upravlenye (GRU)<sup>16</sup> messages. Over time, the term VENONA expanded to cover the general task of breaking Soviet communications. When the project was declassified in 1995, it became known as Project VENONA.<sup>17</sup>

# The Birth of Project VENONA

The VENONA Project was born in 1943 from the need to begin surveillance on the Soviet Union's communications through telegraph lines. Part of this need stemmed from worries within the United States that Stalin might be secretly negotiating with the Japanese, but more importantly from the need to make sure the United States was not again caught off guard by a foreign attack on US soil. For this to work, the Signals Intelligence program needed to ensure that nothing fell through the cracks of surveillance. 18 This need meant that breaking codes was the best way to prevent blind spots or oversights in American intelligence. Part of the project's top-secret status came from the nature of the United States-Soviet Union relationship. At the onset of the project, the Soviet Union was still an ally of the United States, which meant initiating a surveillance project needed to be kept quiet. The operation's top-secret classification changed stances as it continued into the Cold War. During World War II, it was not as imperative that the Soviet Union remain in the dark about the United States working on and cracking their codes; however, when the Soviets became the enemy during the Cold War, the need for ultimate secrecy on VENONA was vital. Had the Soviets discovered earlier that the United States had broken their codes, they would likely have changed the system, and the

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<sup>&</sup>lt;sup>16</sup> Glavonoye Razvedyvatel'noye Upravlenye, or GRU, is the Russian Military Intelligence Service. It was established by Lenin on 20 December 1917. It was operational and conducting espionage within America during the Cold War. Reuvers and Simon, "Index of Intelligence Agencies," <a href="https://web.archive.org/web/20140415211347/http://www.cryptomuseum.com/intel/index.htm#7">https://web.archive.org/web/20140415211347/http://www.cryptomuseum.com/intel/index.htm#7</a>.

<sup>&</sup>lt;sup>17</sup> Cecil Phillips, interviewed by PBS, 1999 Abamedia, accessed April 24, 2019, https://www.pbs.org/redfiles/kgb/deep/interv/k int cecil philips.htm

<sup>&</sup>lt;sup>18</sup> Budiansky. *Code Warriors*, 20.

progress made by Signals Intelligence would have been lost.

Under orders from Colonel Carter Clarke, the Chief of a special branch of the Military Intelligence Service, Project VENONA was created by Gene Grabeel, a retired Virginia school teacher, on 1 February 1943. Colonel Carter directed Grabeel to deal with what they called the 'Russian problem.' This problem was tackled at Arlington Hall, within a cramped fifty-by-fifty foot area isolated with plywood screens within a large open room. Arlington Hall was a former private women's college in Virginia. The Army commandeered it to use as a base of operations for Signals Intelligence during World War II. The codebreakers who worked there are often referred to simply as "Arlington Hall" in many VENONA histories. Arlington Hall was much like Bletchley Park, the British hot spot for cryptologic work during World War II. This team of highly skilled codebreakers and cryptanalysts tackled the Soviet Union's "unbreakable" code system throughout the project.

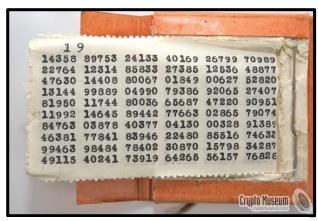
## The "Unbreakable" Code

The Soviet code system was believed to be unbreakable because of its one-time pad enciphering system. The prevailing theory behind this system is that the encryption key used for enciphering messages was at least the same length as or longer than the message to be sent. The key is constructed of a series of random numbers. The plain text of the message, or the message contents before it has been encrypted, is mixed with one of the random sets of numbers from the one-time pad. The encrypted message is then sent to its destination, where the receiver will decrypt the message using the same one-time pad code to obtain the original plaintext message. For the one-time pad system to remain unbreakable, some rules must be followed. First and

<sup>&</sup>lt;sup>19</sup>Budiansky, *Code Warriors*, 15.

foremost, there should only be two copies of the one-time pad in existence. If more than two people have access to the encryption codes, it will be possible to crack the system. Second, the one-time pad pages must only be used one time, and must be destroyed immediately after it is used.<sup>20</sup>

One-time pads can come in many forms, some with only numbers and others with a mix of randomized numbers and letters. In the case of the Soviet one-time pads, the code books contained only numbers. This form of code book requires that the letters of the plaintext message to be converted into a numerical form before the encryption process.<sup>21</sup>



A typical one-time pad booklet used by spies of the Soviet Union. Detlev Vresisleben, *Personal Collection of One-Time Pads. https://bit.ly/3cDilS8* 

# Working on Project VENONA

By using the cryptographic information Finland had uncovered about the Soviet cipher system, the codebreakers at Arlington Hall discovered that the Soviets were passing messages along five different cryptographic communication systems. The largest one involved trading representatives and materials, relaying information about the Lend-Lease program and the Soviet Government Purchasing Commission. The second system dealt with diplomatic issues, such as members of the Soviet diplomatic corps when conducting business with the Soviet embassy. The third communication system was used by the KGB, the Soviet Union's primary security agency from 1954-1991. The KGB used this communication system to relay messages between Moscow

<sup>&</sup>lt;sup>20</sup> Paul Reuvers and Marc Simons, "One-Time Pads (OTP): The Unbreakable Code," Cryptomuseum.com, Last modified January 29, 2013, Accessed March 7, 2020, https://web.archive.org/web/20140314175211/http://www.cryptomuseum.com/crypto/otp.htm.

Reuvers and Simons, "One-Time Pad (OTP)" https://web.archive.org/web/20140314175211/http://www.cryptomuseum.com/crypto/otp.htm.

headquarters and other stations abroad. The fourth and fifth systems involved the GRU, the Soviet military intelligence service. The GRU used system four to communicate with the Soviet Army General Staff Intelligence Directorate and others abroad, while system five was designated for GRU-Naval communications and dealt with Soviet Naval Intelligence Staff. <sup>22</sup> In 1943, Grabeel and other cryptanalysts assigned to the project spent months sorting stored and incoming Soviet telegrams by communication circuits. As their knowledge of the communication systems gradually expanded, the team was able to separate and sort the messages into these five cryptographic systems. <sup>23</sup>

In total, there were nearly 2,900 telegraphic cables sent between Soviet spies and their Moscow KGB superiors that were intercepted and decrypted by VENONA cryptanalysts. <sup>24</sup> Overall, Project VENONA exposed Soviet agents working within the United States, including Julius and Ethel Rosenberg, Klaus Fuchs, Saville Sax, Alfred Sarant and Alger Hiss. On 22 July 1947, a report from Arlington Hall showed that the Soviet message traffic potentially contained hundreds of cover names, many of which belonged to KGB agents. Some of these cover names included ANTENNA and LIBERAL, both of which were later revealed to be code names for Julius Rosenberg. <sup>25</sup> The KGB also gave code names to non-covert operatives, such as public figures and notable locations. <sup>26</sup> These included KAPITAN (President Roosevelt), COUNTRY (the United States), BANK (United States State Department), CARTHAGE (Washington, D.C.), BABYLON (San Francisco), ARSENAL (United States War Department), and ENORMOZ

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Benson, Introductory History, 4.

<sup>&</sup>lt;sup>23</sup> Michael Warner, Robert Louis Benson, National Security Agency, and Central Intelligence Agency, *Venona:*Soviet Espionage and the American Response 1939-1957 (Washington, D.C.: National Security Agency, 1996) xiii.

Hayes and Klehr, *Venona*, 1.

<sup>&</sup>lt;sup>25</sup> Benson, *Introductory History*, 4.

<sup>&</sup>lt;sup>26</sup> See Appendix A. for translated VENONA message.

(Manhattan Project/A-bomb).<sup>27</sup>

Cables deciphered by VENONA show that 349 American citizens, immigrants, and permanent residents had been recruited to spy for the Soviet Union. <sup>28</sup> Though they remained largely unbroken, VENONA revealed an additional 100 names that appeared to be cover names for spies within the United States. <sup>29</sup> These code names may refer to other American spies for the Soviet Union. Most notably, however, VENONA revealed the infamous Soviet spy ring embedded within the Manhattan Project. Venona cryptanalyst Meredith Gardner cracked a message that revealed a large list of scientists stationed at Los Alamos, New Mexico, many of whom were gathering information for the Soviet Union to build its atomic bomb. Due to the high publicity of their espionage cases, some of the most recognizable atomic spies from the Manhattan Project are Klaus Fuchs, Theodore Hall, Harry Gold, Morton Sobell, David Greenglass, and Julius Rosenberg.

In an interview with PBS, former VENONA-cryptanalyst Cecil Phillips explained what it was like to work on Project VENONA. It is essential to remember that the VENONA codebreaking team dealt with an incredible amount of information sent from the Soviets between Moscow and Washington, D.C. In most cases, these messages would be entered into the earliest computers for processing and sorting. With VENONA taking place in the 1940s, the messages were put on IBM (International Business Machine) punch cards. These cards were then sorted while the cryptanalysts looked for repeats in the cipher system. This part involved many steps, including getting the messages ready to be loaded on the punch cards, looking at the messages for clues, and finding duplicate patterns in the code. Next, the codebreakers examined the results

NSA and CIA, Selected Venona Messages, "94. (*Continued*)," Washington, DC, 1996, Accessed March 7, 2020, https://permanent.access.gpo.gov/websites/www.cia.gov/www.cia.gov/csi/books/venona/b94c.gif.

<sup>&</sup>lt;sup>28</sup> Hayes and Klehr, *Venona*, 9.

<sup>&</sup>lt;sup>29</sup> Phillips, interview.

from the computer when they came back from IBM processing. Regarding the "unbreakable" Soviet code system, Phillips believed the Russians were confident their system could never be broken because the one-time pad system is essentially unbreakable when everything is done right. Because of their confidence in the system, the Russians included the names of their operatives in the same message as their code names, something that is largely frowned upon in the covert world. The KGB made this mistake in several messages, revealing in the notes section of the transmissions that codenames ANTENNA and LIBERAL were Julius Rosenberg, KALIBR was David Greenglass, GNOM was William Perl, and RICHARD was Harry Dexter White. These notations discovered by VENONA led to the identification of many Soviet spies.

One of the most important sources of Russian enciphered traffic came from a teleprinter installed in Arlington Hall. In June 1944, the United States Army negotiated an agreement with the Soviet Union to set up a direct radio teleprinter link from the Pentagon to Moscow. This link would go through an American radio station set up in Algiers. The two governments would share the use of the channel while each had their own respective teleprinter terminal set up in their cities. Unbeknownst to the Russians, a teleprinter was set up in Building A of Arlington Hall that would automatically copy everything that passed over the shared circuit. For several years, this secret printer proved to be a valuable asset in collecting Russian messages.<sup>32</sup>

### VENONA Goes Public

VENONA was only made public fairly recently in July 1995, 52 years after the operation

<sup>30</sup> Phillips, interview.

NSA and CIA, Selected Venona Messages, "52. New York 1251 to Moscow, 2 September 1944. *New covernames*," Washington, DC, 1996, Accessed March 7, 2020, <a href="https://permanent.access.gpo.gov/websites/www.cia.gov/www.cia.gov/csi/books/venona/b52.gif">https://permanent.access.gpo.gov/websites/www.cia.gov/www.cia.gov/csi/books/venona/b52.gif</a>. NSA and CIA, Selected Venona Messages, "94. (*Continued*)," Washington, DC, 1996, Accessed March 7, 2020, <a href="https://permanent.access.gpo.gov/websites/www.cia.gov/www.cia.gov/csi/books/venona/b94c.gif">https://permanent.access.gpo.gov/websites/www.cia.gov/www.cia.gov/csi/books/venona/b94c.gif</a>.

Budiansky. *Code Warriors*, 23.

began. While the VENONA Project was extremely successful and produced an immense amount of valuable information on several topics, it remained highly classified for so many years because the secrets it uncovered were deemed to be "too sensitive" to be available for public examination.<sup>33</sup> This highly classified and sensitive nature, however, did not stop people from trying to make VENONA open to the public. While presenting to the Commission on Protecting and Reducing Government Secrecy in May 1995, John Earl Haynes and Harvey Klehr argued VENONA should be declassified and released to the public because the Cold War was over and the messages were over 40 years old. In light of this, the presiding logic that VENONA must remain classified due to the top-secret intelligence it uncovered seemed weak.<sup>34</sup> Scholars such as Haynes and Klehr were not alone in urging for declassification as members within the United States intelligence community were also advocating for the opening of the project. The former head of CIA counterintelligence James Angleton told those he worked with that the messages should be made available to the public. His logic was that if open to everyone, historians and journalists whose perspectives were different from the agents and cryptanalysts working on the project might find something they did not. Most importantly, they might be able to match the real names of Soviet spies to their as-of-yet undeciphered code names. Former VENONA code breaker Cecil Phillips spoke for many of his fellow retired VENONA code breakers in wishing that VENONA be declassified so that their incredible feat might become public knowledge before their passing. NSA officer Robert Louis Benson also advocated for VENONA, saying it was time for the project to become public so that the official record about Soviet espionage in America could finally be accurate.<sup>35</sup>

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<sup>&</sup>lt;sup>33</sup> Hayes and Klehr, *Venona*, 4.

<sup>&</sup>lt;sup>34</sup> Haynes and Klehr, *Venona*, 5.

<sup>&</sup>lt;sup>35</sup> Haynes and Klehr, *Venona*, 5-6.

## **Project VENONA and the Cold War**

VENONA's Importance

Though most of the American public was unaware of the intricacies of Project
VENONA, it nonetheless played a pivotal role in Cold War America. The importance of Project
VENONA is two-fold. VENONA was incredibly important during World War II and the Cold
War years for gathering information on Russian activities and revealing the Soviet espionage
going on within the United States. VENONA's significance came from showing United States
intelligence what was going on in their country during the Cold War. VENONA offered a
glimpse into Soviet operational procedures and how they wrote their reports to and from
Moscow. VENONA also gave American intelligence agencies knowledge of Soviet operations
worldwide and confirmed the guilt of Soviet spies, such as Julius and Ethel Rosenberg.
Translated VENONA messages were also vital in authenticating information given by defected
Soviet agents.<sup>36</sup>

Additionally, today's knowledge of VENONA is increasingly important when it comes to understanding the full history of the Cold War in the United States. It is highly likely that without VENONA, the clandestine Soviet espionage would have gone undetected. Put simply, VENONA proved to be a valuable weapon for the United States during the Cold War. VENONA ultimately dealt with the issue of many Soviet spies in America, either by arresting them or forcing them to flee to another country.<sup>37</sup>

It is important to know about VENONA's accomplishments in the present day because, without knowledge of the project, only pieces of what occurred toward the end of World War II

<sup>&</sup>lt;sup>36</sup> National Security Agency. "VENONA: An Overview," Cryptologic Almanac 50th Anniversary Series. Accessed March 9, 2020. <a href="https://www.nsa.gov/Portals/70/documents/news-features/declassified-documents/crypto-almanac-50th/VENONA">https://www.nsa.gov/Portals/70/documents/news-features/declassified-documents/crypto-almanac-50th/VENONA</a> An Overview.pdf

<sup>37</sup> National Security Agency, "VENONA: An Overview."

and during the Cold War are known. History shows that Soviet spies were captured and tried, and sometimes executed, yet the history books do not tell why such instances occurred. This is where knowledge of VENONA is important. Knowing about VENONA and its accomplishments allow history to be told in full, showing how the Soviet spies were caught based on information learned from their decrypted messages.

Project VENONA was extremely advantageous to the American war effort during the Cold War. Because of VENONA, the United States was awarded the knowledge of how the Soviet Union was interfering with the American home front. VENONA translations gave way to information that ultimately led to the arrest of multiple atomic spy rings, gave proof of espionage activities of the Assistant Secretary of Treasury, Harry Dexter White, Alger Hiss and over 100 others. The discovery of Soviet penetration into the Manhattan Project allowed United States intelligence forces to better grasp the extent of Soviet espionage in America its war efforts.

VENONA decryptions revealed other areas that the Soviets were spying on as well. With VENONA, intelligence agencies learned that the KGB also had spies in place to gather information on aircraft developments and uses, detection equipment, and other industrial capabilities the United States was using during the end of World War II and into the Cold War.

With the Red Scare running rampant through the country and news of Soviet spies being captured and tried, tensions were high in America during the Cold War. Any American with access to a newspaper knew the stories of the Soviet spies, knew the outcomes of their trials and the fate of their lives, but not where the incriminating evidence came from. The information gleaned from the files was used as evidence in a roundabout way in cases like the one against Julius and Ethel Rosenberg, who were convicted for conspiracy to commit espionage in 1951.

<sup>&</sup>lt;sup>38</sup> Robert Louis Benson, "Response to DCI on VENONA - INFORMATION MEMORANDUM," National Security Agency, 3 July 2014 <a href="https://www.nsa.gov/Portals/70/documents/news-features/declassified-documents/venona/declass">https://www.nsa.gov/Portals/70/documents/news-features/declassified-documents/venona/declass</a> materials/doc-03.pdf.

Decrypted VENONA documents identified Julius Rosenberg as "LIBERAL" and Ethel was identified as his wife. Due to the top secret nature of the information, these documents could not be openly admitted as evidence in the trial and the general public could not know about the existence of the incriminating translated file. This is where a great misperception of the Cold War in America came from. The American people were aware of spies in their country from the news reports they read but were in the dark when it came to knowing how these men and women were caught. Before the release of VENONA, the American public did not know the details behind the evidence used to convict Julius and Ethel Rosenberg. They did not know such a project existed that enabled the court system to issue a guilty verdict and send two communist spies to the electric chair. Without knowing the whole scope of knowledge the American government had about the vast extent of communist activities within the United States, the American public was in the dark about where the incriminating evidence came from.

As in the case of the 1951 Rosenberg trial, the judgment has been called into question and disputed by countless people, arguing that either the Rosenbergs were innocent and wrongly executed, or that there was undeniable proof of their guilt. But what was this undeniable proof? It lies within the VENONA files, which are now available to the public, but were still classified during the time of the trial. The absence of available information led to decades of disagreement over the Rosenberg's fate. This is another example of how knowing the successes and results of VENONA allows us to see America's history during the Cold War through new lenses.

### Project VENONA's Cold War Discoveries

Project VENONA's successful decryptions led to a great deal of very important discoveries. Not only did VENONA eventually reveal the identity of numerous Soviet spies and

the existence of expansive Soviet spy rings operating in America, but it also revealed the ongoing attempt by the Soviet Union to obtain information about the United States' secret operation to create an atomic bomb, also known as the Manhattan Project.

When VENONA files were released in July 1995, solid evidence came to light that points toward Julius Rosenberg operating a Soviet spy ring with many contacts and operatives under his supervision. By recruiting agents who could give the Soviet Union blueprints for advanced technology like airborne and land-based radar equipment, jet engines, and missile defenses, Julius was able to create a complex and well-run operation that stole "industrial secrets on an industrial scale." An intercepted message revealed that Julius had eight people working in his direct network by December 1944; however, some of his most productive agents were moved to work with other handlers as the KGB did not want to overwork Julius. While decrypted material concerning Julius Rosenberg contains hard evidence of his espionage activities, the evidence against Ethel Rosenberg within VENONA messages are less concrete. One message, for instance, states that even though Ethel knew of her husband's espionage work, "in view of delicate health," Ethel did not take part in her husband's espionage affairs.

Direct VENONA translations were not the only source confirming Julius Rosenberg's guilt of espionage. A November 1996 *Wall Street Journal* article written by retired FBI agent

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<sup>&</sup>lt;sup>39</sup> The following paragraph is updated from a paper written for a Georgia Southern University HIST 2630 course, taught by Dr. Kathleen Comerford in Fall 2018.

<sup>40</sup> Steven T. Usdin, "The Rosenberg Ring Revealed," *Journal of Cold War Studies* 11, no. 3 (Summer 2009): 115.

NSA and CIA, Selected Venona Messages, "75. New York 1715 to Moscow, 5 December 1944, *Rosenberg*, *again*," Washington, DC, 1996, accessed December 3, 2018, <a href="https://permanent.access.gpo.gov/websites/www.cia.gov/www.cia.gov/csi/books/venona/part2.htm">https://permanent.access.gpo.gov/websites/www.cia.gov/www.cia.gov/csi/books/venona/part2.htm</a>.

<sup>&</sup>lt;sup>42</sup> See Appendix B. for translated VENONA message.

NSA and CIA, Selected Venona Messages "73. New York 1657 to Moscow, 27 November 1944, *Ethel Rosenberg*," Washington, DC, 1996, accessed December 3, 2018, https://permanent.access.gpo.gov/websites/www.cia.gov/www.cia.gov/csi/books/venona/part2.htm.

Robert Lamphere revealed that VENONA "clearly establish that Julius Rosenberg headed up a spy net-work far greater than previously made public."

VENONA played a significant role in exposing Soviet spies in the Manhattan Project.

The Manhattan Project was the codename for a research and development project headed by the United States to create the first atomic weapons during World War II. Most of the work on the Manhattan Project took place at the Los Alamos location in New Mexico. The Los Alamos Laboratory was formally established on 1 January 1943 and was the location where the first Manhattan project atomic bombs were assembled and subsequently tested. 45

The Soviets sent a variety of messages in 1944 regarding the Manhattan Project that VENONA codebreakers would eventually decipher. These messages included a list of new cover names, the recruitment of David Greenglass as a spy, and a list of atomic scientists embedded within the Manhattan Project. <sup>46</sup> Project VENONA was able to uncover a wealth of information from these 1944 Soviet transmissions. The message containing a list of changed cover names was sent from New York to the Moscow office on 2 September 1944. The message contained the changed code names of some famous spies like Julius Rosenberg (codename changed from ANTENNA to LIBERAL). <sup>47</sup> A decrypted Soviet message from 21 September 1944 revealed that Julius Rosenberg had recruited his brother-in-law, David Greenglass, to work in his Soviet spy ring. The Soviet transmission relays that Greenglass was recruited by the Army to be a mechanical engineer and that he was sent to work on the Manhattan Project (codenamed

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<sup>&</sup>lt;sup>44</sup> Lamphere, "Venona Proves Guilt of Julius Rosenberg," 1. https://search.proquest.com/docview/1441174502?accountid=11225.

History.com Editors, "Manhattan Project," History.com, last modified January 17, 2020, <a href="https://www.history.com/topics/world-war-ii/the-manhattan-project">https://www.history.com/topics/world-war-ii/the-manhattan-project</a>.

<sup>&</sup>lt;sup>46</sup> See Appendix C. for translated VENONA message.

NSA and CIA, Selected Venona Messages, "52. New York 1251 to Moscow, 2 September 1944. *New covernames*," Washington, DC, 1996, accessed March 3, 2020 https://permanent.access.gpo.gov/websites/www.cia.gov/www.cia.gov/csi/books/venona/b52.gif

ENORMOZ by the Soviets). 48 A message sent on 2 December 1944 contained a list of names of scientists who were working on the atomic energy problem. This list included the plain names of 17 undercover scientists. 49 On 13 December 1944, the Soviets sent a message regarding the photography of important material uncovered at the Manhattan Project. The message revealed that Alfred Sarant (codename Kh'YuS) handed 17 authentic drawings of the high-resolution airborne radar to Julius Rosenberg. 50 A message from 16 December 1944 stated that David Greenglass (codename KALIBR) had expressed his readiness to help the Soviets discover what was happening in Los Alamos.<sup>51</sup> An intercepted transmission from 31 March 1945 was also a very important find for Project VENONA as it was the Soviet KGB's evaluation of the material they had recovered from the Manhattan Project. 52 The message revealed that they received an interesting method for calculations that would "be used during the design." The transmission also noted that they were interested in the materials they had acquired regarding the testing of membranes and information about the layout of the Los Alamos plant. The message also stated that the Soviets had received technical data on "FUNICULAR," which is suspected to be the gaseous diffusion plant located in Tennessee.<sup>53</sup>

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https://permanent.access.gpo.gov/websites/www.cia.gov/www.cia.gov/csi/books/venona/b76a.gif.

<sup>&</sup>lt;sup>48</sup> NSA and CIA, Selected Venona Messages, "58. New York 1340 to Moscow, 21 September 1944. *Ruth Greenglass*," Washington, Dc, 1996, Accessed March 3, 2020, <a href="https://permanent.access.gpo.gov/websites/www.cia.gov/www.cia.gov/csi/books/venona/b58.gif">https://permanent.access.gpo.gov/websites/www.cia.gov/www.cia.gov/csi/books/venona/b58.gif</a>.

<sup>49</sup> NSA and CIA, Selected Venona Messages, "74. New York 1699 to Moscow, 2 December 1944. *Listing atomic scientists*," Washington, DC, 1996, accessed March 3, 2020, <a href="https://permanent.access.gpo.gov/websites/www.cia.gov/www.cia.gov/csi/books/venona/b74.gif">https://permanent.access.gpo.gov/websites/www.cia.gov/www.cia.gov/csi/books/venona/b74.gif</a>.

<sup>&</sup>lt;sup>50</sup> NSA and CIA, Selected Venona Messages, "76. New York 1749-50 to Moscow, 13 December 1944. *Rosenberg ring*," Washington, DC, 1996, accessed March 3, 2020,

<sup>&</sup>lt;sup>51</sup> NSA and CIA Selected Venona Messages, "78. New York 1773 to Moscow, 16 December 1944. *Rosenberg; ENORMOZ*," Washington, DC, 1996, accessed March 3, 2020, https://permanent.access.gpo.gov/websites/www.cia.gov/www.cia.gov/csi/books/venona/b78.gif.

NSA and CIA, Selected Venona Messages, "90. Moscow 298 to NY, 31 March 1945. *Evaluating ENORMOZ take*," Washington, DC, 1996, accessed March 3, 2020,

<sup>&</sup>quot;https://permanent.access.gpo.gov/websites/www.cia.gov/www.cia.gov/csi/books/venona/b90.gif.

<sup>&</sup>lt;sup>53</sup>NSA and CIA, Selected Venona Messages, "90.(*Continued*)," Washington, DC, 1996, accessed March 3, 2020 <a href="https://permanent.access.gpo.gov/websites/www.cia.gov/www.cia.gov/csi/books/venona/b90a.gif">https://permanent.access.gpo.gov/websites/www.cia.gov/www.cia.gov/csi/books/venona/b90a.gif</a>.

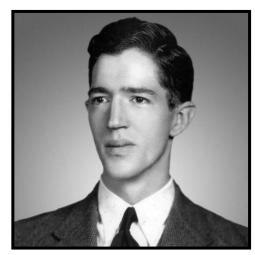
The importance of Project VENONA's work, then, is evident in the information discovered in these messages. Without VENONA's decryption processes, American intelligence agencies would have been in the dark about the Soviet involvement in the Manhattan Project and in their efforts to build their atomic bomb.

# **Project VENONA's Notable Codebreakers**

The stories of the ingenious men and women behind Project VENONA are often mentioned only briefly in VENONA histories. To fully understand the greatness of the VENONA codebreakers and their accomplishments, their contributions must be discussed and their stories must be told. Among those involved with the Project VENONA team, a few notable figures stand out – Meredith Gardner, Cecil Phillips, Gene Grabeel, and Robert Lamphere.

## Meredith Gardner

Meredith Knox Gardner was born on 20
October 1912 in Okolona, Mississippi, and he grew up in Austin, Texas. Gardner graduated from the University of Texas with a master's degree in German, where he also learned Russian from the Russian grandmother of a fellow student. Gardner went on to teach Spanish and German at the



Meredith Gardner, NSA "Hall of Honor" 2004, https://bit.lv/2Zd1vza.

University of Akron.<sup>54</sup> Proving himself to be exceedingly adept when it came to languages, the United States Army's Signals Intelligence Service hired him directly from the University of

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<sup>&</sup>lt;sup>54</sup> Budiansky, *Code Warriors*, 49.

Akron in 1942 to become a linguist. Though Gardner was originally hired to be a linguist to break German codes during World War II, he was quickly transferred to the Japanese section where he mastered the language in three months. 55 After Gardner's work with Japanese codes during World War II, he bettered his knowledge of Russian and his linguistic abilities were transferred to the Soviet section. Gardner began working on Project VENONA in 1946.<sup>56</sup> Gardner's role in VENONA was critical. He was the project's chief "book breaker," which meant he was responsible for figuring out what each group of code meant.<sup>57</sup>

Gardner was instrumental in the effort to break the underlying code in the Soviet system, and his discoveries led to further efforts to reconstruct Soviet codebooks.<sup>58</sup> Shortly after the end of World War II, Gardner began working on a charred Soviet codebook that was recovered from a battlefield in Finland. Though the codebook was incomplete, Gardner was able to identify what was known as "Spell" and "End Spell" sequences. These specific code groups were some of the most common groups found in radio messages. Due to a codebook's limited vocabulary, a word lacking a corresponding code would have to be spelled out letter by letter. The letter sequence would begin with the code for "Spell," and the word "End Spell" would indicate where the spelling sequence ended.<sup>59</sup>

Gardner was able to use the "Spell/Endspell" indicators he discovered to review Soviet radio messages that had been previously collected through VENONA. Using this method, Gardner discovered code duplications across some of the Soviet communication channels. This

<sup>&</sup>lt;sup>55</sup> National Security Agency, "Meredith Gardner," accessed December 22, 2019, <a href="https://www.nsa.gov/About-">https://www.nsa.gov/About-</a> Us/Current-Leadership/Article-View/Article/1622408/meredith-gardner/.

National Security Agency, "Meredith Gardner," accessed December 22, 2019.

<sup>&</sup>lt;sup>57</sup> Budiansky, *Code Warriors*, 49.

<sup>&</sup>lt;sup>58</sup> National Security Agency, "Meredith Gardner," accessed December 22, 2019.

<sup>&</sup>lt;sup>59</sup> Peter Wright with Paul Greengrass, SpyCatcher: The Candid Autobiography of a Senior Intelligence Officer (New York, NY: Viking Penguin Inc., 1987) 180.

indicated that the Soviets had reused some of their single-use code pads. <sup>60</sup> After painstakingly matching the duplicated codes, Gardner made a major breakthrough in the Soviet Washington-to-Moscow Ambassadorial channel by decrypting the "Spell/Endspell" phrase "Defense does not win wars!" Upon breaking it, Gardner recognized the phrase from a book on defense strategies that was published in the United States just before the message was sent. With this breakthrough in mind, the Armed Forces Security Agency (the renamed division of the Signals Intelligence Service) shared their top-secret project with their British allies. Together, the VENONA team and the British began a joint effort to break the Soviet codes, a cooperation that would last beyond World War II for 40 years. <sup>61</sup>

After working on Bulgarian diplomatic traffic for a short time, Gardner returned to Project VENONA on 4 November 1946. His return was accompanied by a burst of new progress for the project. Just two weeks after his return, Gardner recovered 86 new codes from the ZDJ codebook (known at Arlington Hall as the "Jade" codebook). Gardner continued his progress in the Jade codebook on December 13 when he broke the book's spell table from a 1944 ZDJ message that quoted a report originally written in English. Only a week after breaking the spell table, Gardner broke out another piece of a 1944 message that contained names of "scientists who are working on the problem." Gardner recovered the names of leading scientists who were working on the then top-secret Manhattan Project. Soon, the VENONA team would learn that the ZDJ channel was the primary communication channel for spies of the Soviet foreign intelligence service, the KGB. The messages were the primary means for Western Soviet agents

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<sup>&</sup>lt;sup>60</sup> Wright, SpyCatcher, 180.

<sup>&</sup>lt;sup>61</sup> Wright, SpyCatcher, 180.

<sup>&</sup>lt;sup>62</sup> Budiansky, *Code Warriors*, 49.

<sup>&</sup>lt;sup>63</sup> NSA and CIA, Selected Venona Messages, "74. New York 1699 to Moscow, 2 December 1944. *Listing atomic scientists*," Washington, DC, 1996, accessed March 3, 2020,

https://permanent.access.gpo.gov/websites/www.cia.gov/www.cia.gov/csi/books/venona/b74.gif.

<sup>&</sup>lt;sup>64</sup> Budiansky, *Code Warriors*, 50.

to receive instructions from Moscow, and for the agents to send information back to the home office. 65

With his knowledge of the Russian language, Gardner used his linguistic abilities to begin work on reconstructing the Soviet code book. Leading VENONA historian Robert Louis Benson estimates that by mid-1948, the codebook had ten thousand code groups, ninety percent of which Gardner was able to recover through painstaking cryptographic analysis. Once he had decoded these groups, Gardner put the groups into various encoded Soviet messages and began translating the message. This process eventually gave him the text of a Russian message dealing with espionage. <sup>66</sup>

While Gardner was responsible for an incredible amount of successes for Project VENONA, he felt that merely breaking the code groups was not enough. Believing the decrypts had to be put to good use, Gardner sent a memo entitled "Special Report #1" to senior members of the Army Security Agency (ASA) during the summer of 1947. The report indicated the kind of intelligence Gardner believed VENONA could provide and included samples of the messages Gardner had been able to recover. This report ultimately helped the Army fully recognize the value the VENONA Project had, and in part led to the eventual cooperation between the ASA (later the National Security Agency) and the Federal Bureau of Investigation (FBI) in identifying Soviet agents within the United States. <sup>67</sup> Between 1947 and 1948, Gardner wrote eleven of these special reports. These reports were meant to record his findings from the VENONA messages and to direct his findings to his superiors. Gardner's reports covered a range of material from the Cold War, including his initial overview of recovered cover names from VENONA, ENORMOZ

<sup>&</sup>lt;sup>65</sup> Budiansky, *Code Warriors*, 50.

<sup>&</sup>lt;sup>66</sup> Benson, interview.

<sup>&</sup>lt;sup>67</sup> National Security Agency, "Meredith Gardner," accessed December 23, 2019.

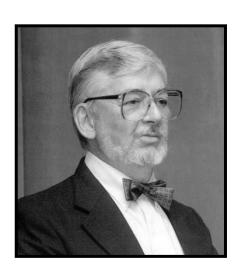
espionage work, confirmation that the decrypted VENONA messages were coming from the KGB, Julius Rosenberg's spy network, reported changes in cover names, and messages concerning Julius Rosenberg's wife, Ethel.<sup>68</sup>

By the late 1960s, Gardner felt that his cryptanalytic break in VENONA was a "mathematical beauty." Gardner thought VENONA was a stroke of genius and was depressed when he discovered the outcome of his hard work. <sup>69</sup> Peter Wright, a former MI5 officer and Assistant Director, recalled Gardner often saying "I never wanted it to get anyone into trouble." Wright revealed that Gardner was appalled that his discoveries ultimately led people to the electric chair. <sup>70</sup>

During his time on VENONA, Gardner proved to be an instrumental part of the VENONA team. He was responsible for an incredible number of advances in breaking the Soviet code and his linguistic and cryptographic abilities proved to be an invaluable piece in the puzzle to solving the Soviet Union's "unbreakable" code. Thanks to Gardner's work, the United States had an idea of what the Soviets were up to during the Cold War.

## Cecil Phillips

Cecil Phillips attended the University of North Carolina for two years before he was recruited to work for the Signal Security Agency (SSA, the successor of the Signals Intelligence Service and a forerunner to the NSA). In June 1943, Phillips began work at the SSA, first merely processing



Cecil Phillips, 2006 Hall of Honor Inductee, https://bit.ly/2s5PT53.

<sup>70</sup> Wright, *SpyCatcher*, 185.

<sup>&</sup>lt;sup>68</sup> Benson, The VENONA Story, 56-57.

<sup>&</sup>lt;sup>69</sup> Wright, SpyCatcher, 185.

incoming messages for analysis. Seeing promise, Phillips' boss began teaching him the basics of cryptanalysis work.<sup>71</sup>

Phillips' work at the SSA soon shifted to working on decoding Japanese weather messages. When this section became unnecessary, the SSA transferred Phillips to the section dealing with Soviet diplomatic codes.<sup>72</sup> July 1944 found Phillips in charge of four of the five identified cryptographic systems used for Russian communications. Phillips' systems dealt with diplomatic traffic from embassies and consulates.<sup>73</sup>

Eventually, Phillips became bored with working on Russian trade traffic, which codebreakers had determined was of no intelligence value, and turned toward a small set of diplomatic messages that included an indicator. An indicator was embedded somewhere within a message to give Soviet code clerks instructions for how to decipher the message. The system Phillips worked on, the aforementioned Jade, had a special condition. Within this system, the total from subtracting the second to last code group from the last code group would always equal 22222.<sup>74</sup>

In November 1944, Phillips started looking for a way to break into the Jade system. By February 1945, none of Phillips' ideas on how to break the system had worked, so he decided to do a frequency count of the numbers appearing in each message. Within the batch of messages from New York to Moscow that Phillips checked, he noticed that the initial code group was not a randomized set of numbers like they ought to have been. Instead, Phillips discovered that the number 6 appeared within the messages roughly 20 percent of the time rather than the 10 percent

<sup>&</sup>lt;sup>71</sup> Budiansky, *Code Warriors*, 15.

<sup>&</sup>lt;sup>72</sup> David Martin, "THE CODE WAR," *The Washington Post*, May 10, 1998, accessed December 23, 2019, <a href="https://www.washingtonpost.com/archive/lifestyle/magazine/1998/05/10/the-code-war/a78021af-6264-4427-9ab1-445391cf2f95/">https://www.washingtonpost.com/archive/lifestyle/magazine/1998/05/10/the-code-war/a78021af-6264-4427-9ab1-445391cf2f95/</a>.

<sup>&</sup>lt;sup>73</sup> Budiansky, *Code Warriors*, 27.

<sup>&</sup>lt;sup>74</sup> David Martin, "The Code War."

that would be expected to show up in a randomized cipher sequence.<sup>75</sup> Still rather new at cryptography, Phillips showed his discovery to a senior cryptanalyst, Genevieve Feinstein. Feinstein suspected Phillips had stumbled upon an instance of "clear key," or when five-digit code groups were taken directly from a one-time pad and put into a message without first being encrypted.<sup>76</sup>

Two crucial breaks came out of Phillips' discovery of the clear key. While the discovery of the clear key was informative, the first break did not occur until Feinstein had a few clerks check Phillips' clear key against a log of five-digit groups that were known to have encrypted trade messages. When these checks turned up some matches, the team realized messages within the Jade system had used some of the same one-time pad pages that were used in trade traffic. <sup>77</sup> Phillips also checked the clear key against a set of hypothetical additives, revealing repeated matches between his code groups and the very first additive groups on each key page used to encipher Soviet messages. This revelation meant the VENONA team now knew that the Soviets were using the very first key group of each one-time pad page as the indicators for the messages. These discoveries offered cryptologists a shortcut to locating depth, or evidence that multiple messages were encoded with the same page from a one-time pad, in messages and also suggested that the team now had a real chance of cracking the Soviet Union's entire cipher system. <sup>78</sup>

Phillips discovered another instance of a reused one-time pad in May 1945. He noticed that Russian code clerks would use a fast and convenient method of encrypting a long message to save time. This method was highly insecure, where the clerks would use the code groups of a key page in normal order for the first 50 groups of a message, and then use the same key page in

<sup>&</sup>lt;sup>75</sup> Budiansky, *Code Warriors*, 27.

<sup>&</sup>lt;sup>76</sup> Budiansky, *Code Warriors*, 27.

<sup>77</sup> David Martin, "The Code War."

<sup>&</sup>lt;sup>78</sup> Budiansky, *Code Warriors*, 27.

reverse order for the next 50 groups. A search for these reuses that Phillips uncovered eventually came up with 4,000 "reverse depths." The reverse part of reverse depth refers to the way the Soviets used the reversed order of code groups on a page when encoding a message. Depth was found when Phillips realized more than one message was coded in this way.

In 1945, the KGB successfully placed a mole in Arlington Hall's Russian section.

William Weisband, a Ukrainian-American cryptanalyst, worked undercover on Project

VENONA and alerted the Soviets when VENONA was close to breaking the Soviet code

system. Though the Soviets were aware the United States was working to decipher their coded

messages, they did not change their systems until Weisband reported that the project was close to

its goal. After that, many of the Russian code systems changed in various ways. One of these

changes affected the Soviet one-time pad systems. The one-time pad systems used for

communications in diplomatic cables underwent a serious change in its indicators and

addresses. In the systems of the systems of the systems are in the systems and the systems of the

Even without finding many duplicate key instances in messages sent after 1945,

Arlington Hall continued to collect, sort, and study the traffic in hopes of locating reused codes.

Once the indicators underwent a system change, it became impossible for Arlington Hall to continue sorting the incoming traffic into the five different systems. Once Phillips broke the new indicator system, Arlington Hall was able to resume sorting incoming messages and traffic analysis. 82

The discoveries made by Phillips during his time working on VENONA proved to be instrumental to the progress of the project. Without his discovery of the clear key, Meredith

<sup>&</sup>lt;sup>79</sup> Budiansky, *Code Warriors*, 48.

<sup>&</sup>lt;sup>80</sup>John Simkin, "William Weisband," Spartacus-Educational.com, Last updated January 2020, Accessed march 9, 2020 <a href="https://spartacus-educational.com/William Weisband.htm">https://spartacus-educational.com/William Weisband.htm</a>.

<sup>&</sup>lt;sup>81</sup> Budiansky, *Code Warriors*, 112.

<sup>&</sup>lt;sup>82</sup> Budiansky, *Code Warrior*, 112.

Gardner would not have had the groundwork he used when breaking the Jade system cipher.

Phillips also gave hope to the VENONA team that the Soviet cipher system was indeed breakable.

Phillips stayed involved with Project VENONA even when he was not actively breaking enemy codes. After VENONA, Phillips served as an executive of the NSA and retired in 1980 as chief of computer and telecommunications planning. Even though he retired, Phillips continued his work with the NSA as a consultant until his death.<sup>83</sup> Phillips also worked with Robert Louis Benson in the 1990's to write a history of the VENONA Project and also gave several classified and unclassified lectures on VENONA.<sup>84</sup>

### Gene Grabeel

Gene Grabeel graduated from Mars Hill College and Farmville State Teachers College to become a home economics teacher in Madison Heights, Virginia. Bored with the dull life of a teacher in small-town Virginia, Grabeel met a young army officer who was looking for recent college graduates to work on an undisclosed project in an unknown location. Grabeel's father urged her to take the mysterious job in hopes that his daughter would be happy. 85



Gene Grabeel, National Cryptologic Museum, <a href="https://bit.ly/2NvzqhJ">https://bit.ly/2NvzqhJ</a>.

Grabeel accepted the offer and began her career with the Army Signal Service (ASA), a predecessor of the NSA, in 1943. Four weeks into her work at the ASA, she was the first person

<sup>85</sup> Budiansky, *Code Warriors*, 10.

<sup>&</sup>lt;sup>83</sup> Stephen Budiansky, "A Tribute to Cecil Phillips--And Arlington Hall's 'Meritocracy'." *Cryptologia* 23:2 (April 1999): 107.

National Security Agency | Central Security Agency, "Cecil J. Phillips," accessed January 5, 2020, <a href="https://www.nsa.gov/About-Us/Current-Leadership/Article-View/Article/1621861/cecil-j-phillips/">https://www.nsa.gov/About-Us/Current-Leadership/Article-View/Article/1621861/cecil-j-phillips/</a>.

tasked with tackling an effort against a target that had otherwise been neglected during World War II—the Russian problem.<sup>86</sup> Grabeel was quickly put in charge of looking over collected Russian diplomatic cables with an Army officer. It was later discovered that KGB and GRU communication traffic was also mixed in with the diplomatic traffic. This duo looking through messages was the birth of Project VENONA as we know it today.<sup>87</sup>

While working with Project VENONA, Grabeel categorized and analyzed encrypted Soviet diplomatic messages. Grabeel spent most of her career at the NSA analyzing and deciphering the collected Soviet codes. Rabeel stayed in leadership roles throughout the VENONA Project and continued her work on the Soviet diplomatic messages until the 1970s. Eventually, Gene Grabeel retired from the NSA and the VENONA Project in 1973, thirty years after she began VENONA.

## Robert Lamphere

FBI Special Agent Robert Lamphere was born 14
February 1918 in Wardner, Idaho. Later, Lamphere attended college at the University of Idaho and earned his law degree at the National University School of Law. Lamphere moved to Washington in 1940 and joined the Federal Bureau of



Robert Lamphere, Atomic Heritage Foundation, <a href="https://bit.ly/38a0lrh">https://bit.ly/38a0lrh</a>.

<sup>&</sup>lt;sup>86</sup> "Grabeel, Gene," *Richmond Times-Dispatch*, February 15, 2015, accessed January 15, 2020, <a href="https://www.richmond.com/obituaries/grabeel-gene/article\_3d11848c-bd49-5f3e-a5d0-b4439f10aed0.html">https://www.richmond.com/obituaries/grabeel-gene/article\_3d11848c-bd49-5f3e-a5d0-b4439f10aed0.html</a>. "History Today – 17 June 2014 – Gene Grabeel," *NSA Daily* (17 June 2014), accessed January 15, 2019,

<sup>&</sup>lt;sup>87</sup> "History Today – 17 June 2014 – Gene Grabeel," *NSA Daily* (17 June 2014), accessed January 15, 2019, <a href="https://www.nsa.gov/Portals/70/documents/news-features/declassified-documents/history-today-articles/17">https://www.nsa.gov/Portals/70/documents/news-features/declassified-documents/history-today-articles/17</a> June 2014.pdf.

<sup>88 &</sup>quot;Grabeel, Gene," Richmond Times-Dispatch.

<sup>89 &</sup>quot;History Today," NSA Daily.

Investigation in September 1941.<sup>90</sup>

In 1948, Lamphere was a supervisor in the espionage section at FBI headquarters. He and three team members had seen some fragmented KGB messages that the ASA had decrypted. Lamphere was amazed by the accomplishment and asked to interview whoever was responsible for the breakthrough, which eventually led him to Meredith Gardner. Once the eventual cooperation between the ASA's VENONA Project and the FBI began, Lamphere was assigned to work alongside Meredith Gardner due to his immense knowledge of Soviet spies. By October 1948, Lamphere was working on VENONA full-time with Gardner. During their partnership, Gardner would decode specific messages for Lamphere who would, in turn, investigate the contents. Together, Lamphere and Gardner were able to catch several Soviet spies.

In the fall of 1949, for example, Lamphere read a recently deciphered 1944 NKGB message from New York to Moscow that contained a summary of scientist Klaus Fuchs' theoretical paper that dealt with a gaseous diffusion process of enriching uranium. <sup>93</sup> A week after reading the paper, Lamphere was able to discern that Klaus Fuchs was the Soviet agent codenamed CHARLZ. <sup>94</sup>

Working together, Gardner and Lamphere also deciphered a message that ultimately identified several Soviet agents who had been collecting information on aircraft and aircraft engines at defense plants along the West Coast in the 1930s and 40s. 95

After VENONA was declassified and released to the public, Robert Lamphere spoke out

<sup>&</sup>lt;sup>90</sup> Spartacus Educational, "Robert Lamphere," accessed January 15, 2020, <a href="https://spartacus-educational.com/Robert\_Lamphere.htm">https://spartacus-educational.com/Robert\_Lamphere.htm</a>.

Robert Lamphere, interviewed by PBS, 1999 Abamedia, accessed January 15, 2020, https://www.pbs.org/redfiles/kgb/deep/interv/k int robert lamphere.htm.

<sup>&</sup>lt;sup>92</sup> John Simkin, "Robert Lamphere," Spartacus Educational, Last updated January 2020, accessed January 15, 2020, <a href="https://spartacus-educational.com/Robert\_Lamphere.htm">https://spartacus-educational.com/Robert\_Lamphere.htm</a>.

<sup>93</sup> Budiansky, *Code Warriors*, 146.

<sup>94</sup> Budiansky, Code Warriors, 147.

<sup>95</sup> Budiansky, Code Warriors, 151.

about Julius Rosenberg's guilt of committing espionage in a 1996 article for the *Wall Street Journal*. In the article, Lamphere revealed that VENONA proved Julius Rosenberg's guilt and clearly shows that he was the head of an expansive spy network. Lamphere also discussed the fate of Ethel Rosenberg in his article. Lamphere relays that he opposed the decision to execute Ethel because the evidence against her was not nearly as concrete as that against her husband. Lamphere also admits in the article that he knew Ethel was part of her husband's conspiracy to commit espionage. Most notably, the article speaks toward the importance of reviewing VENONA's successes: "We now have 2,900 decrypted KGB cables made public that show in great detail how expansive the penetration was by the supposed war-time ally of our government. Historians should have a field day." 97

Lamphere spent eight of his fourteen years with the FBI working at FBI Headquarters where he supervised some of the big Soviet spy cases of the Cold War. Lamphere's work with Gardner and the VENONA Project aided in the identification and capture of some notable Soviet spies, putting into action VENONA's discoveries.

## Breaking the "Unbreakable" Code

Operation of the "Unbreakable" Code

To fully understand how the Soviets crafted an unbreakable code system, it is first important to learn how such a system operated. The Soviet Union used codebooks that assigned various words and phrases numerical values that were typically four digits long, ranging from

Robert J. Lamphere, "Venona Proves Guilt of Julius Rosenberg," *Wall Street Journal (1923-Current File)* (November 6, 1996), https://search.proquest.com/docview/1441174502?accountid=11225.

<sup>27</sup> Lamphere, "Venona Proves Guilt of Julius Rosenberg," 1. https://search.proquest.com/docview/1441174502?accountid=11225.

0000 to 9999. These number groups were then further enciphered in a message by adding a second set of numbers to the original message. These second number sets, called additives or additive keys, were drawn out of a one-time pad that contained random number groups. This double-enciphering method ensured that even if the same word was repeated within a single message, it would appear as a different four-digit number each time. In order for the receiver to decrypt the meaning of the message, they would need to reverse the original process by subtracting the additive key to reveal what the original code groups said. The message recipient would then take the original code and look up its numerical equivalent in the code books. Those who enciphered the original messages usually put what are known as "indicators" somewhere into the messages that would tell the recipient where the starting point in the key book of additives was. <sup>99</sup>

Once the one-time additive pad had been used to encipher and subsequently decipher a certain message, the pad was meant to be thrown away and never reused. The use of these one-time pads is what made the Soviet code system so unbreakable. If they never used the same code twice, it would have been impossible to uncover what the original code groups said, thus insuring its unbreakable nature. According to Phillips, as long as everything was done correctly, the Soviet's one-time pad system was essentially unbreakable. Things were not done correctly, however, and after repetitive analysis of old Russian messages, the VENONA codebreakers finally found some depth. They realized that some pairs of messages appeared to have been enciphered using the same one-time pad. 101

To crack a complex code, it is important for codebreakers to find "depth." Depth occurs

<sup>&</sup>lt;sup>98</sup> Budiansky, *Code Warriors*, 25.

<sup>&</sup>lt;sup>99</sup> Budiansky, *Code Warriors*, 25.

<sup>&</sup>lt;sup>100</sup> Cecil Phillips, interviewed by PBS, 1999 Abamedia, accessed April 24, 2019,

https://www.pbs.org/redfiles/kgb/deep/interv/k int cecil philips.htm

Mundy, "CODE NAME: VENONA," 35.

when a series of messages are enciphered using the same page from an additive book which subsequently allows codebreakers to find patterns in the encryptions. Depth is a very crucial aspect of code breaking and any trace of it can lead to the eventual breaking of a cipher system. Once depth is discovered, code breakers can begin the long and painstaking process of "stripping" the additive from the enciphered messages to reveal their original code groups. From there, cryptanalysts could begin to figure out what the individual meaning of each code group was.

## Cracks in the System

The Soviets effectively eliminated the chance of depth when they used the one-time pad system correctly; however, cracks in the cipher began to appear when the system was used incorrectly. By October 1943, the Arlington Hall cryptographers were using IBM punch-card machines to compare the early code groups from thousands of messages they had that had been sent over the trade channels. Thanks to this highly repetitive analytical process, the cryptologists began to realize there were traces of depth to the Soviet messages. At that time, Lieutenant Richard Hallock and his team at Arlington Hall began trying to locate depth within the Soviet messages they had collected. Knowing that the most likely locations for repeating codes fall at the beginning and end of the messages, Hallock had the first and last five groups of code from ten thousand Soviet messages punched into IBM cards. The results of the test were better than could be expected as they found seven clear cases of messages containing "double hits." Double hits occur when the same pair of code groups appear in two different messages in the same relative locations and are highly indicative that there is a degree of depth between the

 $<sup>^{102}</sup>$  Mundy, "CODE NAME: VENONA," 36.

Stephen Budiansky, "A Tribute to Cecil Phillips--And Arlington Hall's 'Meritocracy'," *Cryptologia* 23:2 (April 1999) 100.

messages. <sup>104</sup> This striking evidence of multiple double hits revealed a crucial clue to the VENONA cryptanalysts – the Soviet Union had used at least a few of their one-time pad pages to encode multiple messages. This ultimately meant that the Soviet cipher system was no longer completely "unbreakable," for where there is depth, there is the chance to unravel the entire system.

One of the major breaks in cracking the Soviet cipher system came from an intercepted tip between the Finns and the Japanese. The Finns had discovered that the Soviets embedded "indicators" within their messages that gave clues on how a certain code system works as well as what resources were used to make such a code. The Finns passed this information to their Japanese allies, which the United States was able to intercept and use to their advantage. The information was passed by way of a series of cables containing an abundance of basic technical data and details about the systems the Russians were using as well as how they worked.

The next big break in Project VENONA occurred when Gardner discovered the "Spell/Endspell" code groups. Using these groups to check collected Soviet communications, Gardner found that duplicated codes were used in the different Soviet communication channels.

Using this new knowledge, Gardner began matching the already enciphered traffic and started to break the code. <sup>107</sup> He took advantage of the cipher breaks that had already been made in VENONA by Phillips and got to work on cracking the underlying code. Using his understanding of the Russian language, Gardner was able to reconstruct the Soviet code book. Gardner took the code groups he had successfully decoded and inserted them into Soviet messages. When he translated the contents of the messages, he uncovered the plaintext of a Russian espionage

<sup>104</sup> Budiansky, *Code Warriors*, 26.

<sup>105</sup> Mundy, "CODE NAME: VENONA," 35.

<sup>&</sup>lt;sup>106</sup> Budiansky, *Code Warriors*, 22.

<sup>107</sup> Peter Wright, Spy Catcher, 180.

message. 108

# Project VENONA's Successes

In total, Project VENONA decrypted and read more than 2,900 Soviet messages, amounting to more than five thousand pages of text in total. While these numbers are incredibly impressive, they only realistically represent a fraction of the total messages sent out by the Soviet Union. Most of the VENONA cryptanalyst's success in the KGB system came from 1944, where they uncovered roughly 45 percent of the messages sent between the KGB New York and Moscow offices. They were only able to crack 1.8 percent of the traffic from 1942 and 1.5 percent of the 1945 messages sent between the KGB offices in Washington and Moscow. 109

The discussion of how many messages were sent, intercepted, translated, and decrypted can be quite confusing as the numbers vary greatly in different historical accounts. In his interview, Phillips detailed that the Soviets sent 25 thousand messages between Washington and Moscow in 1943. This number is simply an approximation of how many messages were sent by the Soviets. Only a small portion, roughly 2,900, of these intercepted messages were successfully decrypted and translated. Since the project's declassification in 1995, the NSA has released translated VENONA messages six times. The first set was released following declassification on 11 July 1995. The second release took place on 26 October 1995. The third, fourth, and fifth releases of VENONA material occurred in March, July, and October of 1996. The final release of VENONA messages was in September 1997. The materials released are located on the NSA

<sup>&</sup>lt;sup>108</sup> Benson, interview.

<sup>&</sup>lt;sup>109</sup> Haynes and Klehr, *Venona*, 35.

<sup>&</sup>lt;sup>110</sup> Dr. David Hatch, email message to author, October 31, 2019.

website.<sup>111</sup> Selected VENONA messages are also available on a website produced by the NSA and CIA.<sup>112</sup>

#### **Conclusion**

Project VENONA has remained an incredible feat throughout history. The team of code breakers who worked tirelessly to decrypt and translate Russian communications accomplished one of the greatest feats of the Cold War. The VENONA team changed the course of history when they broke the Soviet Union's "unbreakable" code. Though this code was undoubtedly one of the most complex systems of the 20th century, code breakers like Meredith Gardner and Cecil Phillips broke into the cipher system and began decryptions and translations of the collected Russian communication traffic.

The importance of Project VENONA cannot be understated. Without this counterintelligence operation, the fate of the Cold War could have been dramatically different. Also important is the impact the declassification of Project VENONA had on history. Without public knowledge of VENONA, the American public had an incomplete picture of the inner workings of the Cold War. The release of VENONA translations filled gaps in the historical records about how Soviet spies in America were caught and convicted. VENONA aided the United States in capturing spies and knowing the enemy's moves, inevitably turning the tide of the war. Examining Project VENONA and its discoveries allow for a more complete picture of the history of that Cold War to emerge and helps to reshape the present-day perceptions of the Cold War in America.

<sup>&</sup>lt;sup>111</sup> "VENONA," National Security Agency, accessed November 1, 2019, <a href="https://www.nsa.gov/News-Features/Declassified-Documents/Venona/">https://www.nsa.gov/News-Features/Declassified-Documents/Venona/</a>.

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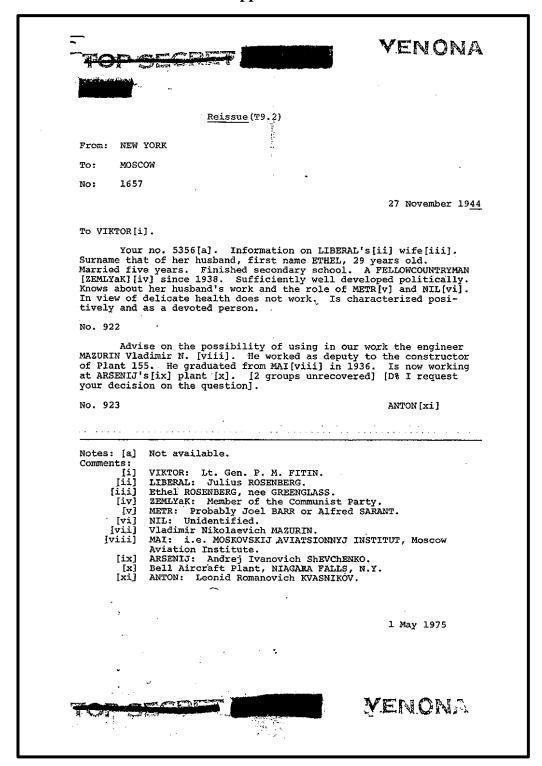
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## Appendix A.

VENONA 95 - 4 -3/NBF/T27 PAULEY[POLE"], although a private owner of oilfields, actually represents the interests of Standard Cil and in RICHARD's opinion his appointment is a "gesture of friendship" by MATROS to the oil men. There is no need to speak of the position of business circles in the campaign which has developed here, inasmuch as these circles are fully represented in the most responsible positions [6% in the BANK] [79 groups unrecoverable] [37 groups unrecovered] [Part VII] Today a report was published that MATROS has sent to the USSR his personal representatives HOPKINS [122 groups unrecoverable] DAVIES's(xv) trip to \$IDON(xvi) [16 groups unrecovered] No. 482 SERGEJ[xvii] Notes: [a] Not available. (b) Inserted by translator. Comments: [i] VINTER: Lt.-Gen. P.M. FITIN. [ii] MATROS: i.e. "SAILOR"; Harry S. TRUMAN.. [iii] COUNTRY: The U.S.A. [iv] KAPITAN: i.e. "CAFFAIN"; Franklin Delano ROOSEVELT. [v] BANK: U.S. State Department. [vi] BABYLON: SAN FRANCISCO. [vii] CARTHAGE: MASHINGTON, D.C. [viii] ShMUL': i.e. "BUMBLEBEE"; Walter LIPPMANN. i.e. "RICHARD"; Harry Dexter WHITE was known by this [ix] RICHARD: covername, but he seems an unlikely figure to occur in this list of newspaper correspondents. 3/NBF/T27

**Figure 1.** VENONA message listing codenames for notable figures and places.

## Appendix B.



**Figure 1.** VENONA message identifying Ethel Rosenberg as the wife of LIBERAL.

# Appendix C.

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Figure 1. VENONA message listing atomic spies embedded in the Manhattan Project.