

PART I—THE SCHEDULE

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SECTION C—DESCRIPTION/SPECIFICATIONS/WORK STATEMENT

C-1 Introduction

- (a) The mission for Oak Ridge National Laboratory is to deliver scientific discoveries and technical breakthroughs that will accelerate the deployment of solutions in clean energy and global security, and in doing so create economic opportunity for the nation. The Oak Ridge National Laboratory supports the Department of Energy's mission to ensure America's security and prosperity by addressing energy, environmental, and nuclear challenges through transformative science and technology solutions. Oak Ridge National Laboratory, subsequently referred to as the Laboratory, is a multi-program Department of Energy (DOE) National Laboratory and a Federally Funded Research and Development Center (FFRDC) established in accordance with the Federal Acquisition Regulation Subpart 35 under the cognizance of the Office of Science (SC). The Laboratory, as established by DOE, maintains a wide variety of highly specialized capabilities and technical expertise in materials science, neutron science, and computational science, among other disciplines. The Laboratory performs work for all DOE programs including Science, Electrical Delivery and Energy Reliability, Energy Efficiency and Renewable Energy, Nuclear Energy, Fossil Energy, Environmental Management, Advanced Research Projects Agency – Energy, and the National Nuclear Security Administration. DOE programs are carried out in partnership with academia, the private sector, other DOE National Laboratories, the international scientific community, and other government agencies.
- (b) The Contractor is responsible for accomplishing the mission of the Laboratory. Under this performance-based management contract, the Contractor is responsible to develop and implement innovative approaches and adopt practices that foster continuous improvement while accomplishing the Laboratory mission.
- (c) Effective partnering with industry in the ultimate application of scientific information and technology to solve DOE or broad public issues is essential to mission success. The Contractor will provide integrated line management of this diverse research institution, aligning multiple program scientific and technical assignments with the appropriate resources and support to deliver world-class science in a cost effective manner. Integrated line management incorporates integrated safety management, integrated safeguards and security management, cross-organizational teamwork recognizing matrix management, and efficient work practices and applies them to programmatic and operational efforts. Core capabilities maintained by the Laboratory may be changed during the annual laboratory planning process discussed below.

C-2 The Laboratory Vision

In collaboration with the Office of Science and via such annual processes as are established by the Office of Science, the contractor shall develop and maintain a compelling long range vision and supporting strategic and business plans for the Laboratory. This vision represents a shared understanding of how those goals fit with DOE missions and result in a

written ten-year plan that reflects the Office of Science’s view of the future of the laboratory consistent with the Department’s, Office of Science’s, and other applicable program offices’ strategic plans. This process occurs in the context of a complete scientific, technical, operational, and managerial vision for a healthy, world-class laboratory and the resource needs and risks associated with accomplishing that vision.

C-3 Performance Goals, Objectives, and Notable Outcomes

The Performance Evaluation and Measurement Plan is provided in Section J, Appendix G of the contract; this process is also referenced in the Section H clause titled “Standards of Contractor Performance Evaluation.”

C-4 Statement of Work (SOW)

(a) Research and Development (R&D)

- (1) **Mission.** The Contractor shall maintain and advance the Laboratory R&D capabilities to accomplish the DOE mission to ensure America’s security and prosperity by addressing its energy, environmental, and nuclear challenges through transformative science and technology solutions. DOE expects the Contractor to make the best use of the highly specialized Laboratory R&D capabilities in materials science, neutron science, and computational science, among other specialties, to accomplish the mission.

Science and Energy—The Department’s goal is to advance foundational science, innovate energy technologies, and inform data driven policies that enhance U.S. economic growth and job creation, energy security, and environmental quality, with emphasis on mitigating the risks of and enhancing resilience against climate change. Relative to and in support of this goal, the Contractor shall maintain and advance Laboratory capabilities in: climate change science; assessing national energy use and projections of future energy supply and demand, as well as supporting efforts in energy assurance and preparedness; biomass renewable energy feedstock and conversion technologies and other technologies to diversify fuel sources; energy efficient technologies for buildings, industry, transportation, and utility end-use; applied materials in support of energy efficient technologies, electrical transmission and distribution, energy storage, renewables, vehicle technologies, and fossil fuel use; and nuclear technology and safety. To further the Department’s strategic intent, the contractor is also expected to emphasize transformative energy technologies in its promotion of mission- related partnerships as well as technology transfer efforts.

One of DOE’s Strategic Objectives is to deliver the scientific discoveries and major scientific tools that transform our understanding of nature and strengthen the connection between advances in fundamental science to technology innovation. To further the conduct of discovery-focused research to increase our understanding of matter, materials, and their properties, the Contractor shall maintain and enhance critical Laboratory capabilities detailed in the Office of

Science Laboratory Plan including nuclear and condensed matter physics, materials, chemical, and computational, science, materials, chemical, and systems engineering disciplines, as well as neutron science, including accelerator science and technology. Also, the Contractor shall maintain and improve Laboratory capabilities in analytical and separations chemistry, computational sciences and high-performance computing, environmental science (including field experimental facilities) and social science, fusion science and technology, genetics, genomics, and biotechnology. The Contractor shall maintain, improve, and effectively employ the instrumentation and assets of the Laboratory.

National Security—The Department’s goal is to enhance national security by maintaining and modernizing the nuclear deterrent, reducing global nuclear and cyber security threats, providing for nuclear propulsion, and stewarding key science, technology, and engineering capabilities and supporting infrastructure. The Contractor shall maintain existing nuclear materials storage and processing facilities and develop related technologies. The Contractor shall support DOE in the development of technologies that promote non-proliferation, international nuclear safety, enhanced national security, and safe stockpile stewardship. The Contractor shall maintain and improve capabilities in science and technology related to nuclear nonproliferation and national security as well as in cyber security.

Management and Performance— The Department’s goal is to position itself to meet the challenges of the 21st century and the nation’s Manhattan Project and Cold War legacy responsibilities by employing effective management and refining operational and support capabilities to pursue departmental missions. To that end, the Contractor shall continue initiatives to improve efficiencies; reduce the cost of doing business; and, in the laboratory planning process, focus on these initiatives to ensure highly efficient and effective business, technical, and facility operations are achieved. The Contractor shall examine Laboratory operations to consolidate work efforts, eliminate duplication of scientific effort, identify underutilized facilities, and reduce operational costs.

In addition, the contractor shall maintain and improve capabilities in environmental technology development to support environmental management. Waste minimization, pollution prevention, and energy demand reduction through green or renewable resources are a challenge and require further Contractor initiatives to support greenhouse gas reduction efforts and environmental sustainability. The Contractor shall effectively and efficiently manage the minimization, characterization, and certification of Laboratory generated wastes and other materials, and optimize the treatment, storage and disposal of newly generated Laboratory waste as directed by DOE.

As the operator of a Federally Funded Research and Development Center, the Contractor is charged with using best business practices and bringing the best science and technology to bear on the Department’s mission; the Contractor may be called upon to support or lead various initiatives either alone or in concert with

other Departmental entities, make recommendations, and disseminate results of activities the Laboratory supports on behalf of the Department. This requires the Contractor to conduct the business of the Laboratory in a manner befitting its special relationship with the Government, to operate in the public interest with objectivity and independence, to be free of organizational conflicts of interest, and to have full disclosure of the Laboratory's affairs to DOE consistent with the terms of this contract.

- (2) Core Capabilities. The Contractor shall effectively and efficiently manage and direct research in all of the Laboratories' core capabilities as assigned during the annual Laboratory Planning process with the Office of Science. In 2020, these consist of the following:

Accelerator Science and Technology	Advanced Computer Science, Visualization, and Data
Applied Materials Science and Engineering	Applied Mathematics
Biological and Bioprocess Engineering	Biological Systems Science
Chemical and Molecular Science	Chemical Engineering
Climate Change Science and Atmospheric Science	Computational Science
Condensed Matter Physics and Materials Science	Cyber and Information Sciences
Decision Science and Analysis	Earth Systems Science and Engineering
Environmental Subsurface Science	Large Scale User Facilities/R&D Facilities/Advanced Instrumentation
Mechanical Design and Engineering	Nuclear Engineering
Nuclear Physics	Nuclear and Radio Chemistry
Plasma and Fusion Energy Sciences	Power Systems and Electrical Engineering
Systems Engineering and Integration	

The Contractor shall ensure the Laboratory conducts basic and applied research, development, and demonstration activities facilitating deployment of technologies. The Contractor will direct these core capabilities into creative research projects for DOE in partnerships with universities, other federal laboratories and agencies, and the private sector. Opportunities to transfer technology into useful products and processes should be conducted in close cooperation with private sector sponsors. The Contractor shall make it possible for the private sector to join in development/operation activities with the Laboratory to enhance teamwork and technology transfer.

- (3) User Facilities. The Contractor is responsible for operating User Facilities supporting diverse DOE mission areas. These are large-scale ORNL facilities which house critical instrumentation and are available for external use to advance scientific or technical knowledge. The User Facilities which the Office of Science

has designated are: the Spallation Neutron Source; the High Flux Isotope Reactor; the Oak Ridge Leadership Computing Facility; and the Center for Nanophase Materials Sciences/Shull-Wollan Center. Others include the Building Technologies Research and Integration Center; the Center for Structural Molecular Biology; the National Transportation Research Center, including the Manufacturing Demonstration Facility; and the Carbon Fiber Technology Facility.

The Contractor shall maintain efficient, effective, and safe operations of existing and planned user facilities, and other ORNL facilities utilized by visiting scientists, as well as provide effective customer service to user clients. The Contractor shall implement DOE mission objectives to ensure user facilities are user friendly, readily available, and can operate within conditions requested by user clients. The number and purpose of user facilities at the Laboratory may vary during the term of this contract. Two areas of particular importance during this extension are efforts related to neutron-enabled research and high performance computing. Also important is maintaining and advancing special capabilities of the High Flux Isotope Reactor and Radiochemical Engineering Development Center, including R&D, continued custom materials and chemical processing for myriad applications, and expanding stable isotope separation capabilities.

The Contractor is responsible for planning and scheduling user facilities experiments, and maintaining agreements to engage user facilities. Agreements are in place with other government agencies, industries, universities, and international participants. As an example of the scale of the interest in the Laboratory's capabilities, in Fiscal Year 2018, over 3,000 Users came to the Laboratory to take advantage of a wide variety of capabilities in the Laboratory facilities. The Contractor is responsible for attracting and accommodating visiting scientists and students that are guests of the Laboratory.

- (4) Management. The Contractor shall manage the resources and capabilities of the Laboratory and provide leadership for this scientific institution. The Contractor will effectively and efficiently direct the day-to-day management of the Laboratory, proficiently linking scientific/engineering capabilities to accomplish DOE's objectives and providing leadership in methods of integrated line management that ensure inter-laboratory team building and intra-laboratory cooperation while supplying a safe and secure working environment. The Contractor is charged with maintaining and enhancing the intellectual resource base in order to avoid erosion of the scientific and engineering foundations at the Laboratory and to promote world leadership and prominence in areas as mandated by the Office of Science. The Contractor shall attract, develop, and retain an outstanding work force, with the skills and capabilities to meet DOE's evolving mission needs. The Contractor is also responsible for the employment of all personnel engaged in the SOW efforts and for the readiness and training of its personnel.

- (b) Protection of Workers, the Public and the Environment

- (1) Operational Expectations. Protection of workers, the public, and the environment are fundamental responsibilities of the Contractor and a critically important performance expectation. The Contractor's Environment, Safety, and Health (ES&H) program shall be operated as an integral, but visible, part of how the organization conducts business. A key element is continued implementation of the ORNL Integrated Safety Management System (ISMS), including prioritizing work planning and execution; establishing clear ES&H priorities; allocating the appropriate level of trained and qualified resources to address programmatic and operational considerations; and continued implementation of integrated safeguards and security management systems and policies to provide a safe and healthful work environment. The Contractor shall ensure that cost reduction and efficiency efforts are fully compatible with ES&H performance.
- (2) Compliance Expectations. The Contractor shall perform all activities in compliance with applicable health, safety, and environmental laws, orders, regulations, and national consensus standards (contained in ORNL Work Smart Standards); and governing agreements and permits executed with regulatory and oversight government organizations. The Contractor shall take necessary actions to preclude serious injuries and/or fatalities, keep worker exposures and environmental releases as low as reasonably achievable below established limits, minimize the generation of waste, and maintain or increase protection to the environment, public and worker safety and health.
- (3) Line Management Expectations. Incorporating integrated line management, the Contractor shall put in place a system that clearly communicates the roles, responsibilities, and authorities of line managers. The Contractor shall hold line managers, including direct reports, accountable for implementing necessary controls for safe performance of work in their respective area of responsibility. The Contractor shall establish effective management systems to identify deficiencies, resolve them in a timely manner, ensure that corrective actions are implemented, (addressing the extent of conditions, root causes, and measures to prevent recurrence) and prioritize and track commitments and actions. The Contractor shall, as appropriate, consider ES&H performance in selection of its subcontractors and incorporate ES&H requirements into subcontracts.

(c) Facilities and Infrastructure.

The Contractor shall efficiently manage and maintain government-owned and leased buildings and facilities at the Laboratory site or used in the performance of the contract, together with the utilities and appurtenances thereto. The Contractor shall manage facilities and resources to optimize the effectiveness of operations in support of the DOE mission. The Contractor is expected to be an active partner with DOE in assuring that the Laboratory is renewed and enhanced to meet future mission needs. Within the constraints of available resources and other Contract requirements, the Contractor, in partnership with DOE, shall renew and enhance research facilities and equipment so that the Laboratory remains at the state-of-the-art and is well positioned to meet future DOE needs. The Contractor is also responsible for certain buildings at

the Y-12 Plant. Other DOE prime contractors manage some of the facilities at the Laboratory; DOE expects the M&O contractor to integrate and interface with these other contractors to facilitate accomplishment of the larger mission. The Contractor's responsibilities are land and facility planning for the Laboratory site, and coordinating and conducting research, and its associated operational and maintenance activities, within the reservation. Site planning activities shall be conducted by the Contractor proactively addressing concerns of DOE, regulatory agencies, and stakeholder groups.

(d) Project Management

The Contractor shall manage all project, engineering, design, fabrication, and construction efforts in a manner that allows completion of project objectives in a safe and environmentally sound manner within the planned schedule, cost, and technical baselines. Specifically, the Contractor is expected to achieve all project deliverables associated with upgrades involving R&D facilities, infrastructure modernization projects, and the demonstration and deployment activities associated with both the Exascale Computing and the United States contributions to ITER Projects in accordance with DOE directives and requirements. The Contractor shall ensure that variance from established cost and schedule baselines for major construction, upgrade, or equipment procurement projects are kept to less than 10%.

(e) University and Science Education Program

In order to advance and enable science workforce development opportunities and to improve, directly or indirectly, the quality of science, mathematics, computing, and technology workforce education, training, and development in the United States, the contractor shall develop and implement innovative programs that utilize laboratory resources in collaboration and cooperation with other academic and research institutions.

(f) Mission-Related Partnerships

In order to maximize the mission impact on science and energy, national security, and economic competitiveness goals and objectives, the Contractor shall maintain and improve appropriate existing partnerships and develop new technology partnership activities. Efforts to develop broad based partnerships with academic research institutions, other agencies, other DOE laboratories, the international scientific community, and with the private sector are essential both to the long-term viability of the Laboratory and to DOE mission success. Mechanisms for partnerships include cooperative research and development agreements, direct assistance programs, employee loan programs, user facility agreements, memoranda of cooperation, memoranda of understanding, memoranda of agreement, license agreements, agreements for commercializing technology, and other arrangements being tested and considered by DOE in which research and development resources are leveraged with private sector partners for demonstration and deployment. DOE expects the contractor to provide widespread notice of availability of promising technology, and

fairness of opportunity to potential partners in moving technology to market. The contractor shall prioritize activities that maximize mission impact; Laboratory capabilities in neutrons for science, biological systems science, isotope production, advanced computational systems, and advanced energy and materials are just a few areas that provide opportunity for partnerships to have a meaningful mission impact.

The Contractor shall ensure the Laboratory contributes to U.S. technological competitiveness by conducting basic and applied research, and through development and demonstration activities facilitating transfer and deployment of technologies into useful products and processes through partnerships with the private sector. The Contractor shall make it possible for the private sector to join in development/operation activities with the Laboratory to enhance teamwork and technology transfer. Cooperation with industrial partners may include long-term strategic partnerships aimed at commercialization of Laboratory inventions or the improvement of industrial products. The Contractor shall respond to specific near-term technological needs of industrial companies with special emphasis given to working with the types of businesses identified in the Small Business Subcontracting Plan clause of this contract. The Contractor may also capitalize on its location in the Southeast by developing productive relationships with regional and local companies and through forums such as conferences, workshops, and traveling presentations. It is anticipated that these organizations will be particularly effective participants in the Laboratory's technology transfer activities in promoting a mutually beneficial relationship between DOE and the communities surrounding the Laboratory.

(g) Security

The Contractor is responsible for the security posture that fully supports safe and secure accomplishment of the Laboratory's mission. This includes, but is not limited to, information and cyber security, nuclear materials control and accountability, personnel security, physical protection, and operational planning and management. DOE expects an integrated, cooperative, proactive approach to security at the Laboratory. DOE's expectation is that the contractor has overall responsibility for security posture at the site, incorporating threat analysis, risk assessment, and cost/benefit analysis to ensure effective and efficient material and information protection.

(h) Other Activities

- (1) The Contractor shall establish a formal make or buy program to optimize performance.
- (2) The Contractor shall assist DOE through direct participation and other support in achieving DOE's energy efficiency goals and objectives in electricity, water, and thermal consumption, conservation, and savings, including goals and objectives.
- (3) In addition to the services specifically described in other provisions of this SOW, the Contractor shall perform services as DOE and the Contractor shall agree in

writing that will be performed from time to time under this contract at Oak Ridge or elsewhere, as follows:

- a. Services incidental or related to the services described in other provisions of this SOW.
- b. Services, using existing facilities and capabilities, for other federal agencies and nonfederal entities in accordance with policies and procedures established by DOE.
- c. Services in support of DOE programs when the work involved has been determined by DOE to be within the unique capabilities of the contractor or when the work involved has been determined by DOE to be within the special scientific and technical capabilities of the contractor's workforce and the urgent need for the services precludes acquiring them from another source.