

**DESCRIPTION OF AGENDA ITEM FOR CONSIDERATION**

March 4, 2024

**Research Partnerships and Workforce Training Programs  
In support of the Battelle Savannah River Alliance  
Savannah River National Laboratory **REVISED PLAN****

Submitted Jointly by: University of South Carolina, South Carolina State University, and Clemson University

**DESCRIPTION:**

Proviso 11.24 of the fiscal year 2023-24 Appropriations Act appropriated \$40 million for the Battelle River Alliance, allocated among Clemson University, University of South Carolina, and South Carolina State University. Prior to fund distribution, the proviso required the institutions submit to the Commission on Higher Education a comprehensive plan and timeline for how the \$40 million will be utilized to further the mission and support the Savannah River National Laboratory. After review by the Commission on Higher Education, the plan then needed to receive review and comment by the Joint Bond Review Committee and approval by the State Accountability Authority before the institutions could receive and expend the funds.

The institutions submitted their plan to the Commission on Higher Education in Fall 2023. The plan was reviewed favorably by the Executive Committee on November 28, 2023, and by the full Commission on Higher Education on December 7, 2023. However, when the Joint Bond Review Committee reviewed the plan at its January 24, 2024, meeting, it did not report the plan out favorably. Rather, the Joint Bond Review Committee directed staff to work with the Commission on Higher Education and other interested parties to develop additional accountability measures and periodic reporting requirement for inclusion in the plan prior to its next meeting scheduled for March 20, 2024.

Commission on Higher Education staff met with staff from the Governor's office and University of South Carolina, South Carolina State University, and Clemson University to include additional accountability, transparency, and reporting requirements in their plan. These efforts culminated in the revised plan now before the Committee on Finance and Facilities for its review. The main substance of the report remains the same as originally approved by the Commission on Higher Education in December 2023. Revisions include more frequent reporting, such as quarterly expenditure reports to the Commission on Higher Education, and more defined program measures and targets.

# Capital Improvements Joint Bond Review Committee

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January 24, 2024

Mr. Georges Tippens  
Deputy Director and General Counsel  
South Carolina Commission on Higher Education  
1122 Lady Street  
Columbia, SC 29201

Dear Mr. Tippens:

At its meeting today, the Joint Bond Review Committee reviewed the plan submitted pursuant to Proviso 11.24 of the Fiscal Year 2023-24 Appropriations Act, which provides among other things for funding to South Carolina State University, the University of South Carolina, and Clemson University that must be expended collaboratively in support of the Battelle Alliance. The Proviso further provides that a comprehensive plan must be submitted to the South Carolina Commission on Higher Education, which is subject to the review and comment of the Joint Bond Review Committee, and approval of the South Carolina State Fiscal Accountability Authority. The Commission's Board approved the plan on December 7, 2023.

Following its review, the Committee observed that, while the plan as submitted includes expenditure plans and program metrics, accountability measures and reporting requirements are not as well-developed. Accordingly, the Committee directed staff to work with the Commission and other interested parties in developing additional accountability measures and in establishing periodic reporting requirements to be included in the plan, with any recommendations reported back to the Committee at its next meeting scheduled on March 20, 2024.

Committee staff will contact you in the next week to discuss compliance with this directive. In the meantime, please advise if you have any questions.

Very truly yours,

F. Richard Harmon, Jr.  
Director of Research

c: Mr. Grant Gillespie, Executive Director  
Mr. Delbert Singleton, Authority Secretary  
South Carolina State Fiscal Accountability Authority

**R. Wes Hayes, Jr.**  
*Chairman*



## MEMORANDUM

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**To:** Delbert Singleton, Secretary, State Fiscal Accountability Authority

**From:** Georges Tippens, Deputy Director and General Counsel, Commission on Higher Education

**Date:** January 25, 2024

**Subject:** Battelle Alliance at Savannah River National Lab

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Proviso 11.24 of the South Carolina Fiscal Year 2023-24 General Appropriations Act directed South Carolina State University, the University of South Carolina, and Clemson University to develop and submit to the Commission on Higher Education a collaborative comprehensive plan and timeline for how they will expend \$40 million of state funding to support the Battelle Alliance. The proviso also stated that prior to any allocation or expenditure of funds the plan must be approved by the Commission on Higher Education's Board, receive review and comment by the Joint Bond Review Committee, and be approved by the State Fiscal Accountability Authority.

By letter dated December 21, 2023, I informed Mr. Rick Harmon and Mr. Grant Gillespie that the Commission on Higher Education's Board approved the plan and timeline at its December 7, 2023, meeting.

At its January 24, 2024, meeting, the Joint Bond Review Committee directed its staff to work with the Commission on Higher Education and other interested parties in developing additional accountability measures and in establishing periodic reporting requirements for inclusion in the plan and that those changes be reported back to the Joint Bond Review Committee at its scheduled March 20, 2024, meeting.

Based on the directive from the Joint Bond Review Committee, I respectfully request that the State Fiscal Accountability Authority delay its review of the plan until its scheduled March 26, 2024, meeting. Commission on Higher Education staff will collaborate with the institutions, Joint Bond Review Committee staff, and other interested parties in developing additional accountability measures and reporting requirements. These additions will be reviewed by the Commission on Higher Education's Board at its scheduled March 7, 2024, meeting.

**Cc:** Mr. Rick Harmon, Director of Research, Joint Bond Review Committee  
Mr. Grant Gillespie, Executive Director, State Fiscal Accountability Authority  
Mr. Wes Hayes, Chairman, Commission on Higher Education  
Dr. Karen Woodfaulk, Acting President and Executive Director, Commission on Higher Education



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# Research Partnerships and Workforce Training Programs



**Boosting Workforce Development**



**Next Generation Scientists & Innovators**

**High Impact Science**

**In support of the Battelle Savannah River Alliance  
Savannah River National Laboratory**

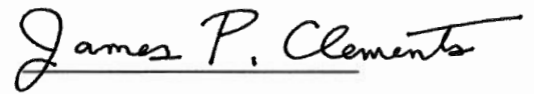
# Leading the way—Research Partnerships and Workforce Training Programs

Submitted Jointly by

**Dr. Michael Amiridis**  
President,  
University of South Carolina

**Alex Conyers**  
President,  
South Carolina State University



**Dr. James Clements**  
President,  
Clemson University

## Executive Summary

The research partnership and workforce development programs as described below which support the Battelle Savannah River Alliance, LLC (BSRA) and the Savannah River National Laboratory (SRNL) are developed and operated by Clemson University, South Carolina State University, and the University of South Carolina System (Columbia and Aiken campuses). These institutions will use the \$40 million authorized by the South Carolina legislature, with the support of Governor Henry McMaster, to support our workforce development (WFD) initiatives. BSRA, LLC operates the SRNL with support from its five subcontractor universities (Clemson, Ga Tech, University of Georgia, South Carolina State University, and the University of South Carolina System). BSRA, which is wholly owned by Battelle Memorial Institute, was awarded the SRNL management contract on December 22, 2020.

The overall objectives of this research partnership and workforce training program are to:

1. Develop and operate a long-term workforce development pipeline that will provide SRNL with new talent at the Bachelors, Masters, and Doctoral levels;
2. Enhance the research and educational capacity of the SC universities with hiring of new faculty and research staff; and
3. Support the SRNL employee base by providing topic-specific and focused training.

This plan will enable SRNL to grow and expand its impact from a national and international perspective. SRNL must attract, motivate, and train a diverse world-class workforce to execute BSRA's Vision. The universities will employ outreach strategies that ensure and expand participation by South Carolina residents.

To fulfill the obligations of the BSRA proposal and Governor McMaster's funding commitment, the SC universities plan a workforce development program that includes the following elements:

- Precollege Student Program to develop the future workforce with programs for students and teachers (USC Aiken and SC State)
- Undergraduate Student Program, to support scholarships and research opportunities for STEM and relevant disciplines (Clemson, SC State, USC Columbia, and USC Aiken, producing a cumulative 115 new STEM Bachelors degrees)
- Graduate Student Program, to grow the domestic research workforce seeking Masters and Doctoral Degrees (Clemson and USC Columbia, producing a cumulative 55 new advanced degrees)
- Postdoctoral Scientist Program, to support university research and to encourage careers as permanent staff to the Lab (Clemson and USC Columbia)
- Experienced Scientist Program, to add new faculty, research staff, and visiting scholars to the university talent pool, thus increasing research collaborations and competitiveness for increased funding of SRNL and SC institutions.
- Professional Development of SRNL Employees, to provide cutting-edge skills and knowledge (Clemson, SC State, USC Columbia, and USC Aiken)

The South Carolina universities have had and will continue to have substantial collaborations with SRNL and BSRA, LLC. The universities and the SRNL have annual collaborative meetings and student poster sessions each year. Students and graduates from the universities apply for and fill summer internships and postdoctoral positions available at SRNL. University personnel are members of the BSRA, LLC Board of Directors. The University of South Carolina Aiken hosts the SRNL-operated Advanced Manufacturing Collaborative, a public-industry research facility, which is scheduled to open in 2025.

## Table of Contents

Executive Summary.....	3
Background on SRNL.....	5
The Universities and Their Current Relationship with SRNL.....	6
The University of South Carolina System.....	6
South Carolina State University.....	8
Clemson University.....	8
Ongoing Collaborative Activities.....	9
New Workforce Development Activities Supported by State Funding.....	10
Objectives.....	10
Program Metrics and Accountability.....	11
Common Program Elements and Budget Categories.....	12
Budget Breakdown and Spend Plan.....	14
Schedule of Engagement.....	16

## Background on SRNL

The Savannah River National Laboratory (SRNL, or the Lab), one of seventeen national labs for the U. S. Department of Energy (DOE), became an independent, federally funded research and development center (FFRDC) in 2021, with the award of the Management and Operations (M&O) contract to Battelle Savannah River Alliance LLC (BSRA). BSRA is a subsidiary of Battelle Memorial Institute, which manages eight other DOE National Labs. Prior to 2021, SRNL was managed by Savannah River Nuclear Solutions LLC, an industrial contractor, and was but one component of the overall site operations.

The University of South Carolina System (USC Columbia & USC Aiken), Clemson University (CU) and South Carolina State University (SCSU) were active participants with Battelle in crafting their M&O proposal to DOE. The universities were assigned a specific role in workforce development (WFD) for the Lab. A brief timeline of activities from proposal writing to award is given below:

- **January 2020-July 2020:** BSRA capture team enlists five universities (USC system, Clemson, SC State, UGA, and Georgia Tech) whose role in the M&O proposal is “Workforce Development.”
- **August 2020:** Governor McMaster provided a letter of commitment to seek \$100M in state funding in support of the three SC universities and their efforts in workforce development<sup>2</sup>.
- **Dec. 22, 2020:** BSRA LLC was selected as M&O Contractor. Each university is a subcontractor to BSRA and holds a voting membership on the BSRA Board of Directors.
- **June 2023:** With the support of Gov. McMaster and university leaders, the SC legislature authorized \$40M for the three SC universities<sup>4,2</sup>.

SRNL has a unique role within the Department of Energy’s national laboratory family for two specific reasons:

- First, SRNL is the nation’s leading research and development center for the DOE Office of Environmental Management (EM) and Office of Legacy Management (LM).
- Second, SRNL serves a critical role for the National Nuclear Security Administration (NNSA) in both weapons and nonproliferation programs. SRNL provides effective solutions for these national programs.

<sup>1</sup> South Carolina Budget [FY 2023-2024 South Carolina Budget - South Carolina Legislature Online \(scstatehouse.gov\)](https://www.scstatehouse.gov/budget)11.24. (CHE: Battelle Alliance at Savannah River National Lab) Of the funds appropriated for the Battelle Alliance, twenty percent shall be allocated to South Carolina State University, forty percent to the University of South Carolina, and forty percent to Clemson University. The funds must be expended collaboratively to conduct research partnerships and develop workforce training programs designed to fill engineering, science, research, and management positions. The three universities shall provide the Battelle Alliance with accredited academic personnel, intellectual capital, and resources necessary to build out research capabilities and programs. Prior to the allocation or expenditure of any funds, the three universities shall collaborate and submit to the Commission on Higher Education a comprehensive plan and timeline for how the funds will be utilized to further the mission and support of the Savannah River National Lab. The plan also must be reviewed by Battelle for alignment with laboratory missions and university goals. This collaborative plan must be submitted to the Commission on Higher Education and approved by its Board of Commissioners. After approval of the plan, the commission shall submit the plan to the Joint Bond Review Committee for review and comment and to the State Fiscal Accountability Authority for approval before any funds can be allocated or expended. If the plan is not approved by June 30, 2024 by the Commission on Higher Education, Joint Bond Review Committee, and State Fiscal Accountability Authority, all funds must then be remitted back to the general fund of the state. Funds allocated for this purpose shall not be transferred or utilized for any other purpose.

<sup>2</sup> The University of South Carolina System was included in the original BSRA SRNL proposal to DOE so both the USC Columbia and USC Aiken’s campuses and resources could be used for the SRNL workforce development effort.



DOE expects SRNL to grow and modernize to ensure it meets the future mission needs for the Department. SRNL has three top-level mission areas: 1) Environmental Management and Legacy Management; 2) National Security; and 3) Science and Energy Security. As a multi-program applied science national laboratory, SRNL's focus is delivering high quality scientific and technology solutions. SRNL utilizes science, technology, engineering, and math (STEM) expertise in the chemical, biological and physical sciences, and engineering, as well as high performance computing, to discover new materials, improve system performance, develop advanced manufacturing solutions, augment inspection approaches, enhance energy systems, and drive new control strategies for critical assets. In addition to its STEM workforce needs, SRNL and BSRA are creating the modern support infrastructure of functional organizations that will enable growth in innovative programs and technical areas.

Specifically concerning workforce development, SRNL must attract, motivate, and train a diverse, world-class domestic workforce to execute BSRA's Vision. **Therefore, the SC universities will use the \$40M appropriation (which is the first installment in the governor's pledge of \$100M) to support a WFD initiative that will provide SRNL with a long-term pipeline for new talent acquisition by recruiting and educating the state's residents while also bringing in additional talent as needed from around the country.** This WFD initiative will also further the careers of the existing employee base at SRNL. The SC universities have world-class programs and facilities to educate the workforce in all the STEM fields that support the Lab. In addition, the SC universities each have programs in business, finance, accounting, communication, social science, and other non-STEM areas that will support the infrastructure of the Lab. The universities also have formal programs for outreach to the technical college system; these include several articulation agreements in various degree programs, and infrastructure such as the Center for Workforce Development at Clemson and Palmetto College at USC Columbia. Recognizing that a strong enduring national laboratory requires a talented, diverse workforce, the inclusion of Historically Black Colleges and Universities (HBCUs) and an intense focus on minority-serving institutions is purposefully infused into BSRA's vision by including an HBCU (SC State) as a principal partner.

## The Universities and Their Current Relationship with SRNL

### The University of South Carolina System

SRNL and the USC system have conducted a host of joint research projects funded by the laboratory and DOE. Research projects span the breadth of USC Columbia's College of Engineering and Computing and College of Arts and Sciences as well as USC Aiken's campus. Projects cover subjects such as advanced catalysis for upcycling plastic waste, molten salt technology for advanced nuclear reactor designs, new crystalline materials for immobilizing nuclear waste, machine learning for designing and evaluating advanced energy materials, and advanced sensors for monitoring nuclear storage sites and for nuclear non-proliferation. USC Columbia is home to the McNair Center, the Horizon energy and materials building, the Artificial Intelligence Institute, the DOE Energy Frontiers Research Center for Hierarchical Waste Forms, and facilities including the Electron Microscopy Center and the X-Ray Photoelectron Spectroscopy Center, all of which have supported SRNL collaborations. USC Columbia currently has two jointly appointed faculty with SRNL. USC Aiken is the site of the DOE-sponsored Advanced Manufacturing Collaborative (AMC), which is a \$60 million facility scheduled to open by the first quarter of 2025. The AMC, which will be operated by SRNL, will have unique capabilities and will bring together SRNL with academia and industry for collaboration.

**Impact of State Funds:** The USC System will broaden their current programs in pre-college, undergraduate, and graduate education, as well as through recruitment of post-doctoral scholars and new faculty who will collaborate and raise significant funding for WFD and research.

USC Columbia's goals are to strengthen the partnership by focusing on recruitment of domestic undergraduate and graduate students, thus serving SRNL's requirement of a domestic workforce serving their missions in national security and resilience. This will be done by coordinating recruitment efforts across the relevant science, technology, engineering, and mathematics (STEM) disciplines, by offering financial aid in the form of research internships in the summer and academic semesters, and by providing nationally competitive stipends for graduate students and post-doctoral research.

The USC system will also increase the number of faculty working in fields that support SRNL's three broad mission areas. USC's fields of interest include chemical and nuclear process chemistry and engineering, cyber-physical security, energy generation and storage, and data science in support of basic chemistry and materials discovery, advanced manufacturing, and national security. New faculty will train the workforce by teaching and by mentoring students in their research projects. Faculty will also collaborate with SRNL and with BSRA partners to win large, funded projects from DOE and other federal agencies. Funds will be spent to equip and update laboratories in support of existing and new faculty hires.

USC Aiken's most impactful SRNL workforce development contributions will be in the areas of cybersecurity, computer science, and engineering. The state funds will ensure USC Aiken acquires excellent faculty to train students in these high demand fields as the enrollment and maturity of the programs continue to grow over the next several years. Specifically, the funds will ensure USC Aiken can support SRNL WFD in computer science, cybersecurity, and engineering. Several programs such as mechanical engineering, process engineering, data science, and cybersecurity are growing at rate of more than 10% year over year to help meet the demand of the region. The funds will continue the growth in these programs and allow USC Aiken to teach the expanded cybersecurity, computing sciences, and engineering curriculum and provide robust high impact learning opportunities such as internships, cooperatives, and capstone projects. USC Aiken has been designated a Center of Academic Excellence-Cyber Defender program by the National Security Agency and requires additional faculty in cybersecurity and engineering to provide for the technical workforce development demands for the SRNL/AMC, and technical workforce in the region. USC Aiken has a high rate of students attending from the region and remaining in the community upon graduation. This is a key element for these high demand fields. The programs align very well with the DOE's and regional industry strategic workforce development goals and applied research outcomes for cyber, computing sciences, manufacturing, and engineering workforce outcomes. USC Aiken engages tens of thousands of K-12 students each year in STEM activities. These activities are provided to K-12 students and teachers through the Ruth Patrick Science Center and the academic departments; with this plan we will augment these programs with activities such as the GenCyber Camps, a topic of high relevance to the Lab. USC Aiken's science and engineering curriculum is based on providing high impact undergraduate experiences including industry led capstones, undergraduate research, and internships with strong workforce ready outcomes. USC Aiken collaborates with more than forty regional companies, SRNL, SRMC, on SRNS on capstone projects and internship opportunities for undergraduate students. Of the funds allocated for the system, 10% will be allocated to USC Aiken.

## South Carolina State University

South Carolina State University (SCSU) is a historically Black, public, 1890 land-grant senior comprehensive institution, located in Orangeburg, South Carolina. SCSU is committed to providing affordable and accessible, quality baccalaureate programs; programs of particular interest to SRNL include business, applied professional science, mathematics, natural sciences, engineering, engineering technology, and education. SCSU has operated its Environmental Field Station with SRNL since 1995. In collaboration with SRNL, the field station offers a variety of Environmental Science courses and provides opportunities for students to participate in research projects. In addition, SCSU has conducted a number of joint research projects funded by the laboratory and DOE in areas such as: 1) Natural Attenuation Progress, Plume Movement, and Source Reduction for volatile organic compound (VOC) plumes; 2) Data Acquisition and Temporal Data Mining (TDM) System Health Physics commissioning (ISD) Sensor Network Test Bed; 3) Analyze of Fission Products from Nuclear Processes and Technology; 4) Detection of Sphingomonas Strains for use in Polycyclic Aromatic Hydrocarbon Degradation; 5) Radiochemistry/Health Physics/Nuclear Engineering; and 6) Enhancement of Environmental Remediation Monitoring and Student Training. Also, SCSU currently has one jointly appointed faculty with SRNL.

**Impact of State Funds:** The SCSU College of Science, Technology, Engineering, Mathematics, and Transportation (CSTEM-T) is organized into the Department of Engineering, Department of Engineering Technology, Department of Computer Science and Mathematics, and the Department of Biological and Physical Sciences. Through these administrative units, the college provides the educational setting, the laboratories, the programs, and the faculty to assist students in developing the professional and technical competencies required to function effectively in their career fields. CSTEM-T is committed to strengthening its biological and physical sciences, mathematics and computer science, and engineering departments that are directly relevant to the SRNL mission. The SRNL funding will support tenure-track faculty hires in specific areas of interest including environmental engineering and sciences (biology; chemistry and radiochemistry), health physics, nuclear engineering, and cyber security and networking. SCSU will also support significant scholarships, fellowships, and SRNL internships for its undergraduate students. Further, the state funding will support: 1) two Centers of Excellence (Center for Energy and Environmental Solutions and the Center for Nuclear Criticality and Radiochemistry); 2) the placement of faculty (jointly appointed at SRNL) in mission-relevant areas; 3) the establishment of two pre-college institutes (Summer Bridge Program and Summer Science Institute); and 4) lab enhancements, namely equipment and modifications to conduct cutting-edge research and provide a high-quality educational experience to STEM students.

## Clemson University

Clemson University has collaborated closely with SRNL for more than four decades on a wide range of initiatives. Clemson's Center for Nuclear Environmental Engineering Sciences and Radioactive Management (NEESRWM) has worked with SRNL scientists on environmental health physics, radioactive waste processing, environmental risk assessment, the nuclear fuel cycle, radiation detection and measurement, environmental radiochemistry, environmental remediation, nuclear forensics, and radioecology. Clemson's Dominion Energy Innovation Center is a \$100 million world-class facility that houses (i) eGRID (Electrical Grid Research Innovation and Development), a 15-megawatt hardware-in-the-loop grid simulator; and (ii) the world's most-advanced wind-turbine drivetrain testing facility capable of full-scale highly accelerated mechanical and electrical testing of advanced drivetrain systems for wind turbines. The Dominion Center supports education, research, and economic development to

speed new electrical technologies to market. Clemson and SRNL scientists have collaborated on grid modernization and cyber physical security-related projects. SRNL scientists have frequently utilized Clemson's Electron Microscopy Facility, which has more than \$20 million in state-of-art, high-resolution transmission electron microscopes, scanning electron microscopes, a combined Focused Ion Beam (FIB)/SEM microscope, and scanning X-ray photoelectron spectroscopy microprobe for a wide range of specimens. Other key Clemson units have ongoing relationships with SRNL, including the Center for Advanced Manufacturing (CAM), the Clemson Vehicle Assembly Center, the Center for Workforce Development (CUCWD), the Clemson Nanomaterials Institute and the Advanced Materials Innovation Complex (AMIC) facility under construction in Clemson.

**Impact of State Funds:** Clemson will develop several workforce development programs, including undergraduate scholarships, graduate fellowships, and postdoctoral scholar support programs for domestic students, particularly South Carolina students. These efforts will cover STEM disciplines aligning with the principal focus areas of SRNL and will link the work at SRNL to students' fields of study.

Clemson will hire interdisciplinary faculty and research scientists with established research and educational reputations to support the mission of SRNL in the areas of advanced materials and manufacturing, energy generation, storage and distribution, artificial intelligence, cyber-physical security, and nuclear environmental management and security. State funds will be critical for providing competitive start-up packages and research infrastructure, as well as stipends, to highly sought talent. These faculty will train the next generation of workers to meet the SRNL's needs, as well as to collaborate with SRNL scientists to attract competitive research funding from federal agencies and industries. As indicated in the BSRA proposal to DOE, Clemson will also make a cluster hire of research scientists and engineers in power electronics and power systems research for the eGRID facility at the Dominion Energy Center to support the national security mission area of SRNL. This will provide critical mass and expertise unavailable elsewhere nationally and will advance technologies from lower to higher TRL levels.

Funds will also be instrumental in updating world-class laboratory equipment aligned with SRNL mission areas, providing students and researchers access to the latest fabrication and characterization equipment in support of environmental management, advanced manufacturing, national security, and science and energy applications.

This endeavor will build upon decades of collaborative research between Clemson and SRNL. Current formal relationships are through BSRA joint faculty appointments (under a comparable model to the current SRNL/Clemson Joint Appointee Professor Brian Powell), and large research initiatives such as the Mesoscale Transport and Flux Facility (MTaFF). We expect these funds to enable deeper and broader collaborations with SRNL and other BSRA partners.

### Ongoing Collaborative Activities

In the 2+ years since BSRA assumed management of the Lab, the South Carolina universities have been active participants in many collaborative initiatives with the Lab.

- **BSRA LLC Board of Directors:** The Board holds three in-person meetings per year, at locations alternating between the site, one of the member universities, and so far, one meeting in Washington DC. Each university provides one Board member; Professors Tanju Karanfil (CU), Louis Whitesides (SCSU), and Michael Matthews (USC System) are the Board representatives for their respective institutions. Board meetings typically include the Director and two Deputy Directors of SRNL, as well as selected Associate Lab Directors and the Director of Innovation and University

Engagement. After each meeting, the Board makes detailed recommendations to the Laboratory Director.

- Mission Committee of the BSRA LLC Board: The Mission Committee meets three times per year, in advance of the full Board meetings. The Mission Committee reviews programs including new initiatives and new funding, current and planned facilities and testbeds, and progress toward in this university-Lab WFD collaboration. The Mission Committee reports to the full BSRA Board.
- SRNL Annual Collaboration Exchange meetings: SRNL organizes a major meeting each summer, focusing on selected research priorities of the Lab. The universities will continue to support faculty, post-doctoral researchers, and students to participate in the meeting. The meeting results in one-on-one interactions with Lab researchers, leading to development of funded programs.
- SRNL Student poster sessions: The Lab hosts two poster sessions each year. This allows Lab personnel to interact with SC university students at the undergraduate, graduate, and post-doctoral levels, with a primary goal of introducing university students to careers in the Lab.
- SRNL Summer Intern program: The Lab hosts qualified undergraduate and graduate students for summer research internships, where they are supervised and mentored by Lab personnel. The SC university partners, along with the Lab-relevant faculty, promote these opportunities to our students. SRNL has established a formal presence in the career placement centers of each university; this is another avenue by which internship and permanent job openings are advertised.
- SRNL Post-doctoral Fellowships: The Lab has a robust program to recruit domestic post-doctoral scientists and engineers to two-year positions at the Lab. University Joint Appointees collaborate with SRNL staff to prepare funding proposals for these positions, and the university collaborator then participates in mentoring of the postdoc and in publishing scientific results. One goal is to turn these into permanent Lab staff positions. Another desired outcome would be for the postdoc to accept a faculty position at a SC university, thus maintaining strong intellectual and collaborative relationships over the long term.

## **New Workforce Development Activities Supported by State Funding**

### **Objectives**

The overall objective of this research partnership and workforce training program is to develop a workforce development pipeline that will provide SRNL with new talent. As the partnership matures, we will also respond to the Lab's requests for short courses and certificates that support the professional development of its employee base. As a result of these activities, after five years the SC Universities expect to double DOE and energy-related research funding from the current base of approximately \$40M in new awards annually to a sustainable \$80M in new awards per year.

As originally proposed to DOE, the universities will develop a multi-tiered WFD initiative comprising (Table 1):

- 1) precollege student workforce pipeline;
- 2) undergraduate student programs;
- 3) graduate student programs;
- 4) post-doctoral scientist program; and
- 5) research and continuing professional development program.

Currently, staff who work within the Lab must be able to obtain security clearance, thus the emphasis on domestic students and especially a focus on SC students. The University of South Carolina System, SC

State University, and Clemson University will use state funding to support the various tiers of the WFD initiative along with programmatic operations necessary to provide coordination.

### Program Metrics and Accountability

Table 1 below summarizes the aggregated metrics that will be reported as required by the state (a detailed breakdown by university is given in Table 3 following). The metrics shown are headcounts, for example, number of pre-college students attending events, number of students undergraduates receiving scholarships or conducting research, or number of new hires. The three universities will also report WFD outcomes to the BSRA LLC Board of Directors, which meets three times each year. Board meetings are an additional mechanism to ensure collaboration and accountability among the partners. While this plan encompasses three years, it is recognized that specific accomplishments will vary from the original plan. Because university personnel are members of the Battelle Savannah River Alliance, LLC (BSRA), all annual plans for the expenditure of funds will be approved by BSRA.

The universities must report quarterly to the Commission on Higher Education (CHE) regarding the expenditure of funds by program element on a form developed by CHE. CHE will then provide this information to the House Ways and Means Committee, the Senate Finance Committee, and the Office of the Governor. The universities will annually present a report to CHE documenting expenditures incurred, and progress made toward achieving the objectives.

**Table 1.** Programmatic Metrics.

Tiers	Programs & Activities	3-Year Goals
Pre-College Student Workforce Pipeline	Summer Bridge Program (SCSU)	150 students
	Summer Science Institute (SCSU)	150 teachers
	GenCyber Camps (USC-Aiken)	150 HS students; 100 STEM teachers
	Summer Scholars Institute USCA	90 students
	Summer math bridge pgm USCA	100 students
	Support to local STEM education K-12 RPC Cyber outreach	300 teachers
Undergraduate Student Programs	Undergraduate fellowships or research assignments	125 undergraduates
	Graduate fellowships	60 graduate students
Graduate Student Programs	Graduate Student Stipends and Fellowships	55 graduate students
Postdoctoral Scientist Program	Post-doctoral fellowships	13 postdocs
Research and Continuing Professional Development Program	Visiting scientists	5 visiting scientists
	New Hires-Faculty <sup>3</sup>	20 new hires
	New Hires-Scientist/Staff	6
	Certifications/coursework for SRNL staff	50 SRNL employees

<sup>3</sup> New faculty hires will be made in areas that mutually support the core competencies needed for SRNL mission and the academic disciplines of the SC universities. SRNL mission priorities include environmental remediation, nuclear materials processing, data science and computer simulation, energy security, engineering and advanced manufacturing, nuclear non-proliferation, and national security including cyber-physical security. Accordingly, the SC universities currently expect that the 20 hires shown will be in the following academic disciplines: Chemistry and Materials Science-4; Electrical Engineering-3; Computing Sciences-3; Chemical Engineering-3; Mechanical and Nuclear Engineering-4; Physics-1; Environmental Science/Engineering including Biology-2.

## Common Program Elements and Budget Categories

Specific activities to be funded are described in the Common Program Elements below; Elements 1-5 correspond to the Program Metrics (Table 1) and to the first five lines in “Program Element” of Table 2, Budget Breakdown, which follows. Each institution will internally fund efforts in the various tiers in keeping with their institutional missions and focus areas. Table 2 also shows the planned expenditures by Program Element for each individual institution.

1. Precollege Student Workforce Pipeline Programs (USC Aiken and SC State) – SCSU will establish a Summer Bridge Program and a Summer Science Institute to serve pre-college students and teachers, especially those that are historically under-represented in STEM fields. The three-year Goal is 150 participants in each program. The Summer Bridge Program will be a 5-week program for high school students who have been accepted into a STEM program at SCSU. The Summer Science Institute will allow the participants, who are high school science teachers, a chance to work with SCSU faculty and undergraduate and graduate students, perform research, and visit SRNL facilities. In addition, the participants will have the opportunity to hear discussion on research topics by professors from other universities (Clemson and University of South Carolina) and SRNL. Each participant will develop classroom science materials and take several resources back to the classroom, which is an excellent way for educators to increase their SRNL/science knowledge and gain valuable hands-on experience that will invigorate excitement in the classroom and raise their comfort level in teaching a science curriculum.

Expansion of the Ruth Patrick Science Center program at USC Aiken will focus on increasing the cybersecurity workforce via the GenCyber Camps, which will reach 150 students and 100 teachers over the course of this plan. USC Aiken will also expand its engineering workforce with The Summer Scholars Institute (a summer research activity) and the Summer Math Bridge program, for students requiring additional math preparation before starting college STEM courses.

2. Undergraduate Student Programs (All SC institutions) – The universities will offer a combination of undergraduate fellowships supporting academic year research with DOE-oriented faculty, and summer research programs that will help identify undergraduate students to recruit for graduate programs. For these summer programs, SRNL staff will participate by offering lab tours and opportunities to interact with research staff. There will be a strong focus to attract South Carolina students from STEM departments around the state. The cumulative goal is at least 115 new BS degrees in STEM fields.
3. Graduate Student Programs (Clemson and USC Columbia) – To meet the SRNL and DOE missions, domestic graduate students will be recruited by the universities and will be trained by junior and senior faculty working with SRNL in mission relevant areas. A full stipend and tuition for a predetermined period, at a level that is roughly equivalent to a National Science Foundation (NSF) graduate fellowship, may be offered. Alternatively, for graduate students with existing support a stipend supplement or a grant for tuition may be offered. The collective goal is to support at least 55 domestic graduate students to obtain their advanced degrees.
4. Postdoctoral Scientist Programs (Clemson and USC Columbia) – Approximately 13 Postdoctoral scientists will be recruited by the universities for typically two-year appointments. STEM post-docs will be selected to work with university faculty in SRNL mission-relevant areas. Postdoctoral

scientists will be introduced to collaborators at SRNL. Through this program, the postdoctoral scientists will be equipped to continue a professional career supporting the DOE mission, either at the Lab or in another professional capacity.

5. **Research and Continuing Professional Development Program (All SC Institutions)** – A key component of this joint plan is for the universities to (a) add new Lab mission-relevant faculty and (b) to recruit visiting scientists to conduct joint research. These personnel will connect world-class skills and expertise of the BSRA academic partners with new program activities in each SRNL mission area (e.g., environmental management, national security, energy, science). Our goals include 32 new faculty hires, 8 visiting scientists, and 6 hires at the level of research scientist/staff to support large research teams and interdisciplinary projects. For new STEM faculty hires on 9-month contracts, a portion of the startup expenses (i.e., lab equipment and renovations and some salary in the summer) will be funded using the allocated state budget, according to university policies. These faculty will be recruited with the goal of increasing collaborative DOE and energy-related research funding within the state of South Carolina. Visiting scholars will spend a sabbatical year jointly between the universities and the Lab. This is a strategic tactic for recruiting leading researchers into South Carolina universities and to SRNL. Appropriate departmental appointments for visiting scholars will be arranged on a case-by-case basis, and may include appointments as an adjunct, visiting or research (non-tenure track) faculty member.

An additional goal in the original BSRA proposal to DOE was to develop focused technological education programs (e.g., short courses and/or credentials) for the continuing professional development of approximately 50 SRNL staff. (Note that no new bachelors or graduate degree programs will be developed using state funding.) This professional development effort for SRNL will be greatly enhanced by completion of the \$20M Joint Workforce Development facility, funded in 2022 by the state legislature and currently in planning in downtown Aiken, SC. In general, these educational programs will be in STEM fields such as actinide science, cyber security, nuclear and radiation safety, data science, virtual reality, advanced manufacturing, environmental analysis, or additional subjects such as business and project management. The specific topics will be identified during the execution of this plan.

6. **Equipment and Lab Infrastructure (All SC Institutions)** – Refer now to Table 2. SRNL's plans for WFD call for significantly enhanced collaborative research and education with its university partners. Supporting the SRNL mission areas require cutting-edge equipment and laboratories at the universities, as well as in the Lab. Equipment and infrastructure will support recruitment of faculty and students, collaborative research with Lab personnel, and competitiveness in seeking federal funding. Each university plans investments in areas including cyber physical security, nuclear science and engineering, chemistry and materials science, grid infrastructure, and data science.
7. **Program Management and Seed Programs (All SC Institutions)** – To ensure collaborative execution of this WFD plan, each institution will fund personnel to assist with program management. The university program managers will coordinate recruitment, marketing, collaborative travel, and messaging. A critical need for the Lab is to recruit and retain domestic staff to work at the Lab. The typical undergraduate or graduate STEM student has no awareness of the types of careers and work available in a national laboratory setting. So, in addition to the



Program Elements described above, USC System, CU, and SC State will develop and support an annual “National Laboratory Career Day” to be held annually on a rotating basis on one of our campuses. The overall program will invite National Lab employees to meet face to face with STEM students; this event will allow for question-and-answer as well as formal presentations. The desired goal of the Career Day is to create awareness and interest in careers, thus helping create and fill the pipeline for the future workforce. The universities also intend to use Program Management funds in the form of seed grants for highly meritorious activities that have high potential to lead to increased funding from DOE.

### Budget Breakdown and Spend Plan

Table 2 shows the anticipated total expenditures plus commitments under each program element described above. (Note that the color coding in Table 2 corresponds to Table 3, the Schedule of Engagement.) The planned period of expenditures plus commitments is based on three years (36 months) from the time of awarding of the funds. The timing of expenditures depends strongly on success in recruitment of domestic faculty, students, and staff. Faculty recruitment especially is highly competitive, and negotiations are sometimes protracted. The universities will report budget activities as follows: actual expenditures, commitments made to new hires when offers have been accepted, and as commitments made to authorize the searches for the positions. When offers are accepted, we will be better able to predict an actual schedule of expenditures. We will update Tables 2 and 3 based on our progress, which will help us to improve our projections for following years. Our goal is to have all funds committed by the end of Year 3. We have assumed a start date of 1 July 2025, the beginning of fiscal year 2025. The budget lines in Table 2 are estimated based upon internal university planning. Funding may be reallocated from different programs as the overall program fully matures and lessons learned are incorporated by each university and the Lab.

**Table 2.** Budget breakdown by school and program element. Spending plan for FY25 through FY27 by school and program element.

Program Element	USC System	Clemson	SC State
Precollege Student Workforce Pipeline Programs	\$0.29M	\$0.00	\$0.71M
Undergraduate Student Programs (Scholarships; GI Bill; summer research)	\$0.82M	\$0.60M	\$2.40M
Graduate Student Programs	\$2.99M	\$1.05M	\$0.00
Postdoctoral & Research Scientist Program	\$1.20M	\$2.13M	\$0.00
Professional Development of SRNL Employees (New Faculty Appointments, Visiting Scholars, Sabbatical, Education)	\$7.72M	\$9.00M	\$2.82M
Equipment and Lab modifications	\$2.02M	\$2.30M	\$1.59M
Program Mgmt./Seed Program	\$0.96M	\$0.92M	\$0.48M
<b>Total</b>	<b>\$16,000,000</b>	<b>\$16,000,000</b>	<b>\$8,000,000</b>

**Table 2 (continued).** Budget breakdown by school and program element. Spending plan for FY25 through FY27 by school and program element.

Clemson	Total Budget (All Years)	FY2025 (12 mos)	FY2026 (12 mos)	FY2027 (12 mos)
Undergraduate Student Programs (Scholarships; GI Bill; summer research)	\$600,000	\$150,000	\$300,000	\$150,000
Graduate Student Programs	\$1,050,000	\$245,000	\$525,000	\$280,000
Postdoctoral & Research Scientist Program	\$2,130,000	\$675,000	\$1,065,000	\$390,500
Professional Development of SRNL Employees (New Faculty Appointments, Visiting Scholars, Sabbatical, Education)	\$9,000,000	\$3,150,000	\$3,150,000	\$2,700,000
Equipment & Lab modifications	\$2,300,000	\$1,800,000	\$500,000	
Program Mgmt./Seed Program	\$920,000	\$306,667	\$306,667	\$306,667
<b>Clemson Totals</b>	<b>\$16,000,000</b>	<b>\$6,326,667</b>	<b>\$5,846,667</b>	<b>\$3,827,167</b>

University of South Carolina System	Total Budget (All Years)	FY2025 (12 mos)	FY2026 (12 mos)	FY2027 (12 mos)
Precollege Student Workforce Pipeline Programs	\$290,000	\$48,000	\$125,000	\$117,000
Undergraduate Student Programs (Scholarships; GI Bill; summer research)	\$820,000	\$120,000	\$400,000	\$300,000
Graduate Student Programs	\$2,990,000	\$450,000	\$1,270,000	\$1,270,000
Postdoctoral & Research Scientist Program	\$1,200,000	\$200,000	\$500,000	\$500,000
Professional Development of SRNL Employees (New Faculty Appointments, Visiting Scholars, Sabbatical)	\$7,720,000	\$2,500,000	\$3,720,000	\$1,500,000
Equipment & Lab modifications	\$2,020,000	\$525,000	\$1,195,000	\$300,000
Program Mgmt./ Seed Program	\$960,000	\$320,000	\$320,000	\$320,000
<b>USC System Totals</b>	<b>\$16,000,000</b>	<b>\$4,163,000</b>	<b>\$7,530,000</b>	<b>\$4,307,000</b>

South Carolina State University	Total Budget (All Years)	FY2025 (12 mos)	FY2026 (12 mos)	FY2027 (12 mos)
Precollege Student Workforce Pipeline Programs	\$710,000		\$355,000	\$355,000
Undergraduate Student Programs (Scholarships; GI Bill; summer research)	\$2,400,000	\$240,000	\$1,080,000	\$1,080,000
Professional Development of SRNL Employees (New Faculty Appointments, Visiting Scholars, Sabbatical)	\$2,820,000	\$1,380,000	\$1,200,000	\$240,000
Equipment & Lab modifications	\$1,590,000	\$530,000	\$795,000	\$265,000
Program Mgmt./ Seed Program	\$480,000	\$160,000	\$160,000	\$160,000
<b>SCSU Totals</b>	<b>\$8,000,000</b>	<b>\$2,310,000</b>	<b>\$3,590,000</b>	<b>\$2,100,000</b>
<b>SC Schools Yearly Totals</b>	<b>\$40,000,000</b>	<b>\$12,799,667</b>	<b>\$16,966,667</b>	<b>\$10,234,167</b>

## Schedule of Engagement

Table 3 shows current plans for specific WFD activities and the associated engagement of individuals (students, teachers, and various professionals). “Engagement” means that an individual is identified with an activity (for instance, a student is receiving a scholarship, or a new faculty member is hired). The universities operate on summer, fall, and spring schedule, with summer terms beginning mid-May. Because FY 25 starts 1 July 2024, in the middle of a summer term, engagement in summer 2025 is mostly zero except for high-school oriented activities at USC-Aiken, where SRNL WFD funds will augment their already-planned programs. Overall, engagement in FY 2025 will be low compared to subsequent FYs because of the timing of the funds and the lag in advertising, recruitment, and outreach efforts. We plan for three full summers (2026, 2027, and 2028); headcounts shown in FY 27 cover summers of CY 27 and 28.

While Table 1 shows the aggregated goals for the SC universities, Table 3 shows new engagements by term for each university. The entries in Table 3 are distinct headcounts, for instance, a scholarship or fellowship offered to a new student. Note that an undergraduate receiving a fellowship in a given academic term would continue receiving that fellowship in subsequent terms. In the case of undergraduate and graduate students, the entries marked with an asterisk (\*) represent the number of degrees that we expect to grant, including years beyond these three FYs. The hiring of research scientists and new faculty are likewise distinct headcounts. The cumulative headcount goals for each activity program are shown in the last column. We plan to commit all funds by the end of FY 2027, but students on fellowships, or new faculty receiving funds for starting up laboratories may incur expenditures beyond FY 2027.

Referring to the several teacher- and student-oriented rows in Table 3, these activities will commence in FY 2025 at USC Aiken. The universities anticipate offering the first round of undergraduate scholarships in Fall of FY 2025 and ramping up the intake of students in the next two fiscal years. Summer undergraduate research activities will begin in FY 2026, and we plan to support UG research for three summers. The recruitment of domestic graduate students for the STEM fields is challenging; we will ramp up recruitment and outreach in FY 2025 to increase the number of incoming students in subsequent years.

Subsequent rows in Table 3 concern hiring of research staff, new faculty, and other professionals. The timing of these is more difficult to predict because of the challenging marketplace and the time required for recruitment and negotiation of offers. Given the timing of the WFD funds, start dates in Fall 2025 are not probable so the first incoming professionals are planned for in Spring of FY 2025, or January of CY 25. The equipping of laboratories and the purchase of equipment will follow the arrival of new faculty and professional staff.

These SRNL WFD activities will lead to a doubling in energy and SRNL-related federal awards, not only from the Department of Energy/SRNL but from agencies such as the National Science Foundation, Army Research Office, and others that have related programs in materials science, environmental engineering, energy science and security, cyber security, and other fields related to the SRNL mission. In the current funding climate, “workforce development” has become a consistent theme even in traditional basic research funding, so establishing a strong workforce development program in South Carolina with these funds will position our universities to significantly leverage this initial \$40M investment. Our new faculty and professional staff hires will submit additional proposals that complement our existing expertise. This, along with the increase in the domestic research workforce, will position the universities in an enhanced competitive position. We expect a two-to-one leveraging of the state’s \$40M investment, leading to \$80M in new funding cumulatively that can be directly associated with this plan.

**Table 3.** Detailed Schedule of Engagement by Institution and Academic Term (\* indicates students who should receive a degree)

Clemson	FY2025 (12 mos)			FY2026 (12 mos)			FY2027 (12 mos)			Cum. Count
	Su	F	Sp	Su	F	Sp	Su	F	Sp	
Activity										
Undergraduate Scholarships & GI Bill students		5			15			20		40*
Summer undergraduate research students				10			20			30
Incoming Graduate Students		5			10					15*
Postdoctoral Students & Research Scientist Program			3		2					5
Research Scientists hired		1	2							3
Visiting Scholars incl. sabbaticals					2			2		4
New faculty hired			4		3		3			10
Laboratories equipped and outfitted					2		3			5
New professional development courses					1			1		2

University of South Carolina System	FY2025 (12 mos)			FY2026 (12 mos)			FY2027 (12 mos)			Cum. Count
	Su	F	Sp	Su	F	Sp	Su	F	Sp	
Activity										
GenCyber Camp-HS students	40			55			55			150
GenCyber Camp-Teachers	20			40			40			100
Summer Scholars Institute	30			30			30			90
STEM Teacher Outreach-RPC	100			100			100			300
Undergraduate Scholarships & GI Bill students		5			20			20		45*
Summer undergraduate research students				20			40			60
Incoming Graduate Students		5			20			15		40*
Postdoctoral Students & Research Scientist Program			1		3			4		8
Research Scientists hired		1		1						2
Visiting Scholars incl. sabbaticals					2		2			4
New faculty hired			2		5			4		11
Laboratories equipped and outfitted					2		5			7
New professional development courses					1			1		2

South Carolina State University	FY2025 (12 mos)			FY2026 (12 mos)			FY2027 (12 mos)			Cum. Count
	Su	F	Sp	Su	F	Sp	Su	F	Sp	
Activity										
Summer Bridge Pgm-HS Students				50			100			150
Summer Science Inst.-Teachers				50			100			150
Undergraduate Scholarships & GI Bill students			5		15			10		30*
Summer undergraduate research students				5			10			15
Research Scientists hired			1							1
New faculty hired			3		4			4		11
Laboratories equipped and outfitted					3		4			7
New professional development courses						1			1	2