SAND2017-13138R

Printed December 2017

Sandia National Laboratories Internship Business Paper

Rena Stearns

Prepared by
Sandia National Laboratories
Albuquerque, New Mexico 87185 and Livermore, California 94550

Sandia National Laboratories is a multimission laboratory managed and operated by National Technology and Engineering Solutions of Sandia, LLC, a wholly owned subsidiary of Honeywell International, Inc., for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-NA0003525.

Printed December 2017

Sandia National Laboratories Internship Business Report

Rena Stearns
Department 10656
Sandia National Laboratories
P. O. Box 5800
Albuquerque, New Mexico 87185-MS

Sandia National Laboratories is a Government Owned Contractor Operated (GOCO) facility. As such, Sandia must comply with federal, as well as, corporate business practices. Sandia National Laboratories began in the 1940's as a spin-off of the Manhattan Project, which began at Los Alamos National Laboratory.

Sandia is also unique in that it is a Federally Funded Research and Development Center (FFRDC). The work at Sandia is funded by the government because the type of work cannot or would not be addressed through normally industry. Either because of security concerns, lack of profit, or a lack of knowledge, the lab offers solutions to problems that ordinarily would not be solved. FFDRC's are entities sponsored by one or several government agencies to perform, analyze, integrate, support, and/or manage basic or applied research and/or development.

Honeywell International currently manages the labs. However, Sandians are employees of National Technology and Engineering Solutions of Sandia (NTESS) who work at Sandia National Laboratories. The employees are not federal employees, Department of Energy or National Nuclear Safety Administration employees, or employees of the Honeywell International.

Sandia National Laboratories has over 10,000 employees and has facilities all over the country, but the largest site is located in Albuquerque, New Mexico. The other locations are in Nevada, Hawaii, Washington, DC, Texas, and California. The labs are on the Kirtland Air Force Base. Sandia Laboratories in Albuquerque is unique because it is the only labs in the country that is located on a military base.

Sandia's customers and collaborators include many federal, state and local agencies, companies and academic institutions. Partnerships are formed through cooperative agreements, licensing, technical assistance, centers of excellence, use of unique Sandia facilities, personnel exchanges and other mutually beneficial arrangements.

Today, Sandia focuses on the following:

- Non-Nuclear Weapon Components
- Cyber Security
- Secure and Sustainable Energy
- Global Nuclear & Assurance Security
- Synergistic Defense Products
- Reduction of Global Chemical & Biological Dangers
- National Security Space Innovations
- Nonproliferation
- Homeland Security
- Climate

1.1.1. ABOUT

Sandia differentiates itself from other laboratories by the area of specialty. Sandia National Laboratories is known as the laboratory that provides nuclear weapons engineering. Their goal is to ensure the nation's safety with the nation's stockpile. Their vision is to be the premier science

and engineering laboratory for innovation and technology. Sandia also solves research and development challenges ranging from microelectromechanical systems (MEMS) to space systems.

Sandia has two primary categories of business units. One is nuclear weapons which is funded by Congressional Appropriations. The other is Strategic Partnership Programs. While no marketing is necessary with nuclear weapons, the SPP grouping requires marketing their technologies and capabilities. This may start with funding for a Laboratory-Directed Research and Development project. It could also start with a white paper submitted to a sponsor.

Laboratory-Directed Research and Development projects were approved by Congress in the 1990s to help inspire engineers to research opportunities that will be helpful in solving our nation's most challenging problems, ranging from biological to radar technologies.

1.1.2. STRUCTURE

Sandia has a hierarchical organizational structure. With the recent acquisition of National Technology and Engineering Solutions (NTESS) of Sandia on May 1, 2017, there have been changes to the organizational structure. The structure is not available for public dissemination.

However, the current management model is described in three tiers.

The top tier mission areas are:

- Reduce global chemical and biological dangers
- Secure and sustainable energy future

- National security space innovations.

These areas are critical to our national security and they enhance our capabilities. Their synergy with the nuclear weapons mission area results from connectivity in capabilities rather than products. However, these mission areas have product connectivity to the mission areas in the middle tier.

The middle tier mission areas are:

- Global nuclear and assurance security
- Cyberspace
- Synergistic defense products.

These areas are strongly interdependent with and essential to the NW mission areas and provide unique value to the nation.

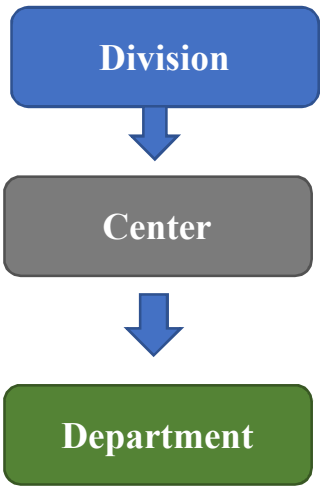
The bottom mission area is nuclear weapons. This mission area enables the broader national security missions shown on the middle tier while allowing Sandia to leverage a broad work scope and thus provide unique value to the nation.

Sandia National Labs is a non-profit organization, however Honeywell International, who currently manages the laboratories, does get paid for this service. However, it is known that the duty is viewed as a service to the country.

Sandia is a government agency, therefore, the products aren't created for sale to the public. Sandia's projects are typically funded through other government organizations and universities to conduct research and development to create a small number of products; typically about 10 or less. Customers might use Sandia to create a product with the intention that they will recreate a marketable product once Sandia has performed all of the engineering and testing necessary for the item.

While there are other national laboratories that provide exceptional services to our country, each has their own specialty.

There are several divisions within Sandia. Each of those divisions have several centers. Within those centers, there are departments under each center. This structure aligns the various disciplines within their own division to streamline the business functions.



1.1.3. ETHICS, POLITICS AND SOCIAL ENVIRONMENTS

Sandia prides itself in maintaining an ethical environment by conducting business with trust and integrity. Employees are required to complete annual ethics training. The training reiterates the

fundamental issues with ethical behavior. Ethical behavior is vitally important to maintain trust between Sandians and their customers.

There is also an on-site ombudsman to consult with to help address situations that might be considered unethical or in violation of corporate policies. They assist with investigating complaints and providing resolution to the conflict. They will provide suggestions to resolve the issue or help with mediation between parties; both internally and externally.

Sandia is an Equal Employment Opportunity (EEO) Employer. This prohibits Sandia from discriminating based on race, color, religion, sex, national origin, age, disabilities, and veterans.

Before Sandia places purchase orders with suppliers, the suppliers are required to complete a questionnaire which addresses each of the categories listed above. By completing the questionnaire, this helps Sandia to insure they award contracts to suppliers that meet the above criteria before placing contracts with companies that do not qualify under the Equal Employment Opportunity statutes. The most common suppliers for the Just-In-Time purchases are typically local, minority/women-owned small businesses. Sandia strives to support our local community when possible.

Every year, Sandia encourages employees to contribute to volunteer work for community organizations, such as Habitat for Humanity or public schools. Employees can enter in their volunteer hours and are recognized at the end of the year for their community volunteer work.

SNL prides itself in being a large contributor to the United Way every year. In order to continue to have the community's support, they need to continue their local support of the community.

Sandia engages in a significant amount of community involvement. Many engineers and staff at Sandia volunteer their time for Science, Technology, Engineering and Mathematics (STEM) engagement with students in grades K-12, in addition to recruiting from universities. Sandia periodically has a family day and Take Your Daughters and Sons to Work Day. These events expose future generations to several of the different applications of work being conducted at Sandia. The goal is to create an interest in the STEM areas, as such, perhaps one day they too will become a Sandian.

Sandia is in a great position to continue outreach to the community, as well as, the nation. As technology advances and new tools become available, Sandia is at an advantage to continue to grow. They have world-class research tools and facilities, that are difficult to find elsewhere. This is what makes Sandia a leader in technological advances for the nation's security and interest.

1.1.4. LEGAL

Sandia must comply with federal and corporate laws. Therefore, having a Legal Department to handle issues that may become a potential lawsuit is an important part of everyday business operations.

There is an on-site Ombudsman. This individual is there to provide resolution of conflicts before the issue may rise to the Legal department. Sandia handles many cases a year ranging from taxes

to labor relations. The Legal department has attorneys on staff to provide legal advice to the Executive Staff and Management.

The primary issues the Legal department handles are related to Human Resources. Sandia also has two unions that they promote. Recently, the two unions had contract negotiations and there were warnings of a potential strike due to disagreements between the union and Sandia management. The legal team worked tirelessly to advise Sandia management of potential ramifications of not reaching an agreement. An agreement was made, thus no further legal action was necessary. Other legal issues Sandia faces are work injuries and investigations.

1.1.5. MARKETING

Although Sandia does not have a "marketing budget", Sandians often visit other government agencies or universities to display new capabilities that technical staff have discovered or improved. If the facility is interested in funding further research or benefit in this capability, they will provide funding to Sandia. The funding is processed and approved by Department of Energy (DOE). Once the funding is accepted at Sandia, then and only then work can begin on the project. Sandia must comply with the Antideficiency Act, which states that a project cannot have obligations or expenses that are more than the allotted funding amount.

Some might say not being able to "market" products puts Sandia at a disadvantage; however, the technical expertise at Sandia "sells" itself.

1.1.6. FINANCE/FUNDING

Once Sandia receives the funding and a project begins, project leads have a team of business personnel that assist them with managing funding on the project. The financial analysts provide reports to the project lead on a regular basis. The report provides the current spend rate, employees charging the project, purchases, travel costs, etc. All projects are prevented from over spending on their project per the corporate cost accounting standards. The business staff also assist in placing purchase orders or other aspects of general project execution. The business staff also provides monthly financial reports for the sponsor to update them on the current project status.

1.1.7. OPERATIONS

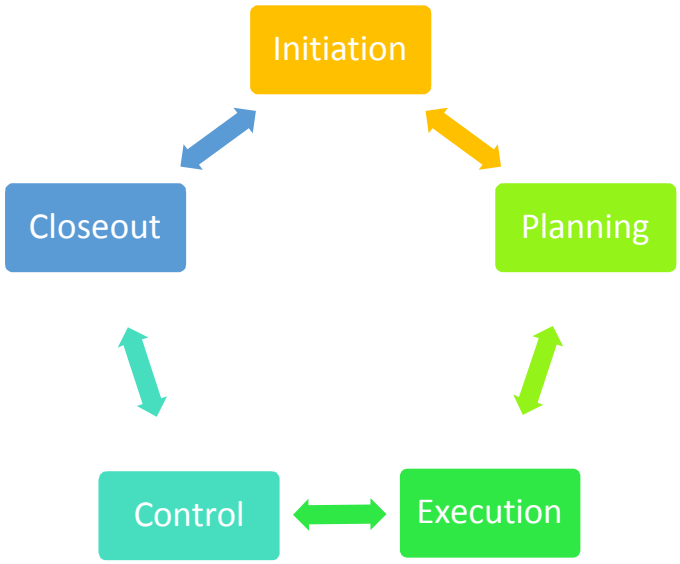
During the planning phase of the project, the project's team is established. Many of the large projects ($1M+) have a project manager, project lead(s), scheduler(s), financial analyst, systems engineers, quality management and a team of technical staff. Often times, the teams consist of a mechanical team, an electrical team, a design team and/or a software team; depending on the scope of the project. Obtaining the right resources is critical to the success of the project.

Once the project begins work, bi-weekly status meetings are held to obtain project status on the project. At these meetings, sometimes technical discussions occur to ensure the proper scope and plan are being executed.

During the execution and control phase of the project, the project's plan is implemented. Risks are identified and communicated to the sponsor. During this phase, project status, cost/benefit analysis, deliverables, effort and cost forecasts and performance reviews are held. Periodic

reviews of project performance are necessary to measure success. Project plans may need to be adjusted. Being a successful project manager includes supporting and helping the team with decisions and providing praise when accomplishments have been achieved. The project manager needs to communicate the relevant parameters, timescales and deliverables of to the team.

In the closeout phase of the project, contracts and invoices are closed out. Meetings are held to discuss lessons learned, help the team(s) reflect on failures and mistakes. It is also the time to make observations and recommendations regarding challenges that arose throughout the project. Finally, to celebrate success.



1.1.8. ACCOUNTING

To comply with accounting rules and regulations, Sandia must adhere to generally accepted accounting standards (GAAP), generally accepted auditing standards (GAAS) and cost accounting standards, (CAS). As an integrated contractor to the DOE, Sandia's financial statements are rolled up into DOE's financial statements and is audited by external auditors as part of DOE's financial statement audit. Sandia is also subject to audits by the U.S. General

Accountability Office (GAO), an independent, nonpartisan agency that works for Congress. The GAO is often referred to as the "congressional watchdog", as it investigates how the federal government spends taxpayer dollars. Sandia also has an internal audit department responsible for helping the organization accomplish its objectives by bringing a systematic, disciplined approach to evaluate and improve the effectiveness of risk management, control, and governance processes. Sandia is also subject to the Office of Management and Budget (OMB) Circular number A-123, which defines management's responsibility for internal controls in Federal agencies.

1.1.9. STAKEHOLDER ANALYSIS

Since Sandia National Laboratories is a Federally Funded Research and Development Center, it does not have any stakeholders. Sandia's funding is managed by the Congress of the United States.

However, each of the projects that are funded at Sandia have stakeholders within the funding agency. As such, there are videoconferences or weekly teleconferences that occur with the sponsor/customer to discuss the status of the project. For projects that have design implementation, they conduct Product Design Reviews, Concept Design Reviews, and Final Design Reviews. Some projects require field testing, as such, the stakeholders may come to Sandia, or Sandians may travel to their location for testing.

1.1.10. SWOT ANALYSIS

1.1.10.1. Strengths

- National laboratory has access to products/equipment that the public does not have access to
- In-depth knowledge among scientists and engineers who are experienced and recognized for breakthrough applications
- Solve complex national security problems through a large spectrum of issues; weapons, security, cyber, biological, chemical
- Gives back to the community
- State-of-the-art tools and facilities to conduct research
- Supply chain encourages contracting with small businesses, especially women owned, veteran owned or disabled business owners

1.1.10.2. Weaknesses

- Cost of operations is very expensive that little companies can't afford partnerships
- Current performance evaluation model doesn't provide competitive raises for employees
- Inability to promote products to general public via mass marking or email blasts

1.1.10.3. Opportunities

- National laboratory has exclusive access to products/equipment that the public does not
- Multidisciplinary national laboratory
- Federally Funded Research and Development Center

- Supports local businesses, with special emphasis on small businesses that are minority owned (woman, veteran, disadvantaged)
- Encourages outreach to local schools for engineering and science education

1.1.10.4. Threats

- Other companies can do the work cheaper
- A target for terrorists
- Protesters against the nuclear work being done at Sandia

DISTRIBUTION

1 The University of New Mexico
Anderson School of Management
Attn: Prof D. Kapelianis
Email: dkapeli@unm.edu
MSC05 3090
1 University of New Mexico
Albuquerque, NM 87131

1 MS0899 Technical Library 9536 (electronic copy)

Sandia National Laboratories