

We put science to work.™



**Savannah River  
National Laboratory™**

OPERATED BY SAVANNAH RIVER NUCLEAR SOLUTIONS

A U.S. DEPARTMENT OF ENERGY NATIONAL LABORATORY • SAVANNAH RIVER SITE • AIKEN, SC

# Strategic and Institutional Plan FY 2015-2019



September  
2014

SRNL.DOE.GOV

### DISCLAIMER

This work was prepared under an agreement with and funded by the U.S. Government. Neither the U.S. Government or its employees, nor any of its contractors, subcontractors or their employees, makes any express or implied:

1. warranty or assumes any legal liability for the accuracy, completeness, or for the use or results of such use of any information, product, or process disclosed; or
2. representation that such use or results of such use would not infringe privately owned rights; or
3. endorsement or recommendation of any specifically identified commercial product, process, or service.

Any views and opinions of authors expressed in this work do not necessarily state or reflect those of the United States Government, or its contractors, or subcontractors.

**Printed in the United States of America**

**Prepared for  
U.S. Department of Energy**



Cover—

[We Put Science To Work™](#) by creating innovative products and services that deliver unique solutions to emerging national challenges.

This Plan provides a 'compass for the hard decisions' we must make to position ourselves as an enduring National Laboratory that solves the nation's most challenging problems while delivering mission success for the Department of Energy.



## A Message from Dr. Terry Michalske

Laboratory Director, Savannah River National Laboratory

### Welcome to the future! Savannah River National Laboratory's Plan for 2015 – 2019

The Savannah River National Laboratory (SRNL) offers a unique combination of capabilities, equipment, and infrastructure based on nuclear science that is not available anywhere else in the United States. Originally created as part of the complex to maintain the US nuclear deterrent, the current mission and capabilities are a significant asset to the site, region and Nation to provide solutions to complex problems of national and international impact.

With the political and economic unrest in the world, it is apparent that the new normal is uncertainty. While the future is unpredictable, SRNL has demonstrated that a sustained focus on safety, security, and innovation can create trusted options that will help our nation navigate through its most difficult challenges.

SRNL innovations developed over the past five years have resulted in over \$5 Billion in savings for our nation's legacy waste cleanup program, providing a greater than fifteen-fold return on investment to the taxpayer. The nation's nuclear deterrent cannot be maintained without the one-of-a-kind tritium processing, storage and transfer system expertise at SRNL. We are also home to the world's only radiological crime investigation laboratory. These are things that make SRNL a world leader in science and technology.

SRNL provides intellectual leadership, innovative solutions, and research and technology necessary to address the nation's most complex nuclear materials processing and environmental challenges. The researchers and staff at SRNL are able to successfully fulfill this mission while also upholding the distinction of being the safest National Laboratory in the country. These things set SRNL apart in demonstrating the laboratory's value to our nation.

Underpinning this Laboratory is a world-class culture of safety and security that provides the confidence from our staff, our regional neighbors, and our clients to tackle our nation's most difficult environmental stewardship, national security, and clean energy challenges. This plan amplifies those contributions and focuses on four strategic areas that provide direction and focus for leadership; therefore strengthening the position of the Laboratory for continued mission success in the areas of Environmental Stewardship, National Security, Clean Energy, and leadership in Nuclear Chemical Manufacturing for DOE.

The SRNL Laboratory Plan FY 2015-2019 provides a reliable compass rooted in a clear and enduring set of national needs and Laboratory operating principles. Safety remains our highest value. This plan continues the world-class safety focus begun by DuPont that will enable SRNL success well into the 21<sup>st</sup> century as "the safest DOE laboratory."

A handwritten signature in black ink, appearing to read "T. Michalske".

## Table of Contents

### Strategic Plan

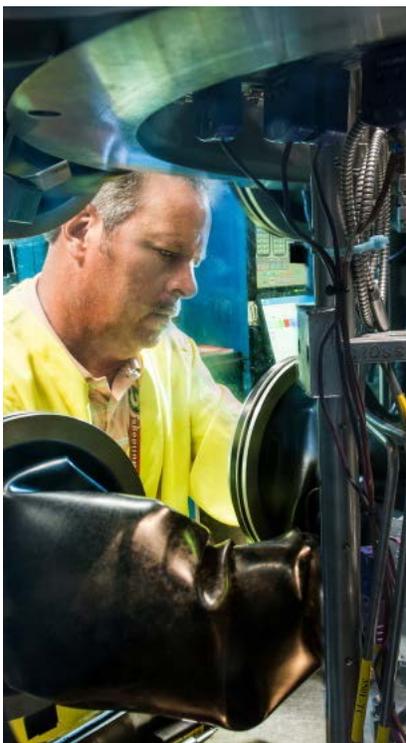
1	Our Enduring Missions .....	6
1.1	Core Purpose .....	7
1.2	Vision .....	7
1.3	Mission.....	7
1.4	Values.....	8
2	Global Outlook.....	9
2.1	Environmental Management .....	9
2.1.1	Technology .....	9
2.1.2	Cooperation.....	9
2.2	National Security.....	10
2.2.1	Tritium Supply .....	10
2.2.2	Non-proliferation .....	10
2.2.3	Nuclear .....	10
2.2.4	Cyber.....	11
2.3	Clean Energy .....	11
3	FY15-FY19 Strategy.....	11
3.1	Strategic Goals .....	13
3.2	Program and Competency Initiatives .....	13
3.3	Effective Customer Solutions .....	14
3.4	Clear Strategic Direction.....	15
4	Alignment with DOE, EM and NNSA Goals .....	16
5	Laboratory Organization.....	17
5.1	Leadership .....	17
5.2	Structure .....	17
6	National Engagement.....	19
7	Directorates .....	20
7.1	Environmental Stewardship .....	20
7.2	National Security.....	20
7.3	Nuclear Materials Program Integration.....	20
7.4	Clean Energy .....	21
7.5	Science and Technology.....	21
7.6	Laboratory Operations and Support.....	21

## Institutional Plan

8	Putting Science to Work .....	23
9	Technology and Competence.....	23
9.1	Core Products and Capabilities .....	23
9.2	Core Capabilities ‘State-of-Health’ .....	24
10	Laboratory Initiatives.....	25
10.1	Program Initiatives – Innovative Customer Solutions.....	25
10.1.1	Natural Gas .....	25
10.1.2	HTGR Fuel Disposition .....	25
10.1.3	Tritium Supply .....	25
10.1.4	Tank Waste .....	26
10.1.5	Intelligence.....	26
10.2	Competency Initiatives – Innovate Nuclear Chemical Manufacturing .....	27
10.2.1	Process Intensification/Smart Manufacturing.....	27
10.2.2	Enterprise Modeling.....	28
11	Laboratory Operations .....	28
11.1	Performance Management.....	28
11.1.1	Planning .....	28
11.1.2	Performance Measures.....	28
11.2	Communications.....	29
11.3	Resource Management .....	30
11.3.1	Human Capital .....	30
11.3.2	Infrastructure.....	32
11.4	Management Review and Oversight.....	33
12	Laboratory Partnerships and Networking.....	34
12.1	Laboratory Directed Research and Development (LDRD) .....	34
12.2	Work for Others (WFO) .....	35
12.3	Technology Transfer.....	35
12.4	University Programs.....	37

## Strategic Plan • 2015–2019

This Plan provides a ‘compass for the hard decisions’ we must make to position ourselves as an enduring National Laboratory that solves the nation’s most challenging problems while delivering mission success for the Department of Energy. Our innovation-to-solutions model serves to integrate the strategic and annual institutional plans which are presented separately.



## 1 Our Enduring Missions

Savannah River National Laboratory (SRNL) provides technical innovations and solutions for DOE Office of Environmental Management missions and serves diverse national interests for DOE and other federal agencies, world-wide.



**SRNL Main Technical Laboratory**

The Savannah River National Laboratory has played a key role in the development of all major processes which allowed for the production of plutonium and tritium at the Savannah River Site (SRS). In the period since the end of the Cold War, SRNL has established itself as the Nation's premier multi-program applied science and technology laboratory addressing the challenges of cleaning up the environmental legacy from the Nation's weapons program and providing key support to help meet National and Homeland Security and Energy Security objectives. SRNL provides applied technology through multidisciplinary programs of scientific research and applied engineering directed toward applications for new and improved techniques, materials science, specialized equipment, systems, and capabilities that meet or exceed our customers' expectations.

SRNL provides advanced laboratory support to the Site Tritium Operations of the National Nuclear Security Administration (NNSA), Liquid and Solid Waste Operations, Nuclear Materials Operations Programs and Site Infrastructure through integrated process development and testing including a full range of bench-scale, pilot and full scale development and testing activities.

Leveraging a sixty-year plus technological heritage, SRNL provides support to SRS, the DOE Complex and the Nation, working in 24 states and 52 countries throughout the world.

## 1.1 Core Purpose

**We Put Science To Work™** has been SRNL's core purpose since its beginnings in 1950. The original Savannah River Laboratory (SRL) mission, to provide new research and development for the start-up and operation of site processes and facilities to establish the US nuclear deterrent, continues today. With the end of the Cold War, SRL became the Savannah River Technology Center (SRTC) with an added focus on environmental remediation, waste stabilization, tritium processing and non-proliferation. SRTC became Savannah River National Laboratory in 2004 in recognition of the Lab's success in developing a multi-program portfolio.

The nuclear science and environmental management missions are our reasons for being. They are what make us unique and create the foundation for providing systems science and engineering expertise and innovative solutions to the most complex nuclear, environmental, energy and security challenges—locally, nationally and globally.

Today, SRNL is the applied research and development laboratory for the DOE Office of Environmental Management. Continued progress at all EM sites requires continued innovation and advanced technologies to achieve success and to accelerate cleanup. SRNL continues to execute all of its missions with an emphasis on deployable solutions – applying its capabilities through the DOE missions to serve a variety of customers across the DOE Complex, with other Federal agencies, and within the private sector.

## 1.2 Vision

***We anticipate and solve the most challenging and complex nuclear, environmental, energy and security problems that affect national and economic security.***

We are widely recognized as a national leader in Environmental Management, National Security, and Energy Security. As the nation's premier applied science laboratory, we deliver world-class innovative solutions for national defense, homeland security, sustainable energy, and accelerated cleanup.

We leverage the excitement and importance of our work with universities to develop and sustain talent pipelines for exceptional staff. Our employees receive broad professional peer recognition for their unique contributions. Our laboratory management and safety record are performance standards for other federal and commercial laboratories.

## 1.3 Mission

***Our unique mission responsibilities in the environmental management (EM) and nuclear weapons (NNSA) programs create a foundation and capabilities that we leverage to solve some of the nation's most challenging security and environmental problems.***

SRNL's three-fold mission is to enable the technical success of the diverse mix of federal missions at SRS; provide technical leadership for future site missions; and use its technical expertise to support achieving broader national and regional DOE goals.

As a multi-program national laboratory, SRNL accomplishes work that is integral to the missions of DOE-EM and NNSA and other federal agencies. SRNL provides technical expertise and/or leadership in many areas including:

<b>DOE-EM</b>	<ul style="list-style-type: none"> <li>• Soil and Water Remediation</li> <li>• Deactivation and Decommissioning</li> <li>• Liquid and Solid Waste</li> <li>• Nuclear Materials Management</li> </ul>
<b>DOE-NNSA</b>	<ul style="list-style-type: none"> <li>• Tritium Supply</li> <li>• Nuclear Non-proliferation</li> <li>• Radiological Assistance</li> </ul>
<b>SRS</b>	<ul style="list-style-type: none"> <li>• Site-wide Environmental Safety and Health</li> <li>• Engineering and Construction</li> </ul>
<b>Other DOE and Work for Other Federal Agencies</b>	<ul style="list-style-type: none"> <li>• Clean/Renewable Energy</li> <li>• National and Homeland Security</li> </ul>

As a Federally Funded Research and Development Center (FFRDC) for the DOE, we apply our deep technical knowledge and expertise as an objective, independent and trusted advisor to inform policy debates on many technical issues for our customers.

## 1.4 Values

SRNL’s core values provide the framework for our daily performance, our mission impact, and enable us to achieve success as a national laboratory with multiple sponsors and critical, inter-dependent missions. We uphold these core values because they provide the underpinnings for the overall quality of performance expected of us, as well as what we expect of ourselves in all our work.

<b>SAFETY</b>	<ul style="list-style-type: none"> <li>• Conduct all aspects of our work safely, continuously improving in pursuit of injury- and incident-free performance</li> </ul>
<b>TEAMWORK</b>	<ul style="list-style-type: none"> <li>• Create and maintain highly effective relationships with each other, our customers and suppliers, and other stakeholders</li> <li>• Respect each other’s perspectives and share knowledge and resources to achieve excellence, deliver value, and grow individually and collectively</li> </ul>
<b>INTEGRITY</b>	<ul style="list-style-type: none"> <li>• Live by the highest standards of ethics, transparency, and security</li> </ul>
<b>CUSTOMER SATISFACTION</b>	<ul style="list-style-type: none"> <li>• Satisfy our customers, deliver quality services of unmatched value, and constantly raise the bar on our performance</li> </ul>

## 2 Global Outlook

The Nation continues to deal with the global war on terrorism, the potential for a new war in the Middle East, a slowly recovering economy, changes in the makeup of Congress from upcoming 2014 mid-term elections, calls for substantial reductions in federal spending and a federal budget deficit that could continue long term budget cuts affecting defense, energy and the environment.

### 2.1 Environmental Management

#### 2.1.1 Technology Needs

“DOE estimates the cost to complete [planned environmental remediation] work could range between \$187B and \$223B”.<sup>1</sup> Given the Federal budgets for the foreseeable future, meeting regulatory requirements with today’s technologies requires unrealistic funding.<sup>2</sup> Schedule extensions drive up costs by consuming an ever increasing fraction of funding for maintenance and infrastructure costs.<sup>3</sup>

The goal must be ‘sustainable remediation’. Improved and new technologies and tools that deliver compliant environmental remediation can increase the rate of cleanup progress while reducing maintenance and operating costs. Advances in non-nuclear chemical process re-engineering are well underway and are being driven by process intensification, smart manufacturing and enterprise modeling. Further innovations driven by materials and geochemical sciences can point the way toward ‘sustainable processing and remediation’ for nuclear materials. Key innovation opportunities exist in:

- Alternative approaches for processing high-level waste and legacy materials
- Green, sustainable approaches for remediating soil, groundwater, and contaminated facilities
- Integrated tools to assess the long-term effectiveness of environmental remedies

For example, Process Intensification (discussed below) is focused on materials at the molecular level and new devices to handle the materials. At the molecular level, new solvents, catalysts, and bio-reactive agents are possible. At the device level, much smaller devices can leverage material properties to speed up chemical reactions, lower heat mass and transfer, and reduce waste.

The challenge is to find the balance between near-term compliance and cleanup results and then identify and invest in technology critical to future success.

#### 2.1.2 Cooperation

On March 11, 2011, a tsunami struck the Pacific Coast of Japan. The resulting flooding disabled the control systems at the Fukushima nuclear power plant and led to the dispersal of radioactive material across a wide coastal area of north-central Japan. Within days EM and NNSA responded with consequence management teams, representing the first time DOE and its laboratories fielded a full team to a large scale nuclear emergency. SRNL post-accident clean-up support is based on 25 years of rad-

---

<sup>1</sup> Presentation to the SEAB Task Force on Technology Development for Environmental Management, Office of Environmental Management, July 15, 2014

<sup>2</sup> Report of the Task Force on Technology Development for Environmental Management, Secretary of Energy Advisory Board, November 24, 2014

<sup>3</sup> Id.

waste remediation experience and nuclear science expertise. Dispersal accidents will happen in the future and key opportunities exist in:

- Planning for emergencies
- Responding to emergencies
- Nuclear operations and forensics
- International engagement

## 2.2 National Security

### 2.2.1 Tritium Supply

Tritium is a radioactive form of hydrogen gas that is an integral component in the nuclear weapons stockpile. It must be replenished in weapons periodically. Many weapons in the stockpile were built during the Cold War-era and NNSA is actively engaged in maintaining, refurbishing and extending the life of the aging weapons, including replacing the tritium gas. Required tritium production has slowed due to recent Federal budget reprioritizations and NNSA is developing options for future production. Key innovation opportunities exist in alternative, sustainable approaches for tritium production and storage.

### 2.2.2 Non-proliferation

One of the gravest threats the United States and the international community face is the possibility that terrorists or rogue nations will acquire nuclear weapons or nuclear materials. SRNL works closely with NNSA, key federal agencies, other DOE national laboratories, and the private sector to develop and implement innovative technical solutions to limit or prevent the spread of materials, technology, and expertise related to nuclear and radiological materials around the world. Key innovation opportunities exist in:

- Nuclear and radiological material monitoring and removal
- Proliferation detection
- Fissile materials disposition

### 2.2.3 Nuclear Threats

Practically all countries use nuclear technology for peaceful purposes. In 2011, the International Atomic Energy Agency (IAEA) reported that 101 non-nuclear weapons countries have small quantities of nuclear materials for various research, medical and other purposes. Five countries have officially acknowledged possession of nuclear weapons while three others have well-developed nuclear programs and the capability to build nuclear weapons. NNSA works to understand the full range of potential nuclear threat devices as part of U.S. nuclear counterterrorism and counter-proliferation programs. SRNL provides nuclear science expertise and innovative technologies to support NNSA and other federal agencies in countering nuclear threats. Key innovation opportunities exist in:

- Nuclear counter-terrorism capabilities

- Nuclear threat science

### 2.2.4 Cyber Threats

Securing and maintaining a stable electric grid is a shared responsibility (Government and private sector) and Homeland Security Presidential Directive 7 designated DOE as responsible for the energy sector. The introduction of new energy sources (renewable) and technologies (smart grid, load management, plug-in electric vehicles, distributed generation/microgrids) will further complicate management of the electric grid.

Key innovation opportunities exist in:

- Secure wireless
- Grid security and real-time forensics technologies



### 2.3 Clean Energy

DOE leads the nation in developing and deploying clean energy and efficiency technologies and is the largest federal sponsor of basic research in these areas. US security and economic growth depends on a stable, efficient and effective energy supply.

A stable energy supply relies on more effective use of domestic energy resources (coal, oil, natural gas, nuclear, etc.), higher efficiencies in energy production, transmission and end-use applications, and development of nascent renewable energy sources (solar, wind, hydrogen, etc.). Finally, while development of energy technologies can cross many borders, effective energy production and use policies tend to be more effective when developed for regions and localities.

Key innovation opportunities exist in:

- Technologies that reduce greenhouse gas emissions
- Increasing energy production efficiencies
- Technology options for diverse energy resources (hydrogen, wind, solar, geothermal, nuclear)
- Development, transportation and use of domestic natural gas
- Standards, test procedures and certifications for US energy systems and equipment

## 3 FY15-FY19 Strategy

**The value of SRNL to the nation can be summed up in ‘what we will do’ to address the emerging challenges and continuing threats to US security and economic growth.**

This year, SRNL celebrated its first 10 years as a national laboratory and over 60 years of dedicated service to the country. It marked a milestone in the Laboratory’s evolution over six decades.

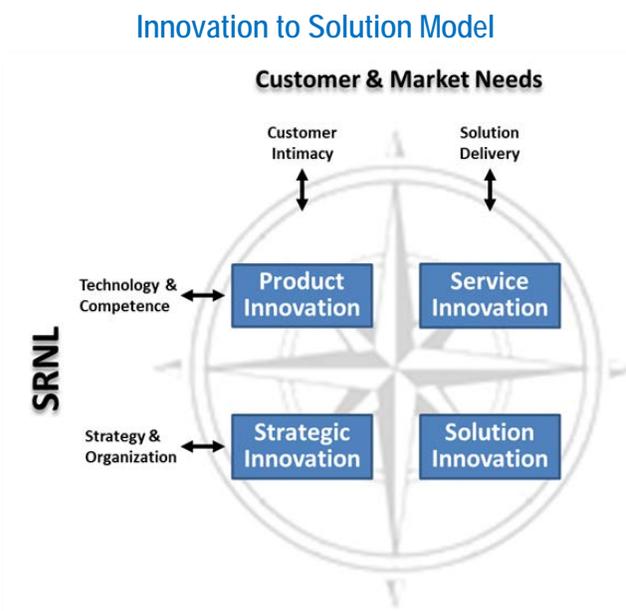
“SRNL has made the transition from a site-specific resource to a true National Laboratory...SRNL innovations in technology will have a much broader impact as the U.S. moves to be the technology competitor of the world...SRNL is vital in addressing not only the nation’s waste challenges, but in developing technology for the rest of the world. This is how we will be competitive in a global economy.”

*David Klaus, DOE Deputy Under Secretary for Management and Performance, April 29, 2014*

Our commitment to mission delivery continues to drive everything we do. However, given the Laboratory’s evolved national and international role, a change in how we do our work is necessary to maintain Laboratory vitality and deliver competitive, innovative solutions to global challenges.

SRNL leadership has embarked on a deliberate course of leveraging both the site and Labs resources, and of investing in core competencies for the future, all with a focus on excellence and innovation in core products and solution delivery to address emerging national challenges. Why? This type of approach improves on traditional top-down planning because it is customer- and capability-focused and enables SRNL to modify strategies quickly.

SRNL captures this approach in our strategic innovation-to-solutions model. Based on customer intimacy and emerging challenges, SRNL drives innovation in capabilities and products, services and integrated solutions. Our strategy, based on this model, has three main purposes: articulating and implementing SRNL’s strategic direction, better coordinating SRNL’s interface with our customers, and developing new business and new customers to put science to work on the nation’s most complex and challenging problems. The strategy explains how SRNL’s expertise and technology are applied to evolving customer and market needs to create solutions with much broader impact and higher value.



Our innovation strategies and plans are based on internal analyses (supplemented by external review) of our Federal sponsor and customer markets, SRNL core competencies and capabilities, and competitive analysis of other DOE laboratories. This approach provides a level of assurance that 1) real potential for major contributions has been identified, 2) SRNL facilities are viable within the DOE laboratory system, and 3) assigned functions and missions focus on what SRNL can and does do well.

### 3.1 Strategic Goals

SRNL plays a key role in our nation’s nuclear materials management strategy by coupling our scientific and technical knowledge with the Savannah River Site nuclear materials management capabilities to provide innovative solutions to national needs in environmental stewardship, national and homeland security and clean energy. Hence, our strategic goals are closely coupled to continuously innovating our core products/services. Four enduring Strategic Goals (~10 years) for delivering high value, innovative solutions guide SRNL in achieving its vision and mission. The Strategic Goals are interdependent, build upon our underlying core capabilities and competencies, and provide strategic focus that enables all of SRNL’s programs.

	<b>Strategic Goal</b>	<b>Core Product/Service</b>
<b>1</b>	Apply science and technology to reduce the risk associated with radiological contamination at sites in the U.S. and abroad	Environmental Remediation and Risk Reduction
<b>2</b>	Advance the state of the art of radiological materials handling and chemical engineering processes to support our nation’s needs	Nuclear Materials Processing and Disposition
<b>3</b>	Develop and field integrated capabilities to systematically observe, assess, and analyze nuclear materials, operations, and events	Nuclear Detection, Characterization, and Assessments
<b>4</b>	Develop technologies to store, transport and use small molecules for national security and clean energy applications	Gas Processing, Storage, and Transfer Systems

### 3.2 Program and Competency Initiatives

Long-term Program and Competency Initiatives (~5 years) identify clear achievements that are necessary deliver innovative and cost effective solutions. These initiatives outline a clear strategic direction to execute the missions, achieve SRNL’s vision, and provide long-term priorities for resource allocation decisions. The initiatives are foundational to SRNL’s annual strategic planning process and provide a basis for quarterly performance self-evaluation and external evaluation. SRNL’s Leadership team tracks performance through the Senior Staff review process and the DOE-SR Site Office monitors performance of Performance Based Incentives contained in the annual Performance Evaluation Management Plan (PEMP).

	<b>Program</b>	<b>Initiative</b>	<b>Description</b>
<b>1</b>	<b>Environmental Management</b>	Tank Waste	Expand the SRS role at Hanford, building on SRNL expertise and SRS experience; evaluate and pursue international opportunities for partnership and leveraging
<b>2</b>	<b>Nuclear Materials</b>	Fuel Disposition	Develop High Temperature Gas-Cooled Reactor (HTGR) fuel feasibility study and prepare for HTGR fuel receipt and disposition
<b>3</b>	<b>National</b>	Tritium	Establish and operate an assured, domestic source of tritium at SRS

	<b>Security</b>	Readiness	to meet the needs of the nuclear weapons stockpile
<b>4</b>	<b>National Security</b>	Intelligence	Realize near-term successes while developing larger, sustainable intelligence programs that provide technical support and technical solutions to meet National Security needs
<b>5</b>	<b>Clean Energy</b>	Natural Gas	Establish a gas storage/handling prototype laboratory to further develop hydrogen and natural gas technologies as transportation fuels

<b>Competency Initiative</b>		<b>Description</b>
<b>1</b>	Process Intensification/ Smart Manufacturing	Reinvent nuclear chemical manufacturing to become smaller, more flexible, and to allow online decision making, thereby improving safety and efficiency, and reducing size and cost
<b>2</b>	Systems / Enterprise Modeling	Shift paradigm to the use of modeling/simulation as a value-added tool for business development and operations; establish enterprise modeling capability at SRNL

### 3.3 Effective Customer Solutions

Innovative technical solutions alone will not solve evolving environmental, security and energy challenges. Stakeholders, requirements, and needs are constantly changing, making the definition of a solution much more difficult, if not impossible. In response, SRNL program managers are shifting their solution development processes from a Lab viewpoint to that of the customer. In many cases, this means partnering with the customer to manage the entire process from defining requirements through delivery of product/service. In short, SRNL is focused on improving the customer experience. Assignment of SRNL staff to a customer location is an example of this trend.

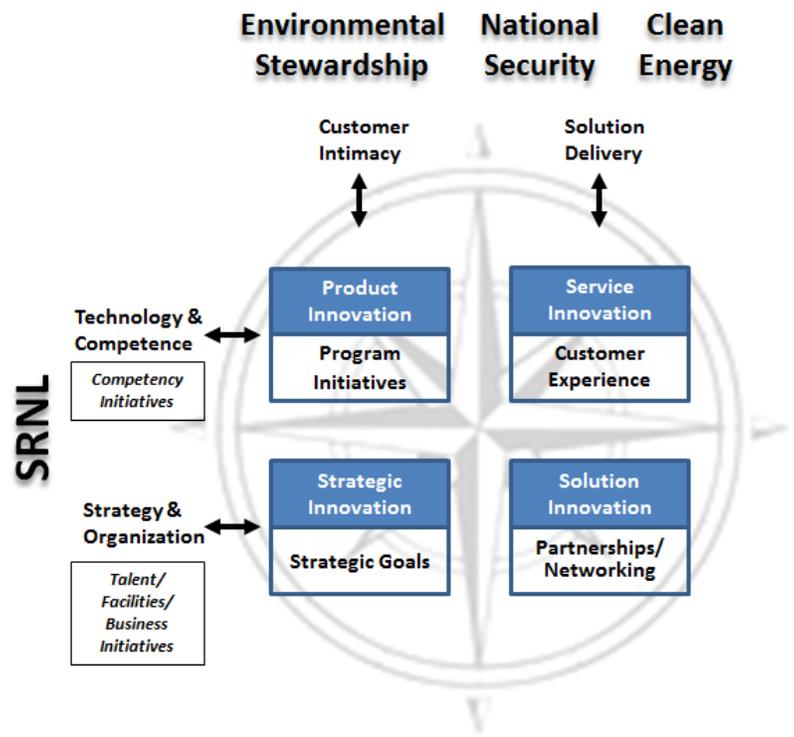
It is also clear from the market and customer analyses above that many solutions will require 1) competitors and suppliers to form partnerships to deliver effective solutions and that 2) given the complexity of solutions, no Lab or company may have the expertise to realistically build and provide everything. Partners and a platform approach, where various expertise and technology must be integrated and managed as a single solution, are required. Designation of a Lab as lead on national/international challenges (WIPP recovery, Fukushima) are examples of this trend.

### 3.4 Clear Strategic Direction

The integration of our Strategic Goals, and Program and Competency Initiatives with Customer Experience and Partnerships provides a clear strategic and actionable direction based on enduring national needs and SRNL competencies and capabilities.

SRNL’s strategic compass is focused on innovating our core products and institutionalizing our customer and market ‘interfaces’ so that emerging challenges and technology come together using foresight and design. This strategic direction represents a systems-based approach to dealing with accelerating change and often chronic challenges and needs.

#### SRNL Strategic Innovation to Solutions



Using the model, SRNL has set its course on re-engineering nuclear chemical manufacturing processes to:

1. Deliver effective solutions at much lower cost for our environmental management mission
2. Apply the expected advances and breakthroughs in nuclear engineering to the nation’s non-proliferation, energy and security challenges.

#### Strategic Technical Innovation



## 4 Alignment with DOE, EM and NNSA Goals

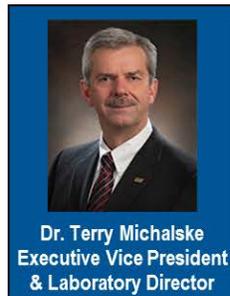
SRNL’s strategic planning process ensures integration and alignment with the DOE and NNSA Strategic Plans and DOE-SR’s expectations in the Performance Evaluation Measurement Plan (PEMP) Key Areas. The FY15 PEMP documents are the negotiated criteria by which the DOE and NNSA Savannah River Offices appraise our performance. Table 1 illustrates the line-of-sight alignment and consistency of the SRNL FY15-FY19 Programs with the DOE 2014-2018 Strategic Plan, the EM FY14 Annual Performance Agreement, the NNSA Strategic Plan and the FY15 SRNL PEMP.

DOE GOALS (MAR 2014)	SCIENCE AND ENERGY		NATIONAL SECURITY			MANAGEMENT AND PERFORMANCE					
EM GOALS (NOV 2013)							SAFETY CULTURE	REDUCING LIFECYCLE COST	CONTRACT AND PROJECT MANAGEMENT EXCELLENCE	MANAGEMENT EXCELLENCE	SUSTAINABILITY
NNSA GOALS (2014)			MAINTAIN THE STOCKPILE	COUNTER- TERRORISM	EMERGENCY RESPONSE	PREVENT PROLIFERATION			RECAPITALIZE INFRASTRUCTURE		
SRNL PRGMS (FY15-19)	Clean Energy	Science & Technology	National Security			Environmental Stewardship	Nuclear Materials		Laboratory Operations		
EM PEMP Contract Outputs (FY15)	CO-4: Close and secure the nuclear Fuel Cycle CO-5: Clean Alternative Energy Project		CO-6: SRNL presence in National Security			CO-1: Nuclear material disposition paths CO-2: High level liquid waste dispositioning CO-3: Next Generation Cleanup technologies CO-7: SRNL Infrastructure Sustainment CO-8: Effective laboratory management					
NNSA PEP (FY15)	PO-3: Science, Technology, and Engineering and Other DOE Mission Objectives		PO-2: Broader National Security Mission PO-5: Contractor Leadership								

## 5 Laboratory Organization

### 5.1 Leadership

SRNL is structured to provide strong integration across our environment, national security and clean energy missions, flexible and rapid mission delivery and clarity in leadership mission roles, responsibilities, authorities and accountabilities. The SRNL leadership team is integrated into the Savannah River Nuclear Solutions (SRNS) leadership structure and reports to the SRNS President. The SRNL leadership team brings hundreds of years of Federal and private sector experience in the nuclear, energy, and national security arenas.



#### Associate Laboratory Directors



#### Laboratory Fellows



#### Strategic Development & Innovation



*Effective July 2015*

### 5.2 Structure

SRNL's **We Put Science To Work™** performance exists because the Laboratory structure captures the benefits of both project and functional organization structure. Our matrix organization enables leadership to effectively manage getting the job done while maintaining and improving performance. The structure also provides the flexibility needed in finding new ways to help shape EM's future.

SRNL Directorates, Programs and Strategic Initiatives are organized to operate effectively across the spectrum from applied research to one-of-a-kind/low volume production and unique/ standard services.

**SRNL Directorates, Programs and Strategic Initiatives**  
(NOTE – PI denotes Program Initiative; CI denotes Competency Initiative)

Environmental Stewardship	National Security	Nuclear Materials	Clean Energy	Science & Technology	Laboratory Operations
Liquid Waste	Defense Programs	Materials Management	Nuclear Programs	Materials Science	Business & Workforce Management
Environmental Restoration	Nonproliferation	EM Liaison	Renewable Energy	R&D Engineering	Research Operations
Actinide Science	Global Security	PI-2: HTGR	CI-1: Process Intensification/ Smart Manufacturing	Analytical Labs	Quality Assurance
PI-4: Tank Waste	National Security		CI-2: Enterprise Modeling	LDRD	Communications
	Counterintelligence		CI-1: Natural Gas		CIO
	PI-3: Tritium				R&D Safety
	PI-5: Intelligence				

A project structure facilitates making decisions and directly managing all the necessary resources. A functional structure provides centralized coordination and specialization that produces products and services efficiently and predictably. Both structures were (unnamed but) in place in 1950 when the Savannah River Laboratory began under DuPont.

“We feel that an aggressive research and development program for process improvement is justified for the benefit of the Savannah River Plant, and that it can most effectively be realized as our responsibility. It should be administered with employees under our direction and closely integrated with the plant operation in which the opportunity for improvements is apparent in proper perspective.”

*R. Monte Evans, Assistant General Manager of DuPont’s Explosives Department  
(1951 letter to Curtis Nelson, Field Manager, Atomic Energy Commission)*

Every organization must have the requisite talent, facilities and equipment, and business infrastructure to efficiently and effectively execute its work. The Laboratory has implemented and continues to evolve programs to recruit tomorrow’s world-class employees; modernize, build and acquire required facilities and equipment; and update legacy business systems. Laboratory operations are discussed in the Institutional Plan.

As in the past, delivering results rests on SRNL leadership’s ability to effectively manage the balance between getting the job done and maintaining efficient and predictable performance under changing customer needs and regulatory conditions. Our customers continue to validate that our ‘matrix’ organization serves the Nation well by investing mission and infrastructure funds at SRNL.

## 6 National Engagement

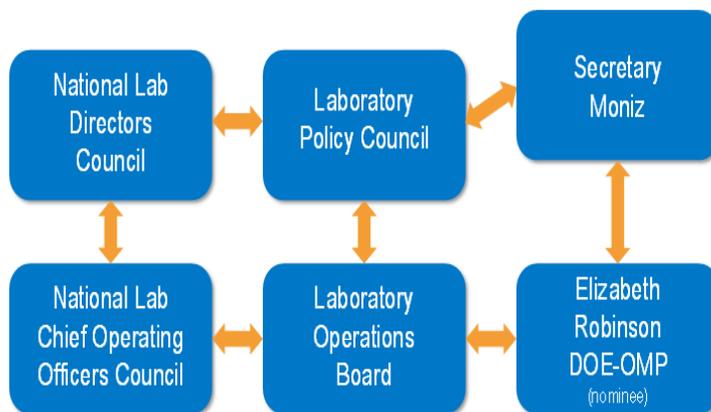
Successfully meeting the increasingly complex national challenges requires involvement of both Federal and contractor experts and organizations in systemic engagement to discuss trends, identify emerging issues, make recommendations, jointly plan and execute effective courses of action. Joint engagement, including laboratory networks, provides opportunities to better inform and link government policies with technologies, budgets, actionable opportunities and realizable courses of action.

As the National Laboratory for the Environmental Management program, SRNL has a strong history of service to all of the current active cleanup sites as well as many additional sites that have achieved cleanup milestones and are now transitioned into long-term legacy management. Through the increased leadership and stewardship from EM-HQ, we are building on that history of performance and playing an ever increasing role in DOE's major cleanup activities nationally and internationally.

While we are the sole designated EM National Laboratory, we are committed to bring the very best science and technology capabilities to bear on critical cleanup challenges whether those resources lie within the DOE National Laboratory complex, academic community or private industry. In recognition of SRNL's ability to build strong collaborations and networks, the laboratory is increasingly relied upon by DOE leadership to lead high priority tasks to include: Hanford Vapors Expert Team, WIPP Technical Assessment Team, Repatriation and Processing of High Temperature Graphite Reactor Fuel, evaluation of Salt Waste Processing options, and leadership of the EM Minority Serving Institutions program.

The SRNL Laboratory Director and Deputy Director participate on the national DOE and laboratory policy and operating councils and boards. SRNL is charged with leading the Secretary of Energy's Laboratory Policy Council in matters regarding the Environmental Management Mission. Under these auspices, SRNL has led a cohort of five DOE national laboratories in developing new concepts for accelerating innovation for the cleanup mission. As a result, the Secretary of Energy has charged his Secretary of Energy Advisory Board to recommend how the DOE can better utilize research and development assets.

### National Leadership Engagement



SRNL also is slated to chair the National Laboratory Chief Operating Officers Council. In this role, SRNL leads efforts to develop laboratory networking, collaboration and support on common operating issues. The Council advises the Laboratory Directors and DOE on specific and department-wide operational issues and improvement opportunities, resource impacts of policy and regulation, and management and operating best practices and lessons learned.

At the government's request, SRNL, as an FFRDC and 'trusted advisor', loans technical and policy experts to DOE and other federal agencies to help provide technical insights and potential implications

on operations, policy questions and emerging issues. SRNL recently provided an Associate Lab Director to the Office of Environmental Management as a National Lab Liaison and subject matter expert.

## 7 Directorates

SRNL Directorates ‘deliver the mission’ and create the scientific and technical innovation necessary to meet the continually evolving challenges to national defense and economic growth. They are designed to focus on our core competencies, capabilities and products to maintain expertise and continue to differentiate us from other National Labs. SRNL operates six Directorates that execute programs, conduct applied research, and support Laboratory business and operations.

<b>Environmental Stewardship</b>
Liquid Waste
Environmental Restoration
Actinide Science
PI-4: Tank Waste

### 7.1 Environmental Stewardship

The Environmental Stewardship Directorate provides unique development expertise and support for applied technology capabilities to assist DOE sites across the nation in meeting legacy cleanup requirements and closure programs as well as process computer modeling to support closure plans. SRNL has deployed numerous technologies for protecting and cleaning up the environment. The Lab’s work spans the fields of soil and water as well as hazardous and radioactive material identification, characterization, stabilization, and cleanup. In addition, The Lab’s proven capabilities in waste processing technology have supported the DOE Complex waste processing needs for over four decades.

### 7.2 National Security

SRNL’s National Security Directorate supports a wide range of national defense, homeland security, remote detection and nuclear material management technologies. Based on our specialized areas of expertise, SRNL is able to provide unique support for security initiatives in fields that include emergence response, urban search and rescue, border protection and law enforcement support. Since its earliest days, SRNL has been a leader in technologies to enhance the safety and cost-effectiveness of the Site’s work with tritium, plutonium and other materials. Over the years emphasis has moved from the production of special materials to the deployment of improved technologies to ensure stockpile safety and reliability as well as proliferation and global threat reduction. That same expertise goes into the development of technologies and techniques for detecting and identifying chemical, biological and radiological materials to address homeland security objectives.

<b>National Security</b>
Defense Programs
Nonproliferation
Global Security
National Security
Counterintelligence
PI-3: Tritium
PI-5: Intelligence

<b>Nuclear Materials</b>
Materials Management
EM Liaison
PI-2: HTGR

### 7.3 Nuclear Materials Program Integration

SRNL’s Nuclear Materials Program Integration Directorate provides life cycle program management and integration of Savannah River Site nuclear materials programs. SRNL provides for national and international integration of nuclear

materials, Global Threat Reduction Initiative (GTRI) material returns and disposition, and fissile materials disposition.

## 7.4 Clean Energy

SRNL’s Clean Energy Directorate consists of Renewable and Nuclear Energy Programs. Renewable Energy includes projects that will reduce greenhouse gas emissions that are key to both national energy needs. Hydrogen, Natural Gas, Fusion Energy, Offshore Wind/Wind Drive Train Testing, Concentrated Solar Power, and Grid Simulation are all part of the research taking place at SRNL. SRNL’s Hydrogen Technology Center continues to advance clean fuels based on the hydrogen technology developed by SRNL over years of tritium research and production. Nuclear Energy includes campaigns established by the Fuel Cycle Technology program: Separations and Waste Forms, Used Fuel Disposition, Nuclear Fuel Storage Transportation Planning Project, Fuel Cycle Options, and investigating technologies to address near-term and long-term objectives of the nuclear fuel cycle. SRNL features a core of expertise that maintain very active applied research and development programs for ongoing DOE missions to manage fuel cycle options, reprocess nuclear fuel, and dispose used nuclear fuel and high level waste.

<b>Clean Energy</b>
Nuclear Programs
Renewable Energy
CI-1: Process Intensification
CI-2: Smart Manufacturing
CI-2: Enterprise Modeling
PI-1: Natural Gas

<b>Science &amp; Technology</b>
Materials Science
R&D Engineering
Analytical Labs
LDRD

## 7.5 Science and Technology

The SRNL Science & Technology (S&T) Directorate oversees the cross-cutting Core Competencies and Capabilities that provide the science & technology base for SRNL programs. These Core Competencies include analytical chemistry and science, materials science & engineering, environmental science, computational science, and specialty equipment and systems design. The S&T Directorate provides technology based solutions to meeting the country’s energy security objectives through multidisciplinary programs of scientific research and applied engineering. The directorate also manages SRNL's discretionary research programs such as LDRD.

## 7.6 Laboratory Operations and Support

The SRNL Operations and Support Directorate include the Research Operations organization which safely operates SRNL Facilities and provides maintenance support to its R&D customers. Standard support functions include: safety, QA, project controls, technology transfer, university partnerships, communications, and the IT/computing. The Directorate also coordinates operations and support functions provided by SRNS including health, security, emergency management, training and qualification, nuclear safety, nuclear material management and assurance.

<b>Laboratory Operations</b>
Business & Workforce Management
Research Operations
Quality Assurance
Communications
CIO
R&D Safety

## Institutional Plan • 2015–2019

This Plan provides a ‘compass for the hard decisions’ we must make to position ourselves as an enduring National Laboratory that solves the nation’s most challenging problems while delivering mission success for the Department of Energy. Our innovation-to-solutions model serves to integrate the strategic and annual institutional plans which are presented separately.



## 8 Putting Science to Work

The SRNL Institutional Plan guides the implementation of SRNL's Strategic Plan to accomplish its three-fold mission: enable success of SRS operations; provide technical leadership for future site missions; and utilize its technical expertise to provide vital national and regional support in achieving the broader goals of DOE and the federal government in a safe manner.

This plan is a living document and will be used as a management tool. It provides a framework that helps us manage our partnerships effectively, maintain our core competencies and retain our employees, improve processes and implement our strategic initiatives effectively. Actions resulting from institutional planning are implemented through SRNL's directorates. This plan is the key document to ensure SRNL remains focused on what is important to us, the site, and our customers, and will be revised annually, as necessary, to maintain relevance and alignment with the evolving missions and strategies.

It also provides an integrating framework for SRNS, the M&O contractor, to increase the effectiveness of SRNL as EM's Corporate National Laboratory across the EM complex, to position SRNL for transition into a financially sustaining, distinct business unit, and to maintain and enhance SRNL as a pre-eminent center for research, development and deployment of technologies for DOE and the Nation.

## 9 Technology and Competence

SRNL is the only national laboratory for the Department of Energy's Office of Environmental Management and is the Laboratory for the nation's only complete nuclear material management facility. It also is continuing to evolve as a multi-program national laboratory that plays a strategic role in the DOE Complex, the region, and the world.

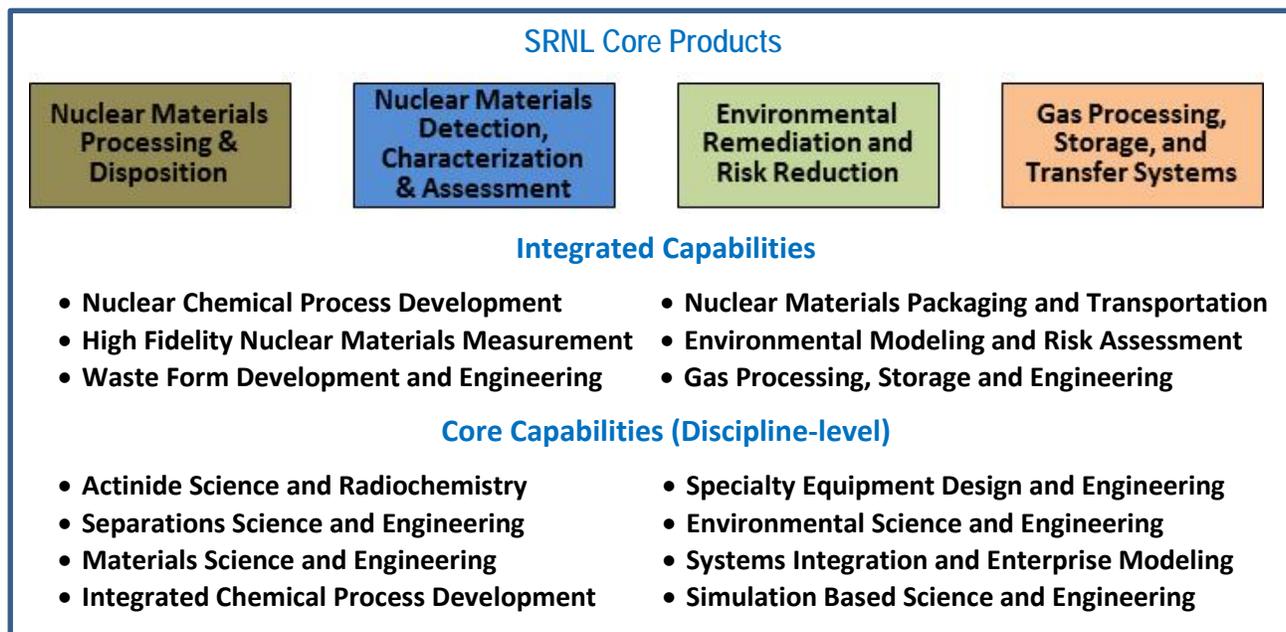
Over sixty years of combined nuclear science and environmental management missions has made SRNL unique, and created the foundation for providing systems science and engineering expertise and innovative solutions to the most complex nuclear, environmental, energy and security challenges—locally, nationally and globally.

### 9.1 Core Products and Capabilities

SRNL conducted a core competency assessment in 2013 to validate and assess the health of the Laboratory's competencies and products that support our key mission objectives and differentiate our research, development, engineering, testing and evaluation from the broader set of DOE and other Federal Laboratories.

Core products provide the tangible link to the solutions our customers are seeking. SRNL has established a dominant/unique position in four core products. This position enables SRNL to shape how these products evolve and their future applications.

SRNL programs create these products by integrating the Laboratory's underlying core capabilities and their associated technologies. These competencies are what have placed SRNL in a unique position to address complex challenges at the intersection of nuclear science and the environment. They provide SRNL's competitive advantage and will allow the Laboratory to branch into related markets as well as provide a significant benefit to existing customers and missions.



## 9.2 Core Capabilities 'State-of-Health'

In general, SRNL is maintaining strength in its process knowledge and expertise in integrated capabilities. Core capabilities are beginning to weaken due to SRNL's limited ability to attract and retain younger scientists and engineers in needed disciplines because of prior funding pressures.

SRNL has extensive access to operating nuclear facilities. This provides SRNL staff the ability to conduct solution-focused R&D, and develop and evaluate enhanced or alternative technologies under actual conditions in controlled, safe environments. However, these operating facilities are incurring steeply increasing operating and maintenance costs due to their age. Budget pressures are limiting Congress' and DOE's ability to fund needed maintenance and refurbishment. Loss of these operating facilities would limit SRNL's ability to continue to create alternative technology for more cost effective environmental remediation and national security applications.

Our ability to address evolving and future environmental and national security challenges depends on leveraging the opportunities we create to sustain and grow SRNL capabilities and customers. SRNL is pursuing strategies and developing initiatives and plans for:

- Baseline funding for SRNL capabilities and consolidated infrastructure
- Talent staffing plans and workforce pipelines with Universities and private industry

- Expanded university collaborations that include private industry and personnel and facility access
- Enhanced customer intimacy to identify emerging opportunities where innovation is needed
- Evolving the developing network of DOE laboratories into strategic partnerships to better leverage unique assets and prioritize available funding

## 10 Laboratory Initiatives

### 10.1 Program Initiatives – Innovative Customer Solutions

Program Initiatives focus on innovating our core products and institutionalizing our customer and market ‘interfaces’ so that emerging challenges and technology come together by foresight and design.

#### 10.1.1 Natural Gas

SRNL has decades of hydrogen gas handling and storage experience and is the DOE complex leader in gas handling, processing, and storage. To meet the needs of EERE & Fossil Energy in greenhouse gas mitigation, SRNL is accepting a challenge to reduce the nation’s reliance on imported oil and increase the GDP by use of natural gas as transportation fuel and other value-added products in the chemical, energy, and transportation sectors. We will lead a multi-lab initiative that defines natural gas storage technical targets, develops core technologies for natural gas storage and use, and establishes SRNL as the Natural Gas Hub through national lab, corporate, and university partnerships.

#### 10.1.2 HTGR Fuel Disposition

SRNL manages the overall Nuclear Materials Management Program for the Savannah River Site, which includes developing and maintaining the Nuclear Materials System Plan and the Nuclear Materials Planning Roadmap. This program management includes developing material processing strategies and techniques, as well as coordinating material receipt in the applicable site facility.

SRNL has accepted the DOE challenge to conduct a feasibility study for High Temperature Gas Reactor (HTGR) fuel disposition that will describe processing alternatives and perform necessary actions for potential receipt and disposition of HTGR fuel pending NEPA action. The principles of Process Intensification and Enterprise Modeling, being developed and implemented under a Competency Initiative, are being employed to reduce project risk.

#### 10.1.3 Tritium Supply

The Savannah River Site is the source of the nation’s only active tritium processing facilities, to include tritium extraction, purification, reservoir loading and unloading, packaging and storage. With these facilities come decades of practical tritium experience in the areas of gas handling, storage, function testing, and accelerated aging effects on materials through operation of the Life Storage Program. SRNL personnel and facilities heavily support the SRS Tritium facilities and this vast experience makes

SRNL the only practical choice for leading a national effort to ensure a robust, sustainable tritium enterprise for the nation.

SRNL has coordinated development of a draft NNSA Strategy for the Gas Transfer System and anticipates funding for tritium production supply chain initiatives in the future. SRNL will work with the Tennessee Valley Authority (TVA) and Oak Ridge National Laboratory regarding enriched uranium supply, in order to better inform studies on tritium production. SRNL will also evaluate the commercial Light Water Reactor tritium production program to identify risks and necessary mitigation.

As an FFRDC, SRNL is acting as ‘trusted advisor’ to NNSA as they evaluate the need for long-term analysis of alternatives to TVA.

#### 10.1.4 Tank Waste

The complexity of waste and needed technical solutions often leaves no Laboratory or company with all the expertise to realistically design, build and implement cost-effective, compliant remediation.

Extensive SRNL experience in developing technologies for waste characterization, process development/refinement, and waste form development at the Savannah River Site has delivered recognized and cost-effective successes in areas such as vitrification, solvents, and tank closures. SRNL is well regarded and positioned to apply these successes, in partnerships, at other domestic and international remediation sites.

SRNL will share this knowledge and experience through technology transfer, and will also apply innovative nuclear chemical manufacturing techniques such as Process Intensification, Smart Manufacturing, and/or Enterprise Modeling to further drive efficiency and reduce cost.

SRNL is developing technical partnerships with the laboratories and contractors operating the tank waste area of the Hanford Site. Because the technical and programmatic challenges at the Hanford Site (tank waste area) are significant and long term, SRNL is establishing a presence, transfer knowledge and experience, and help Hanford operators improve efficiencies. This approach will be applied to other domestic and international sites.

#### 10.1.5 Intelligence

The US Intelligence community recognizes the insights and value DOE national laboratories’ core competencies can contribute to the intelligence effort. SRNL is recognized for its traditional expertise in nuclear material processing, environmental monitoring, tritium production and processing and chemical process modeling.

SRNL will address broader national security issues and expand its contributions in remote sensing, countering weapons of mass destruction, and other areas of critical need. In addition, the Laboratory will explore ‘strategic/technology issues’ as global science and technology evolves.

## 10.2 Competency Initiatives – Innovate Nuclear Chemical Manufacturing

Competency Initiatives focus on advances and breakthroughs in nuclear chemical manufacturing to deliver effective solutions at much lower cost for our missions, and apply them to the nation’s non-proliferation, energy and security challenges.

Institutionalizing any advances in nuclear manufacturing requires long lead times because of the need to address safety, security, health and environmental concerns, which have driven wild cost escalation in the past. In parallel with these competency initiatives, a key opportunity exists to explore the potential impacts of nuclear manufacturing technology innovations and associated implementation costs on existing customers, market needs, products and services.

### 10.2.1 Process Intensification/Smart Manufacturing

The era of “big box” nuclear processing facilities is coming to an end, driven mainly by large capital and life-cycle costs. The nation must create improved and new technologies and tools that deliver compliant environmental remediation that increases the rate of cleanup progress and reduces total costs (construction, maintenance and operations).

Nuclear processing is 30+ years behind the chemical process industry. SRNL has focused on the necessary innovations—Process Intensification (PI) and Smart Manufacturing (SM)—to aid both the Department and Nation in completing its missions and potentially driving new industrial opportunities. Process Intensification focuses on manufacturing in small, modular, flexible facilities using materials at the molecular level and new devices to handle the materials. Smart Manufacturing focuses on on-line, real-time process models with budget/production decisions made on-line in real time.

Based on experience in the non-nuclear chemical industry, SRNL expects to apply these developing competencies to nuclear chemical manufacturing and obtain benefits that include:

- Reduced capital costs in time of constrained budgets
- Reduced nuclear safety and criticality controls due to smaller material quantities
- Improved ability to develop inherently safe processing technologies and approaches
- Increased flexibility for process upgrades
- Reduced sample collection and radioactive material handling
- Reduced life cycle (including D&D) costs with a smaller footprint
- Integrated, on-line business and production decision making
- Enhanced efficiency and reduced total costs

SRNL is actively exploring options to proceed with pre-conceptual design of an Advanced Manufacturing Center, in partnership with key stakeholders, that would apply the process and manufacturing innovations in a new, collaborative facility. SRNL’s Program Initiatives could potentially apply process and manufacturing innovations to elements not involving nuclear materials. Proof of benefits would open the way for applications to nuclear manufacturing.

## 10.2.2 Enterprise Modeling

Enterprise models that dynamically simulate entire economies and markets have been in place and used for several decades. More recently, many large corporations have successfully developed and implemented engineering models to dynamically manage their manufacturing operations, entire supply chains and global logistics. Application of enterprise modeling to nuclear chemical manufacturing offers the potential to enhance the expected benefits from PI/SM. SRNL is exploring near term application of these techniques to accelerate development in our Program Initiatives.

# 11 Laboratory Operations

## 11.1 Performance Management

### 11.1.1 Planning

SRNL's annual planning process ensures integration and alignment of all our planning elements, including the strategic plan, strategic goals, program and competency initiatives and institutional plan. SRNL's Laboratory Plan FY15-19 is aligned with the DOE Strategic Plan, the EM Annual Performance Agreement, and the NNSA Strategic Plan. It also aligns with other planning documents including the DOE Savannah River Site Strategic Plan, other relevant DOE program guidance and direction, and strategic guidance provided by SRNS. Because of the significant amount of work that SRNL conducts for agencies and organizations outside of DOE, the SRNL planning process also accounts for non-DOE goals and objectives (consistent with SRNL's DOE mission assignments and technology base).

SRNL manages an integrated annual planning schedule that aligns with SRNS and DOE schedules. The Laboratory Plan is reviewed and revised annually, as needed, to reflect progress and to ensure alignment with current DOE-EM, NNSA, Corporate, and internal goals.

The Laboratory Plan sets the high-level vision, direction, operational strategy and initiatives for SRNL. Laboratory Directorates translate this plan into program and project plans to maintain core capabilities, and integrate core products into system-level engineering solutions for our Federal, public and private customers. Subordinate major Laboratory plans address human capital, infrastructure, communications, and Laboratory partnerships.

### 11.1.2 Performance Measures

SRNL management uses an integrated set of performance measures to manage risk and work execution. Measures fall into six categories. Example measures include:

- Customer Focus – Corporate scores; Site Office scores, completion and delivery of customer milestones and Performance Baseline Incentives
- Products & Services – Technical and schedule measures for projects, programs and the Laboratory; mission share; external reviews

- Financial/Market – Cost and schedule measures for projects, programs and the Laboratory; mission share
- Human Resources – Project, programs and Laboratory productivity; talent recruiting and retention; capability and program critical skills and staffing
- Process Management – Process and procedure maintenance; corrective actions and closures
- Governance & Social Responsibility – Standard measures of performance in safety, health, security, QA, emergency management, training and qualification, nuclear safety, nuclear material management, assurance, project controls, technology transfer, and university partnerships



By its nature, DOE national laboratories must accept and manage risks because complex technical challenges to national security simply must be addressed and solved. SRNL incorporates contractual and corporate risk management requirements into an approach that enhances the ability of individuals involved to identify the risks they face and to properly evaluate, communicate, and address them. SRNL’s approach begins by recognizing that risks fall into three categories. Management mitigates these risks with appropriately designed strategies and constantly reviews status and results in management reviews and through oversight.

### Risk Categories and Management Strategies

Category	Description	Management Strategy
Preventable	Internal to the organization, controllable, eliminate or avoid	Prevent – monitor operational processes and guide individual behavior and decisions to required standards (rule-based)
Strategy	Voluntary acceptance to create solutions for complex problems	Mitigate – monitor performance and adjust plans to reduce the probability that risks materialize
External	Beyond organizational influence or control	Identify and Mitigate – apply foresight to anticipate, develop mitigation options; if discovered in hindsight, rapidly mitigate

## 11.2 Communications

The secrecy required to build the Savannah River Plant and produce basic materials used in nuclear weapons insulated the Site from needing to communicate broadly for most of its existence. A dawning awareness and knowledge of the large scale and long lived effects of budget deficits, pollutants and radioactive materials (to name a few) has dramatically increased demands to operate responsibly.

Today, all stakeholders expect SRNL to measure and manage its impact on society (locally, regionally, nationally and globally). Conversely, when the public believes SRNL should, but is not, taking more responsibility for something it is doing, the public takes action and seeks recourse.

Our communications strategy begins by recognizing that SRNL must manage awareness and understanding of all impacts (good and bad) we could have. Acknowledging these allows SRNL to

SRNL Impact	Response	Example
Directly traceable to	Take ownership: measure & manage	Environmental Remediation
Contributes to	Take action: provide expertise	STEM Education
Chooses to	Take interest: use trusted parties	United Way

establish communications priorities, set measurable goals, and develop and deliver messages and information that are appropriate and coherent.

The communications messages will center on how SRNL manages its business and on how it manages the other effects it has on society. Impacts fall into three categories: those directly traceable to SRNL operations, those to which SRNL operations contribute and those in which SRNL chooses to influence. Examples are shown in the table.

SRNL communicates with a variety of different stakeholder audiences, with a particular emphasis on DOE and NNSA and their various offices; Congress and their staffs; universities and business partners; the local community; economic development organizations; employees; community leaders; and a number of others.

The strategy employs a variety of media, including print, video, website, social media, and speaking engagements. When and where appropriate, our preference is personal engagement. Face-to-face communication creates the opportunity to listen and allows for immediate detection and correction of any misunderstanding. It also physically demonstrates interest and ownership. Therefore, a great amount of effort is expended by the laboratory leadership to engage with the stakeholders directly using media products to facilitate communication of the lab’s message.

SRNL recently practiced this strategy during a meeting of the SRNL External Advisory Board. A discussion session brought together the Board members, SRNS President, SRNL Laboratory Director, local university leaders and community leaders from the surrounding counties. Many topics were discussed including local jobs, new technologies and partnership opportunities.

SRNL has a small communications office staff that coordinates with SRNS Public Communications to provide materials and products to support these communications efforts. The communications office ensures that SRNL is responsive to DOE on matters that support customer-directed laboratory communications, and also provides materials that support the various products and distribution channels maintained by the SRNS Corporate Communications staff. In addition, the communications office has a Protocol Officer that is the primary point of contact for both DOE and SRNS on matters pertaining to tours and visits at SRNL and conferences where SRNL will either participate and/or exhibit.

## 11.3 Resource Management

### 11.3.1 Human Capital

As a national laboratory, SRNL people are our greatest asset. They are essential to supporting and developing scientific and engineering innovations to address our critical environmental, security and energy missions.

Almost half of laboratory staff will reach full retirement eligibility within a few years. Workforce age and chronic Federal budget pressures combine to affect SRNL’s ability to attract and retain qualified talent in both technical and non-technical positions.

Laboratory core capabilities are beginning to weaken due to SRNL’s limited ability to attract and retain younger scientists and engineers in needed disciplines. Laboratory facilities and equipment degradation is also reducing our ability to retain younger employees in several critical and in-demand fields.

To address these trends, SRNL, in concert with SRNS, has developed and is executing the SRNL Human Capital Management Plan (February 2014). SRNL’s strategy focuses on 1) maintaining ‘core staffing’ for a suite of technical and business competencies in sufficient numbers to sustain the Laboratory now and in the future, and 2) succession planning. The SRNL core competency assessment, completed in 2013, forms the foundation for this approach. Staffing trends, staffing affordability and succession planning are reviewed by SRNL management on a quarterly basis.

### **Core Staffing**

Recruiting focuses on developing talent pipelines with Universities (Section 12.4) and professional societies for entry-level staff in critical disciplines. Development efforts for these new hires emphasize early mentoring with seasoned staff to transfer and reduce the loss of institutional knowledge.

Active intern and post-doc programs provide rapid access to new ideas, techniques and research being pursued at Universities in critical disciplines that help maintain SRNL relevancy. They also provide an opportunity to train and evaluate potential employees while they complete mission work on diverse and challenging projects. Hiring limited-term-employees (LTE) is under active review. LTE’s allow flexibility in recruiting and retaining critical staff for limited duration projects and programs.

Retention focuses on providing growth opportunities for staff in terms of different assignments (within the laboratory and with customers), training, laboratory-directed research, and professional interactions with peers at other Laboratories and in industry. Degraded facilities are being addressed as limited funding permits. Retention options under active development include joint appointment/employment with Universities, expanding loans to Federal customers and enabling longer term assignments at several locations where SRNL has long duration programs.

Several development activities have been underway for several years and are continuing. Among them are enhanced laboratory communications on compensation and promotion, technical presentations, expanded mentoring, professional development, and rotational assignments.

Workforce recognition activities include laboratory acknowledgement of professional honors, as well as Laboratory awards for life-time contributions, annual key contributions and individual Spot awards.

### **Succession Planning**

The aging workforce, potential for re-competition of the SRNS management and operating contract, and increasing demand for high level talent, combine to create ‘one-deep’ talent in critical disciplines and encouragement for valuable senior leaders and key staff to leave.

Succession planning addresses six essential elements. In concert with SRNS, SRNL has established succession planning for each Associate Laboratory Director, their direct reports, and critical positions in each organization.

Succession Planning Elements
Target positions
Role requirements
Succession candidates
Turnover risk
Candidate readiness
Development plans

### 11.3.2 Infrastructure

A decade has passed since the National Research Council assessment of DOE Facility Management and Infrastructure Renewal (2004) offered seven recommendations after concluding that "...reinvestment in DOE facilities and infrastructure is generally inadequate to sustain an acceptable level of performance." As recently as 2010 in a review of DOE's Environmental Management Cleanup Technology Roadmap, the National Academy of Science (NAS) strongly emphasized that "the complexity and magnitude of EM's cleanup task require the results from a significant, ongoing R&D program," and confirmed that the core capabilities and infrastructure of the national laboratories will be needed to address the challenges in EM mission.

SRNL participation on the National Laboratory Operating Board (LOB) assessment of infrastructure across the laboratories is providing strategic insights into DOE complex-wide conditions. The increasing age of EM infrastructure and the enduring mission for SRNL suggest that a transformational change in how we maintain, acquire and utilize facilities seems necessary. Addressing deferred maintenance alone at SRNL is not enough, as old facilities are often insufficient to support cutting-edge science and other program objectives.

Discussions with other DOE laboratories, plants and sites reveal a few principles being used to guide evolving approaches to the chronic under-investing in facilities and infrastructure. These principles work in concert with developing DOE strategies to continue critical investments in new major projects while excessing facilities and upgrading and renovating basic infrastructure.

- Reserve limited DOE capital funding for high risk, critical facilities, infrastructure and equipment
- Create near-term operating and maintenance savings with rapid, aggressive consolidation, where feasible
- Invest Contractor-generated savings in on-site IGPP projects and mission facilities
- Relocate low/no risk mission facilities outside of protected/limited areas or off-site
- Increase work in non-DOE owned facilities through partnering and third party funding/construction, facility sharing/leasing

Given these insights, SRNL will develop an Infrastructure Consolidation Roadmap and transition strategy in FY15. The roadmap will be based on mission usage and required mission capabilities and the condition status and deferred maintenance as reported to DOE. Space/equipment needs will be evaluated to determine potential footprint reductions for assets that SRNL currently maintains. Assessments will include determining objectively where facilities should be enhanced, obsolete facilities and capabilities eliminated, and unnecessary duplication removed.

Current priorities are to vacate Radiological Buildings (e.g. F Area laboratories), Limited Area buildings (e.g. 736-A), and other buildings/trailers outside the limited area.

This roadmap and follow-on plans will support SRNL's input to the SRS 10 Year Site Plan and the evolving DOE-wide infrastructure strategic plan. Strategies and plans will be properly coordinated with SRNS and with all appropriate DOE offices.

In late FY15/early FY16, SRNL will develop a plan for new/upgraded physical plant capabilities and facilities. Planned consolidation initiatives would be funded through Institutional General Plant Projects (IGPP) and implemented in FY15-17.

In parallel with these efforts, SRNL intends to develop collaborative partnerships that can create viable options for acquisition and use of third party facilities for low risk portions of customer-funded mission work.

### 11.4 Management Review and Oversight

Reviews are the routine evaluation of whether individual work, projects, programs and management systems are performing as intended and producing the desired results as efficiently as possible. Management reviews and oversight provide the ongoing “due diligence” that fills the gap between day-to-day work activities and periodic formal assessments.

SRNL Management Reviews and Calendar



SRNL has a formal management review process and integrated schedule that provide cascading oversight, reviews and feedback on a continual basis. Customer, SRNS and external reviews are integrated into the SRNL review process.

- DOE-SR and NNSA customers hold monthly meetings with SRNL management to review performance, progress on common milestones and other areas of interest.
- The Lab Director and /or Deputy Lab Director holds bi-weekly and quarterly Senior Staff reviews to monitor progress being made by the organization and internal and PBI milestone completion.
- Associate Lab Directors perform periodic reviews with their section managers to monitor progress on milestones and identify issues requiring additional management attention to ensure milestone completion.
- Program and project reviews are planned and conducted based on the nature of the work and customer requirements.

The SRNL External Advisory Board (EAB) provides independent objective assessments and advises the Laboratory Director on all aspects of Laboratory management and operations. It is composed of nationally respected senior leaders from industry, government, and other national laboratories.

SRNL will augment the EAB in early 2015 with an External Review Committee (ERC), and extended review panels. The ERC will be chaired by a South Carolina top research University. The ERC will bring together nationally recognized university experts in SRNL's core product and capability areas to review and provide advice on technical and scientific relevance, quality, performance and facilities operations.

SRNL performance is reported to SRNS, DOE-SR, NNSA, EM and our customers in a wide array of monthly, quarterly and annual reports.

## 12 Laboratory Partnerships and Networking

Today SRNL and the Nation find an environment of constant change and increasingly unprecedented challenges. In response, SRNL participates in many types of partnerships to apply its knowledge, expertise, processes and resources in solving critical national issues. Technically difficult problems have innumerable causes, are tough to describe, frequently come with extreme disagreement among the interested parties, and often cannot be permanently solved. Innovations and workable solutions require partnerships and networking among companies, laboratories, governments and countries because no entity may have the knowledge, expertise, processes or resources to realistically build and provide everything.

### 12.1 Laboratory Directed Research and Development (LDRD)

Laboratory Directed Research and Development is a congressionally authorized program that provides the 'seed corn' from which many of the Laboratory's multi-discipline advancements are made in both science and technology. The program is the backbone for insuring that scientific, technical and engineering capabilities can meet current and future needs. It is an important tool in reducing the probability of technological surprise by allowing laboratory technical staff room to innovate and keep abreast of scientific breakthroughs. The synergism among the EM and NNSA missions, work from other federal agencies and LDRD is the key element in maintaining the vitality of SRNL's technical programs.

The LDRD program aims to position the Laboratory for new business in clean energy, national security, nuclear materials management and environmental stewardship by leveraging the unique capabilities of the Laboratory to yield foundational scientific research in core business areas, while aligning with SRS strategic initiatives and maintaining a vision for ultimate DOE applications.

The FY15 LDRD Program focus areas are as follows:

**Nuclear Materials Management & Environmental Stewardship** – Unique concepts that lead to new approaches and options for critical EM risk reduction challenges in processing high activity

liquid waste and nuclear materials, remediating contaminated soil, groundwater and facilities, as well as validating long-term remediation strategies are needed.

**Clean Energy** – Advance research in development, demonstration, and deployment of clean energy technologies; enhance associated development and commercialization of intellectual property. Innovative technologies to assure the future utilization of clean, reliable energy that dramatically improve the energy efficiency of industrial, manufacturing, transportation, and/or building technologies and strengthen SRNL’s Core Capabilities are required.

**Non-Proliferation & Nuclear Deterrent** - Unique concepts that address national security mission area needs that are currently underserved by the DOE Lab system. Game-changing innovations and tools that advance the national security agenda for the United States Government, including monitoring, nonproliferation, and deterrence are needed.

The SRNL LDRD Program operates under the auspices of SRNS Operating Contract and follows the requirements contained in DOE O 413.2B Admin Chg 1, Laboratory Directed Research and Development. The program is documented in the FY15 SRNL LDRD Program Plan.

## 12.2 Work for Others (WFO)

SRNL conducts work for Federal agencies and non-Federal customers on a reimbursable basis. This makes the Laboratory’s highly specialized and unique technical expertise and equipment, much of which does not exist anywhere else in the U.S, available to other Federal agencies, State and local governments, universities and industry to address other national challenges, strengthen the technology base, transfer technology for commercialization, improve competitiveness and accomplish goals that may otherwise be unattainable and avoids potential duplication of research efforts.

Non-DOE funded research related to ongoing DOE research at the laboratories helps leverage DOE research by further developing needed technical expertise and providing complementary research results.

The FBI’s Radiological Evidence Examination Facility is an example where the Department of Justice leverages SRNL’s unique facilities and expertise to examine and process radiologically contaminated evidence. SRNL works with the FBI to develop innovative forensics technologies and techniques and uses its expertise to provide radiological crime scene training to FBI agents from around the country.

The SRNL WFO Program operates under the auspices of SRNS Operating Contract and follows the requirement contained in DOE Order 481.1C, Work for Others and DOE Order 484.1, Admin Chg 2, Reimbursable Work for the Department of Homeland Security. The program is documented as part of the SRNL FY15 Technology Transfer Plan.

## 12.3 Technology Transfer

Technology Transfer facilitates the efficient and expeditious development, transfer, and exploitation of federally owned or originated technology to non-DOE entities for the public benefit and enhances the accomplishment of DOE missions; and leverage DOE resources through partnering.

The FY15 program continues and builds upon FY14 initiatives to increase positive commercialization impacts by:

- Strengthening the strategic alignment of the intellectual property portfolio with SRNL core business objectives and
- Continuing to promote SRNL partnerships and collaboration through engagement with regional and national technology transfer entities

### **2014 Innovation Summit**

Based on last year's success, SRNL is continuing its partnership with GRU to co-sponsor the second annual 'Innovation Summit' in Augusta, Georgia focused on the local Central Savannah River Area (CSRA). The Innovation Summit brings together federal, university, commercial, and local entities to promote technology and innovation across the region.

### **University Research**

Research universities in the Southeast continue to be central to SRNL's innovation and economic assistance strategies. SRNL is currently in discussions with South Carolina's top research universities, Clemson and USC, to expand collaborations in technical areas of mutual interest and to develop technical assistance programs that more directly help the State's economy.

### **National User Facility**

SRNL is working with DOE, Clemson University and private industry to develop an e-GRID National User Facility in Charleston, SC. This facility would be a first-of-its-kind 15 mega-watt sandbox/simulation user facility and will promote development of new technologies that can be marketed by private industry.

### **Small Business Technical Assistance**

An initiative is currently underway for increased engagement with South Carolina Department of Commerce (SCDC) to identify potential funding and partnering opportunities to deliver SRNL expertise to small businesses across the State of South Carolina. SCDC has Small Business Administrative offices around the State that can be influential in publicizing the capabilities, expertise, and technology available from SRNL. Growth of this relationship between SCDC and SRNL has the ability to promote the National Lab to a wider audience throughout the State providing technology transfer opportunities and stimulation of the South Carolina from an economic standpoint as well as potential job creation.

### **External Program Review**

SRNL is currently awaiting feedback on possible areas for improvement from Technology Ventures Corporation (TVC) following TVC's visit to SRNL to discuss the laboratory's technology transfer processes, activities, and performance.

The SRNL Technology Transfer Program operates under the auspices of SRNS Operating Contract and follows the requirements of Public Law and additional Departmental guidance. The program is documented in the SRNL FY15 Technology Transfer Plan.

## 12.4 University Programs

Partnerships with Universities allow SRNL to take full advantage of global research and innovation, to facilitate access to world-class faculty, and enhance undergraduate and graduate teaching and research experiences that enable the critical skills talent pipeline.

The University Program plan defines the framework for aligning university partnerships with SRNL core competencies. The Plan addresses elements needed to implement the SRNL vision and provides a University-focused platform for technological growth, increased research collaboration, pursuit of joint funding opportunities, and improved workforce development and business practices.

The FY15 program continues and builds upon new FY14 emphasis to align university partnerships with SRNL core competencies. Objectives focus on:

- Enhancing SRNL's core products and capabilities
- Supporting university research and growth objectives
- Providing opportunities for SRNL personnel to engage in collaborative research in a university environment
- Providing a talent pipeline for critical skills
- Stimulating economic growth through improved technology transfer with university partners to encourage entrepreneurship and start-up companies

### **University Scholars Program**

For FY15, SRNL is developing a new partnership program with Universities to further enhance the talent pipeline. The University Scholars Program would target high potential STEM undergraduates in regional universities. The program would provide seniors the opportunity to work on SRNL research problems under the guidance of an SRNL PI and faculty advisor.

The overall program goal is to expose regional students to the exciting employment opportunities at SRNL and in the local area while providing valuable and challenging, hands-on work. As the students gain this experience and develop relationships with laboratory personnel, SRNL will be more likely to be successful recruiting, hiring and retaining top students. The program would begin with students at University of South Carolina, Aiken and expand to other schools in the region based on experience and resources.

### **Minority Serving Institution Program**

SRNL has accepted the DOE-EM challenge to redesign and then manage the Minority Serving Institution Program.

The DOE Office of Environmental Management (DOE-EM) recognizes the need to develop and recruit the innovative scientists, engineers and other technical professionals that will complete the important legacy environmental cleanup mission that is already well underway. Minority representation in critical science and engineering fields is an important part of DOE-EM's vision for this future workforce. To help meet this vision, the DOE-EM Minority Serving Institution (MSI) Program has been designed to enlarge the pipeline of minorities with science and engineering experience in areas important to the success of the DOE-EM mission. The MSI Program does this by providing support in two ways:

1. Internships and other on-site work opportunities – programs where students can go out and work with National Laboratory and DOE site contractors in ways that are designed to provide minority S&T students with direct experience and skills related to the DOE-EM mission, and
2. Competitive research opportunities - where undergraduate science and engineering students work as part of a research team through their home institution to develop and submit research proposals in response to calls in research areas that are critical to DOE-EM needs. These opportunities are designed to help the colleges and universities seed and develop research programs in areas of need for DOE-EM, as well as give minority science and engineering program students experience in working on an R&D program.

The MSI program is documented in the FY15 Minority Serving Institution Program Plan and the MSI Research/Internship Opportunity Announcement.

The SRNL University Program operates under the auspices of the SRNS Operating Contract and follows the requirements of Public Law and additional Departmental guidance. The program is documented in the SRNL FY15 University Program Plan.

## Acknowledgements

Special thanks to all members of the Laboratory Leadership Team, Directorate managers and SRNL staff for their dedicated work in developing and articulating the Strategic Goals, Program and Competency Initiatives and Directorate and Program descriptions.

