STATEMENT OF CONSIDERATIONS

ADVANCE WAIVER OF THE GOVERNMENT'S DOMESTIC AND FOREIGN PATENT RIGHTS AND COPYRIGHT UNDER DOMESTIC SUBCONTRACT 8F-30005 ISSUED BY ARGONNE NATIONAL LABORATORY FOR THE CORAL NRE PROGRAM; DOE WAIVER NO. W(A) 2017-007

The Department of Energy (DOE) has a long history of deploying leading-edge computing capability for science and national security. Going forward, DOE's compelling science, energy assurance and national security needs will require a thousand-fold increase in usable computing power, delivered as quickly and energy-efficiently as possible.

The DOE's Office of Science (SC) is the lead Federal agency supporting fundamental scientific research for energy and the nation's largest supporter of basic research in the physical sciences. The SC portfolio has two principal thrusts: direct support of scientific research and direct support of the development, construction, and operation of unique, open-access scientific user facilities. These activities have wide-reaching impact. SC supports research in all 50 States and the District of Columbia, at DOE laboratories, and at more than 300 universities and institutions of higher learning nationwide. The SC user facilities provide the Nation's researchers with state-of-the-art capabilities that are unmatched anywhere in the world.

Within SC, the mission of the Advanced Scientific Computing Research (ASCR) program is to discover, to develop, and to deploy computational and networking capabilities to analyze, to model, to simulate, and to predict complex phenomena important to the DOE. A particular challenge of this program is fulfilling the science potential of emerging computing systems and other novel computing architectures, which will require numerous significant modifications to today's tools and techniques to deliver on the promise of exascale science.

While DOE's extreme-scale computer requirements are a driving factor, these projects must also exhibit the potential for technology adoption by broader segments of the market outside of DOE supercomputer installations. The public-private partnership between industry and the DOE ensures development of technology that reduces economic and manufacturing barriers to constructing exaflop-sustained systems, but also ensures the selected technologies have broad market impact for low-power embedded, cloud/datacenter, and midrange HPC applications. This ensures the DOE investment forms the center of a sustainable software/hardware ecosystem that is supported by applications across the broader IT industry. DOE expects this technology transfer to increase DOE's ability to leverage commercial developments. It is not DOE's intent to fund the engineering of near-term capabilities that are on existing product roadmaps.

Scientific computation has come into its own as a mature technology in all fields of science. Never before have we accurately been able to anticipate, to analyze, and to plan for complex events that have not occurred-from the operation of a reactor running at 100 million degrees to the changing climate a century from now. Combined with the more traditional approaches of theory and experiment, it provides a profound tool for insight and solution as we look at complex

systems containing billions of components. Nevertheless, scientific computation cannot yet do all that we would like. Much of its potential remains untapped in areas such as materials science, earth science, energy assurance, fundamental science, biology and medicine, engineering design, and national security because the scientific challenges are too enormous and complex for the computational resources at hand. Many of these challenges have immediate and global importance.

These challenges may be overcome by a revolution in computing that promises real advancement at a greatly accelerated pace that can only be accomplished with federal government investments, such as the ongoing FastForward and DesignForward collaborations between ASCR and Advanced Simulation and Computing (ASC). Planned pre-exascale systems (capable of 10^{18} floating point operations per second) in the next four years will provide an unprecedented opportunity to attack these global challenges through modeling and simulation.

DOE's SC has several critical mission deliverables, including future energy generation technologies for SC. Computer simulations play a key role in meeting these critical mission needs. Data movement in the scientific codes is becoming a critical bottleneck in their performance. Thus, memory hierarchy and its latencies and bandwidths between all its levels are expected to be the most important system characteristic for effective pre-exascale systems.

Data intensive workloads are of increasing importance to SC and are becoming an integral part of many traditional scientific computational science domains including cosmology, engineering, combustion, and astrophysics. The pre-exascale systems will need data centric capabilities to meet the mission needs in these science domains.

Further, in order to meet challenging system requirements, it will be necessary to accelerate key non-recurring engineering (NRE, also known as research & development) as part of this acquisition in order to accelerate technology, improve capabilities, improve application performance, and lower the total cost of ownership of the delivered systems.

Argonne National Laboratory (ANL) is issuing the CORAL2 Subcontract No. 8F-30005 to its Prime Contract, working with Intel Federal LLC (Intel) to modify the existing Aurora system build contract, which was based on the previous CORAL procurement with ORNL and LLNL. ANL will partner with Intel, and its lower-tier subcontractor Cray, Inc. (Cray) to enable innovative hardware, make software and application porting enhancements to the Aurora system. The proposal evaluation process will be performed by ANL.

The Allocation of Patent Rights

Any small business or non-profit organization will retain the patent rights to its subject inventions under the Bayh-Dole Act. See 35 USC 200-212. These subcontracts will contain standard clause DEAR 952.227-11 Patent Rights-Retention by the Contractor.

For non-Bayh-Dole subcontractors, the Government retains title to subcontractor's subject inventions under DEAR 952.227-13 Patent Rights-Acquisition by the Government. However, a subcontractor that agrees to cost-share by an amount of at least 40% of the total cost of the subcontract shall qualify for this Advance Waiver where DOE agrees to waive, in advance, patent rights to the subcontractor such that it may elect its subject inventions. See Appendix A, paragraph (b) of 10 CFR 784.12 PATENT RIGHTS--WAIVER (JUL 1996). The patent rights waiver is subject to the retained government-use license, march-in rights, reporting requirements, DOE approval of assignments, 35 U.S.C. 204, and a U.S. Competitiveness provision (paragraph (t)), which are all contained in the clause.

If a non-Bayh-Dole subcontractor under the subject subcontract does not agree to cost-share of at least 40% of the total contract cost, that subcontractor will receive the standard DEAR patent and FAR data clauses in connection with the R&D procurement. However, such a subcontractor can still seek DOE Headquarters Program approval, with DOE GC concurrence, to have this Advance Waiver apply. In the alternative, the subcontractor may petition the government for either a separate Advance Waiver for its specific subcontract or an Identified Invention Waiver to obtain title to specific subject inventions as developed during the performance of the subcontract.

The Allocation of Rights in Computer Software

The Bayh-Dole Act only applies to the allocation of patent rights. However, many subcontractors prefer to have advance rights in technical data developed under their subcontracts. Therefore, this Advance Waiver also allows a domestic subcontractor (small business, non-profit or for-profit organization) to assert copyright in computer software without the Contracting Officer's prior approval. Under the subject CORAL program, DOE agrees, in advance, to authorize the subcontractor to assert copyright, without the Contracting Officer's prior approval, in software produced under the subcontract by its employees. See Appendix B, Rights in Data General, paragraph (c)(1)(iii). The right to assert copyright in software is subject to a limited government-use license to allow the subcontractor sufficient time to commercialize the computer software. In the limited government-use license, the subcontractor grants to the Government and others acting in its behalf, a paid-up nonexclusive, irrevocable worldwide license in such copyrighted computer software to reproduce, prepare derivative works, and perform publicly and display publicly (but not to distribute to the public) by or on behalf of the Government. However, the limited government-use license in copyrighted software will revert to a broad Government license, which allows the Government to distribute copies to the public, if either the subcontractor abandons the commercialization of the software or DOE march-in rights are exercised; for example, where the subcontractor has not taken effective steps to commercialize the software. In addition, the broad Government license would apply where the software is released as Open Source Software (OSS).

The deliverables expected will be detailed reports of technical activities, performance results, and lessons learned associated with the endeavor. Also, hardware may be delivered to ANL under the NRE subcontracts. If software is a deliverable under a subcontract, the standard policies and practices

regarding submission to DOE's Energy Science and Technology Software Center (ESTSC) shall apply. Therefore, ANL should consult with ASCR (and with DOE Patent Counsel concurrence) to determine whether any software developed under specific subcontracts should be (a) delivered to ANL and/or (b) distributed as Open Source Software. DOE believes granting the copyright in software is warranted here in order to stimulate developed end products to purchase in the future.

The Delayed Release of Unpublished Data-Other Data

Since these subcontracts are for long-term commercialization activity, many companies will want to protect their data generated under the subcontracts from public release. However, DOE's policy (and statutory provisions) is to publicly release technical data that is funded by the U.S. Government. This policy promotes both the commercialization of the technology and the further development of knowledge in the academic/research community. However, many companies would be reluctant to enter into this subcontract if its competitors could have immediate access to the technology. DOE could limit the data delivered to ANL and DOE; however, ANL needs to receive all the pertinent data necessary to carry out the objectives of the Government's program. Therefore, ASCR supports a delayed release of up to five years of technical data developed under the subcontracts in order to allow the subcontractor the opportunity for a competitive advantage to commercialize this technology. There are several exceptions where DOE may release the data, for example, when responding to a request under the Freedom of Information Act (FOIA). See Appendix B, Rights in Data – General, paragraph (d)(3) for a full list of exceptions.

Foreign Subcontracts

The provisions of this Advance Waiver do not automatically apply to any foreign owned or controlled subcontractors at any tier. However, ANL should consult with ASCR to determine whether a foreign subcontractor could be granted the above rights or require the foreign subcontractor to submit a separate petition for an Advance Waiver to be approved by DOE GC.

Conclusion

This Advance Waiver and the terms of the intellectual property clauses included within the subject subcontracts are meant to cover only the scope of the work under the ANL NRE Program and shall not serve as precedent for any follow-on work to be negotiated separately with the selected subcontractors. Also, this Advance Waiver shall apply to second tier subcontracts that a first tier subcontractor issues. However, this Advance Waiver will not apply to foreign owned or controlled companies unless as noted above.

DOE Patent Counsel will qualify each subcontractor upon written certification by ANL that

this Advance Waiver is applicable. Such certification will include verification of the minimum percentage cost share by the subcontractor, a determination that the subcontractor is a U.S. company, and verification of the acceptability of the terms and conditions of the subcontract.

If any company does not qualify for this Advance Waiver or is not satisfied with the terms and conditions of the subcontract necessary to qualify for this Waiver, then that company may separately petition DOE for its own Advance Waiver.

For the foregoing reasons, and in view of the objectives and considerations set forth in 10 CFR 784, it is recommended that the requested waiver be granted for domestic first tier and second tier subcontracts issued under the CORAL NRE Program.

[redacted]

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Date: November 17, 2017

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Date: 11/17/2017

Based upon the foregoing Statement of Considerations, it is determined that the interests of the United States and the general public will best be served by a waiver of the United States and foreign patent rights as set forth herein, and, therefore, the waiver is granted. This waiver shall not affect any waiver previously granted.

CONCURRENCE:

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Date: 12/8/2017

APPROVAL:

[redacted]

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