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Critical Infrastructure Protection-

Los Alamos National Laboratory

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### Abstract

Los Alamos National Laboratory (LANL) has been a key facet of Critical National Infrastructure since the nuclear bombing of Hiroshima exposed the nature of the Laboratory's work in 1945. Common knowledge of the nature of sensitive information contained here presents a necessity to protect this critical infrastructure as a matter of national security. This protection occurs in multiple forms beginning with physical security, followed by cybersecurity, safeguarding of classified information, and concluded by the missions of the National Nuclear Security Administration.

## Critical Infrastructure Protection-

## Los Alamos National Laboratory

Los Alamos National Laboratory (LANL) has been a key facet of Critical National Infrastructure since the nuclear bombing of Hiroshima exposed the nature of the Laboratory's work in 1945. A month prior to the utilization of "Little Boy" the Laboratory conducted one nuclear detonation test at the Trinity Site in south central New Mexico. Strict safeguarding protocols of information were imperative to the Laboratory's ability to keep this new weapon technology secret from our World War II enemies, though the sparsely populated area of operation greatly added to disallowing rumors during that era. While the presence of nuclear weapons technology is no secret in modern times, that does not negate the sensitivity of the information nor the developments of new sensitive technologies produced by the Laboratory. With the overwhelming amount of sensitive scientific information present, and the common knowledge of the nature of sensitive information contained here, it is understood that protecting this facility, and all that it holds is a matter of national security. Protecting this critical infrastructure is not as simple as locking a door or setting an alarm, though the most obvious line of protection is physical security. Immediately following physical security, cyber security cannot be ignored as a consideration and threat that is now a permanent fixture concerning not only critical infrastructure but every day activities, these concerns are only

compounded when associated with information of national security secrets. The task of safeguarding classified and sensitive information is not unique to the Laboratory, but the knowledge produced there is, and must be protected as a critical infrastructure concern. Along with the programs and research conducted at the Laboratory, they also work in conjunction with the National Nuclear Security Administration making Los Alamos National Laboratory a critical factor in the nuclear nonproliferation equation.

In understanding the safeguards emplaced to protect Los Alamos National Laboratory as a facility of critical infrastructure a basic understanding of the Laboratory's mission is beneficial. Los Alamos National Laboratory is the "senior laboratory in the DOE system, we execute work in all of DOE's missions: national security, science, energy, and environmental management". (LANL Communications and Public Affairs: Mission, 2017) As such, the spectrum of research conducted is all encompassing including but not limited to, nuclear weapons assurance testing, nuclear security, intelligence, defense, emergency response, nonproliferation, counterterrorism, energy security, emerging threats, and environmental management. (LANL Communications and Public Affairs: Mission, 2017) With such a broad research mission the indicative nature of protecting this facility as critical infrastructure becomes apparent for all.

As the first and most obvious line of defense in protecting Los Alamos National Laboratory, physical security exists on a full spectrum of access denial measures. The Laboratory's approach to physical security is based on a concept of denying access to those who do not have authorization, applicable security clearance, and need to know from areas in which work in the ascending levels of classification are conducted. Roadways intersect the Laboratory property, and are open for public use. While the public is able to utilize these roadways, they are submitted to vehicle check points and random vehicle inspections while on Laboratory property. "Employees may be subject to random drug tests, vehicle inspections, and searches of individual belongings. Certain Lab areas have multiple layers of access control". (LANL Communications and Public Affairs; Safety and Security, 2017) The Laboratory contracts security forces through SOC, LLC for their physical protection needs concerning security officers protecting the property. This force is reported as being highly trained and "equipped with military-grade vehicles and weapons". (LANL Communications and Public Affairs; Safety and Security, 2017) External to the Laboratory, the county of Los Alamos has a modern and well-funded police department for a county of its size. The Los Alamos Police Department provides an FBI certified Bomb Squad in support of protecting the Laboratory's critical infrastructure. Notably, the Los Alamos Police Department "Bomb Squad has jurisdictional authority to respond to all potential bombing incidents within our region,

including Los Alamos County and the Los Alamos National Laboratory". (Los Alamos County Public Affairs Staff; Special Teams, 2017)

Access control begins at the Badge Office for all wishing to gain access to the property. Documented justification for the access is needed along with verification and validation of applicable security clearance, verified by the Badging Office. The Badging Office provides services to US Citizen employees, foreign national guests and employees, as well Official visitors to the Laboratory. The badges provided are utilized for visual verification of security clearance, as well as a physical access requirement to certain areas of the Laboratory.

As has become apparent in the modern era, cybercrimes and terrorism presents a substantiated threat to not only individuals but to entire government organizations. Acknowledging this threat Los Alamos National Laboratory has developed a robust cyber security network. While the specifics of the Laboratory's cyber security measure being disclosed could identify potential weaknesses, it is safe to assume that it is state of the art and robust enough to safeguard the work conducted at the Laboratory. These assumptions can be made based on the available information concerning cyber security projects that Los Alamos National Laboratory acknowledges working on. Los Alamos National Laboratory has worked to either develop or has collaborated with other partners to develop advanced cyber security systems. Cyber Insider Detection

has been a concern for the Laboratory since the 1980's, and has recently "expanded to the detection of anomalous changes in network traffic and today we are breaking new ground in detecting more subtle anomalous changes in complex event graphs". (LANL Communications and Public Affairs: Cyber Security Science, 2017) Los Alamos National Laboratory actively participates in the annual Cyber Fire training event, which is a "week-long, hands-on computer security training and exercise for cyber defenders in the Department of Energy, other government agencies, government contractors, and related critical infrastructure". (LANL Communications and Public Affairs: Cyber Fire, 2017) Los Alamos National Laboratory has also developed Quantum-Enabled Security, this technology "uses quantum (single-photon) communications integrated with optical communications to provide a strong, innate security foundation at the photonic layer for optical fiber networks". (LANL Communications and Public Affairs; Projects, 2017) These open source advancements in cyber security reinforce the concept of Los Alamos National Laboratory is actively combating cybercrimes and terrorism directed at the Laboratory and the critical infrastructure that it possesses.

Due to the nature of research conducted at Los Alamos National Laboratory safeguarding classified information is an inherent part of Laboratory life for those employees possessing security clearances. While the specifics pertaining to the safeguarding of classified information vary based on the organization, the legal parameters concerning the safeguarding of classified

information can be found in 46 CFR 503.59. Furthermore, Los Alamos National Laboratory is required to adhere to the provisions in Executive Order 13526-Classified National Security Information, until such time as the Order is either revoked or superseded by a subsequent order specifically stating such. In addition to Los Alamos National Laboratory complying with 49 CFR 503.59 and Executive Order 13526, which specifically covers the safeguarding of classified information in the categories of Confidential, Secret, and Top Secret information, the Laboratory also works in Restricted Data and special nuclear material. With these additional classification concerns being present Los Alamos National Laboratory must also adhere to the Department of Energy's classified information safeguarding regulations concerning such. In order to facilitate this additional mandate, the Department of Energy issues DOE specific clearances in the "Q" and "L" categories, with "Q" having access to the Restricted Data and special nuclear material so long as a need to know consideration exists as well. (DOE Departmental Personnel Security Staff, 2016)

Los Alamos National Laboratory, and all Department of Energy National Laboratories for that matter, find themselves in a somewhat unique situation in that they are inherently critical infrastructure, yet their mission is largely also to advance the protection of critical infrastructure via scientific advancements. Acknowledging this in 2000, Congress established the National Nuclear Security Administration as "a semi-autonomous agency within the U.S. Department of Energy responsible for enhancing national security through the military

application of nuclear science". (National Nuclear Security Administration Staff, 2017) The National Nuclear Security Administration defines its mission as six distinct individual missions- Maintaining the Stockpile, Nonproliferation, Counterterrorism and Counterproliferation, Emergency Response, Powering the Nuclear Navy, and Oversight and Change. Maintaining the Stockpile largely revolves around the concept of maintaining an effective nuclear deterrent. This mission set reinforces internal critical infrastructure protection at many of the National Laboratories, including Los Alamos National Laboratory. The Oversight and Change mission "require a secure production and laboratory infrastructure meeting immediate and long term needs". (National Nuclear Security Administration Staff, 2017) This mission inherently aids the protection of critical infrastructure by overseeing operations and influencing change when deficiencies are identified. The four remaining missions of the National Nuclear Security Administration support critical infrastructure non-organic to Los Alamos National Laboratory to include counterterrorism efforts worldwide.

Conclusively, Los Alamos National Laboratory has been a key facet of Critical National Infrastructure since the nuclear bombing of Hiroshima exposed the nature of the Laboratory's work in 1945. Common knowledge of the nature of sensitive information contained here presents a necessity to protect this critical infrastructure as a matter of national security. This protection occurs in multiple forms beginning with physical security, followed by cybersecurity, safeguarding of classified information, and concluded by the missions of the

National Nuclear Security Administration. While the mission of protecting Los Alamos National Laboratory as a critical infrastructure target, and one of national security, is a complex mission it is one that cannot fail and is approached as such by the professionals who work to keep it safe daily.

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