AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT D CODE	PAGE OF PAGES
	1 13

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. *(If applicable)*
P00004	See Block 16C	RES-22-0472 & RES-22-0393	

6. ISSUED BY	CODE	7. ADMINISTERED BY *(If other than Item 6)*	CODE
US NRC - HQ ACQUISITION MANAGEMENT DIVISION MAIL STOP TWFN-07B20M WASHINGTON DC 20555-0001	NRCHQ		

8. NAME AND ADDRESS OF CONTRACTOR *(No., street, county, State and ZIP Code)*		9A. AMENDMENT OF SOLICITATION NO.
INFORMATION SYSTEMS LABORATORIES INC ATTN JASON WILLIAMS 8130 BOONE BLVD STE 500 VIENNA VA 221827745	(x)	9B. DATED *(SEE ITEM 11)*
	X	10A. MODIFICATION OF CONTRACT/ORDER NO. 31310019D0002 31310021F0038
		10B. DATED *(SEE ITEM 13)* 09/03/2021

CODE	VXDFH959NB65	FAC LITY CODE

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers ☐ is extended ☐ is not extended.
Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended , by one of the following methods: (a) By completing tems 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted ; or (c) By separate letter or electronic communication which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted , such change may be made by letter or electronic communication, provided each letter or electronic communication makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNT NG AND APPROPRIATION DATA *(If required)*
2022-X0200-FEEBASED-60-60D003-60B301-1145-11-6-174-252A-11-6-174-1145 Net Increase: $127,250.19

13. THIS ITEM ONLY APPLIES TO MODIFICATION OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

CHECK ONE	
	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: *(Specify authority)* THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIF ED TO REFLECT THE ADM NISTRATIVE CHANGES *(such as changes in paying office, appropriation data, etc.)* SET FORTH N ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
X	D. OTHER *(Specify type of modification and authority)* FAR 52.243-2 CHANGES - COST-REIMBURSEMENT. (AUG 1987)

E. IMPORTANT Contractor ☐ is not ☒ is required to sign this document and return 1 copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION *(Organized by UCF section headings, including solicitation/contract subject matter where feasible.)*

PLEASE SEE CONTINUATION PAGES FOR DESCRIPTION OF MODIFICATION TO INCREASE THE TASK ORDER CEILING, PROVIDE FUNDING, REVISE THE PRICE SCHEDULE, REVISE THE STATEMENT OF WORK, AND EXTEND TO TASK ORDER'S PERIOD OF PERFORMANCE.

Task Order Ceiling: $674,429.99 (Changed)
Task Order Obligation Amount: $617,381.16 (Changed)
Period of Performance: 09/03/2021 to 12/31/2022

Except as provided herein, all terms and conditions of the document referenced in Item 9 A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER *(Type or print)*		16A. NAME AND TITLE OF CONTRACT NG OFFICER *(Type or print)*	
		JENNIFER A. DUDEK	
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED
(Signature of person authorized to sign)		[redacted] *(Signature of Contracting Officer)*	09/12/2022

Previous edition unusable

STANDARD FORM 30 (REV. 11/2016)
Prescribed by GSA FAR (48 CFR) 53.243

The purpose of this task order modification is to: (1) increase the task order ceiling by $184,299.02, from $490,130.97 to $674,429.99; (2) provide incremental funding in the amount of $127,250.19, thereby increasing the obligated amount from $490,130.97 to $617,381.16; (3) revise the price schedule; (4) revise the Statement of Work to add in Task 5 entitled, “Code Documentation for Generalized Expansion of TRACE/PARCS Interface to Accommodate Dynamic Control Rod Motion and In-Core Detector Response;” and (5) extend the period of performance through December 31, 2022. Accordingly, the task order is hereby modified as follows:

Section B - Supplies or Services/Prices was revised as follows.

Summary of Clause Changes:

Clause titled **CONSIDERATION AND OBLIGATION-TASK ORDERS** is incorporated as follows:

CONSIDERATION AND OBLIGATION-TASK ORDERS

(a) The ceiling of this order for services is $674,429.99 (Costs of [redacted] and Fee of [redacted]).

(b) This order is subject to the minimum and maximum ordering requirements set forth in the contract.

(c) The amount presently obligated with respect to this order is $617,381.16 (Costs of [redacted] and Fee of [redacted]). The obligated amount shall, at no time, exceed the order ceiling as specified in paragraph (a) above. When and if the amount(s) paid and payable to the Contractor hereunder shall equal the obligated amount, the Contractor shall not be obligated to continue performance of the work unless and until the Contracting Officer shall increase the amount obligated with respect to this order, in accordance with FAR Part 43 - Modifications. Any work undertaken by the Contractor in excess of the obligated amount specified above is done so at the Contractor's sole risk and may not be reimbursed by the Government.

(d) The Contractor shall comply with the provisions of FAR 52.232-22 - Limitation of Funds, for incrementally-funded delivery orders or task orders.

Summary of Clause Changes:

Clause titled **PRICE/COST SCHEDULE** is incorporated as follows:

PRICE/COST SCHEDULE

CLIN	Description	Amount
00001	Estimated Cost	[redacted]
00002	Fixed-Fee	[redacted]
	TOTAL	$674,429.99

Section C - Description/Specifications was revised as follows.

Summary of Clause Changes:

Clause titled **STATEMENT OF WORK** is incorporated as follows:

STATEMENT OF WORK

PARCS Code Suite Maintenance, Development, and User Support

Contents

C.1 Background

The U.S. Nuclear Regulatory Commission (NRC), Office of Nuclear Regulatory Research (RES), Division of Safety Analysis (DSA) has responsibility for the development, testing, assessment, maintenance, and user support of the NRC's thermal-hydraulic (T/H) and neutronics computer codes (such as PARCS).

PARCS (Purdue Advanced Reactor Core Simulator) is a computer code that solves the time-dependent two-group neutron diffusion equation in three-dimensional Cartesian geometry using nodal methods to obtain the steady-state and transient neutron flux distribution. The code may be used in the analysis of reactivity-initiated accidents in light-water reactors where spatial effects may be important. It exists both as a stand-alone program and as a separate computational module coupled to other thermal-hydraulic codes. In this latter context, the source code for PARCS is tightly integrated with TRAC/RELAP Advanced Computational Engine (TRACE). PARCS may also be run in a coupled mode with RELAP5 using a looser coupling technology called the Generic Interface (GI). Associated with PARCS is the GenPMAXS code which is used for converting macroscopic cross-sections generated by lattice physics codes like SCALE/TRITON, SCALE/Polaris, CASMO, or HELIOS into a form readable by PARCS, along with a generalized capability to construct a cross section case matrix with

consideration for nodal burnup history effects and nodal state parameterizations.

The PARCS code supports independent regulatory decision making in that it allows staff and contractors to develop core physics models to confirm that core behavior is within safety limits for general steady-state operation and for a range of plant transients. PARCS is specifically used as a tool in confirmatory safety reviews of power plant operator actions, core designs, power uprates, and license amendments. This is done for both design certifications and License Amendment Requests (LARs).

For the context of this work, and when not directly coupled to TRACE or RELAP, PARCS is maintained in a larger, standalone form for quasi-steady-state fuel cycle analysis, with consideration for fuel shuffle schemes over multiple fuel cycles. In standalone form, PARCS also maintains a basic T/H-to-neutronic feedback capability through its coupling with the PATHS (BWRs/PWRs) code, along with an even simpler mass-energy based T/H solver that is specific to PWRs. When maintained in this standalone configuration, PARCS has its own version control system, regression test suite, and set of assessments problems. GenPMAXS is also maintained in its own version control system with a test suite segmented by all of the lattice physics codes that it supports. There is also a corresponding Perl-based regression harness that is used to test and interrogate the conversion of SCALE/TRITON cross sections from t16 format to PMAXS format in a systematic and visual manner.

C.2 Objective

The objective of this acquisition is to obtain regulatory technical support with the maintenance, code support, assessment, development, and user training of the PARCS and GenPMAXS codes and the interface of PARCS with SNAP. The contractor shall provide the necessary personnel, management, materials, equipment, administrative and technical services as outlined in this Statement of Work.

C.3 Scope of Work

The contractor shall provide the following services for the PARCS code suite: configuration control, the correction of code errors, documentation updates, the development of test problems, and user support to the NRC, its contractors, and members of CAMP and the domestic user community.

PARCS and GenPMAXS code changes shall be tested on a variety of compiler/operating system combinations. The following compilers shall be used during maintenance and development of both of the PARCS and GenPMAXS source codes:

Windows (Microsoft Visual Studio/Intel Visual Fortran)
Linux (gfortran, Intel, NAG, Portland Group)

The contractor shall ensure that the above compilers and platforms are in place for the entire period of performance, and that these compilers are maintained at their most current release levels throughout the contract. The Contracting Officer's Representative (COR) may require the contractor to extend support to other compiler/operating system combinations that are not listed as a result of changing priorities.

SPECIFIC SUBTASKS:

3.1: Task 1 – PARCS/PATHS Code Maintenance

Subtask 1.1: Identify Code Bugs

The contractor shall identify all code bugs and maintain them in a "bug report" document which, at a high level, summarizes code errors received from all PARCS/PATHS users (bugs, unexplained behavior, and documentation problems). This document shall include the following information for each bug: a summary description of the bug; the date the bug was reported; the user or organization who reported the bug; and the status of the bug (i.e. in what code version the bug was discovered).

Subtask 1.2: Perform Code Fixes

Under COR technical direction, the contractor shall make changes to the collective PARCS/PATHS source code in response to bugs reported by the COR and all other PARCS/PATHS users, as captured in the bug report under Subtask 1.1.

Upon COR direction, the contractor shall also update the LaTeX(lua)/python-based code documentation (PARCS Input, Theory, User Guide, and MAPTAB manuals and PATHS Input and Theory manuals) as the result of the correction of typos, the elimination of features that are no longer supported in the code, or the desire of users to make the documentation more clear and relevant, which may be included in the bug report.

Any PARCS/PATHS source code changes made as a result of code bugs shall be tested against the PARCS regression test suite before being checked into the code version control system. New test problems that are added to the PARCS or GenPMAXS test suites as a result of the correction of code bugs shall be documented in the HyperText Markup Language (HTML) summary file. The contractor shall modify the run scripts for the test suite as a result of any test problem additions, changes, or deletions, and shall modify the build scripts as a result of any additions, changes, or deletions to the source code.

The contractor shall create new versions of PARCS in response to code bug corrections. These different code versions shall be maintained using a version control system methodology, and this methodology shall have the ability to retrieve previously released code versions. Each retrieved code version shall contain enough information such that it can be a self-contained distribution (an archive).

Subtask 1.3: Prepare TRACE Updates

At a frequency determined by the COR, the contractor shall prepare a TRACE update for submittal to the TRACE website. This update shall include the revised PARCS source code (and the revised TRACE source code, if necessary), a list of the differences between code versions embedded in text files, new test problems formulated to test the code update, revised code documentation, and the results of automated testing against the TRACE regression suite.

3.2: Task 2 – PARCS/PATHS Code Support

As directed by the COR, the contractor shall provide analysis and consultation support related

to PARCS/PATHS and GenPMAXS. This support shall include, but is not limited to: guidance on PARCS use, GenPMAXS, explanations of the algorithms that are coded into PARCS/PATHS, develop PARCS/PATHS models or GenPMAXS models, interpret results, or explain underlying physics phenomena or algorithms, explanations of the input format, or guidance on best-practices ("how to approach a problem"), the interpretation of any associated lattice physics models or PMAXS cross section libraries that are affiliated with the core model, performing pre-analysis scoping studies, and responding to code user questions and comments provided to the contractor by the COR. Analysis and consultation support may require the preparation of summaries, emails, or revised input decks, as well as participation in NRC meetings.

3.3: Task 3 – PARCS/PATHS Code Development

Upon COR direction and prioritization, the contractor shall perform any PARCS/PATHS source code development that may be necessary as a result of user feedback, future RES program needs, regulatory user needs, and CAMP needs. This code development shall not be limited to code fixes, but shall be broadly applied to significant code changes that support user convenience (e.g., improved error checking and advanced editing options), code robustness and speed (e.g., linear solver upgrades and changes and advanced neutronic methods), significant modeling enhancements, or utility codes or scripts that support PARCS/PATHS code use.

Any PARCS/PATHS source code changes made as a result of code enhancements or modeling changes shall be tested against the PARCS regression test suite before being checked-in to the code version control system. The contractor shall modify the run scripts for the test suite as a result of any test problem additions, changes, or deletions, and shall modify the build scripts as a result of any additions, changes, or deletions to the source code. The contractor shall revise the LaTeX(lua)/python-based code documentation (PARCS Input, Theory, User Guide, and MAPTAB manuals and PATHS Input and Theory manuals), to reflect the code development activity.

Subtask 3.1: Pre-Code Documentation Requirements

For each code development activity, the contractor shall develop the following documentation, per the guidance specified in NUREG-1737:

Software Requirements Specification (SRS)

The SRS is a technical document that focuses on the underlying algorithms, technical specifications, and requirements of the software.

Software Design and Implementation Document (SDID)/Qualification Test Plan (QTP) (referred to as the "test plan" in NUREG-1737)

The SDID/QTP is a combined document that describes the implementation of the technical specifications and algorithms outlined in the SRS, i.e., how the software will be structured and designed, and also describes how the implemented capabilities are proposed to be tested, i.e. the test problems which will be used to demonstrate the new capability.

Subtask 3.2: Perform Code Development

The contractor shall implement code development features into the PARCS code distribution (i.e., source code, build scripts, test problems, and code documentation (as applicable), etc.) as directed by the COR.

Subtask 3.3: Prepare Completion Report

The contractor shall prepare a Completion Report (CR) that documents the programming effort. Specifically, the report shall summarize the methodology, software, and user changes, and shall include calculation results that demonstrate the changed coding.

Subtask 3.4: Prepare TRACE Updates

A matching TRACE update (that envelopes the PARCS code changes completed in Subtasks 3.1 through 3.3) shall be prepared by the contractor for submittal to the TRACE website. This update shall include the new PARCS source code (and new TRACE source code, if necessary), the differences between code versions embedded in text files, new test problems formulated to test the code update, code documentation, and the results of automated testing against the TRACE regression suite.

3.4: Task 4 - GenPMAXS Code Support and Maintenance

The contractor shall provide technical support and code maintenance for GenPMAXS to assure the consistency and accuracy of the cross section data that feeds PARCS.

Subtask 4.1: Maintain GenPMAXS in a Version Control System

The contractor shall maintain GenPMAXS in a version control system, each version being retrievable as a self-contained unit. Along with each version the contractor shall store the build system (MSVS workspaces, Linux and windows make files, and source), the test suite (test problems and run scripts), and the code documentation. The GenPMAXS code documentation shall include a manual describing the use and methodology behind GenPMAXS, as well as a document describing known issues.

Subtask 4.2: Correct GenPMAXS Bugs

The contractor shall correct bugs resulting from the use of GenPMAXS for reading in cross section data supplied by the lattice physics codes. Any new test problems that are added to the GenPMAXS test suite as a result of the correction of code bugs shall be documented in the GenPMAXS manual.

3.5: Task 5 - Code Documentation for Generalized Expansion of TRACE/PARCS Interface to Accommodate Dynamic Control Rod Motion and In-Core Detector Response

Part A

The contractor shall draft software planning documents (SRS and SDID/QTP) that plan the development and implementation of the capability for TRACE to manipulate PARCS control rod bank positions in response to nuclear power plant signals. During operational transients, these

plant signals will be simulated through TRACE control system logic and propagate through the TRACE/PARCS interface to be translated to bank positions.

If control rod motion other than an overt SCRAM could be simulated, then this would expand the types of operational transients that the staff could consider with TRACE/PARCS to more realistic scenarios. An example might be to simulate a partial SCRAM, a dynamic power adjustment, or a selective control rod rapid insert (SCRRI).

Note: [redacted] Some progress was made both by [redacted] and Spain with respect to accomplishing dynamic control rod motion with RELAP/PARCS, with Spain (Universitat Politecnica de Valencia) having placed this capability into their version of RELAP/PARCS (NUREG/IA-0402) and modeled a PWR Rod Ejection Accident (REA).

Part B

Within the SRS/SDID/QTP documents developed in Part A, the contractor shall also draft the plan to upgrade TRACE/PARCS such that PARCS detector response values can be propagated through the TRACE/PARCS interface (in reverse to the situation described in Part A), to the TRACE control system.

This capability would enable TRACE/PARCS to simulate the BWR instability monitoring and prevention solutions that have been approved by the NRC (Long-Term Stability Solutions (NEDO-31960-A) Options I-D, II, and III being examples). These BWR instability prevention solutions make use of an APRM (Average Power Range Monitor) or an OPRM (Oscillation Power Range Monitor) in which the logic unit within the Reactor Protection System (RPS) uses averaged core detector signals to detect potential power oscillations. A large number of Local Power Range Monitor (LPRM) signals are fed into OPRM channels in which the LRPM signals are averaged and directed into one of several RPS algorithms that calculate the relative rise in the local core power distribution and initiate a trip signal through the safety logic if that rise is too high. The OPRM/RPS logic can be generalized to accommodate the different averaging definitions and BWR stability prevention solutions: core-wide; regional; quadrant-based; and single channel APRM signals; or with different combinations of OPRM/APRM signals.

In addition to the simulation of BWR instability solutions, the integration of both of these features (Part A and B) together will enable calculations of automated plant responses such as dynamic control rod motion in response to a received, aggregated detector response signal.

Subtask 5.1: Software Requirements Specification (SRS)

For this code development activity, the contractor shall develop an SRS (per the guidance specified in NUREG-1737) that outlines the expected software requirements for the integration of the capabilities described in Parts A and B of the task description. The SRS is a technical document that focuses on the underlying algorithms, technical specifications, and requirements of the software.

Subtask 5.2: Software Design and Implementation Document (SDID)/Qualification Test Plan

(QTP)

For this code development activity, the contractor shall develop an SDID and a Qualification Test Plan, per the guidance specified in NUREG-1737.

The SDID/QTP is a combined document that describes the implementation of the technical specifications and algorithms outlined in the SRS, and also describes how the implemented capabilities will be tested. For this task, the SDID shall describe any planned changes to inputs (if any) in the form of additional fields, cards, and blocks in TRACE and PARCS (and GenPMAXS, if any). The QTP shall propose model test problems to demonstrate the functionality of the implementations.

There should be at least one BWR model proposed to test the capabilities described in Part B (interaction of PARCS detector signals with the TRACE control system), and at least one other LWR model proposed to test the capabilities described in Part A (TRACE control of PARCS control rod movement).

C.4 Reporting Requirements - Monthly Letter Status Report (MLSR)

The contractor shall provide a Monthly Letter Status Report which consists of a technical progress report and financial status report. This report will be used by the Government to assess the adequacy of the resources proposed by the contractor to accomplish the work contained in this SOW and provide status of contractor progress in achieving activities and producing deliverables. The report shall include order summary information, work completed during the specified period, milestone schedule information, problem resolution, travel plans, and staff hour summary.

C.5 Deliverables and Delivery Schedule

The Contractor shall correct errors in contractor developed software and applicable documentation that are not commercial off-the-shelf which are discovered by the NRC or the contractor. Inability of the parties to determine the cause of software errors shall be resolved in accordance with the Disputes clause in Section I, FAR 52.233-1, incorporated by reference in the base contract.

Section #	Deliverable	Due Date	Format	Submit to
3.1, Subtask 1.1	Bug Report	20th of the following month	MS Word Document	COR
3.1, Subtask 1.2	PARCS/PATHS Code Distribution	Within 5 business days of the completion of code checked-in PARCS code version	Tarball or SecureZIP Archive Transmitted via e-mail, TRACE Website or other mechanism specified by the COR	COR

3.1, Subtask 1.3	TRACE Update Distribution	Within 15 business days of COR request	Tarball or SecureZIP Archive Transmitted via e-mail, TRACE Website or other mechanism specified by the COR	COR
3.2	Code Support Documentation	Within 10 business days of the COR request	Documentation follows guidance from COR (email or MS Word document or revised input deck)	COR
3.3, Subtask 3.1	Pre-Code Documentation (SRS, SDID/QTP)	Within 20 business days of technical direction by COR	MS Word document	COR
3.3, Subtask 3.2	PARCS/PATHS Distribution	Within 25 business days of technical direction by COR	Tarball or SecureZIP Archive Transmitted via e-mail, TRACE Website or other mechanism specified by the COR	COR
3.3, Subtask 3.3	Completion Report	Within 20 business days of completion of the programming effort in Task 3.2	MS Word Document Document follows guidance in NUREG-1737	COR
3.3, Subtask 3.4	TRACE Code Update	Within 15 business days of the completion of Task 3.2	Tarball or SecureZIP Archive Transmitted via e-mail, TRACE Website or other mechanism specified by the COR	COR
3.4, Subtask 4.2	GenPMAXS Distribution to COR	Within 5 business days after checking in the GenPMAXS version	Tarball or SecureZIP Archive Transmitted via e-mail, TRACE Website or other mechanism specified by the COR	COR
3.5, Subtask 5.1	Pre-Code Documentation (SRS) for Dynamic Control Rod/Detector Capability	Within 30 business days of Subtask 5.1 commencement	MS Word document	COR
3.5, Subtask 5.2	Pre-Code Documentation (SDID/QTP) for Dynamic Control Rod/Detector Capability	Within 30 business days of Subtask 5.2 commencement	MS Word document	COR

C.4 MLSR	Monthly Report	20th of the following month	MS Word Document	CO/COR

C.6 Required Labor Categories

Labor Category	Minimum Qualification Requirement
Principal Engineer	Completion of graduate level courses in numerical methods, neutronic methods, reactor physics, and thermal-hydraulics Knowledge of core nuclear analysis algorithms and application; nuclear analysis methods development; numerical algorithms for the solution of systems of equations; and the numerical methods and algorithms which make up PARCS Knowledge of FORTRAN, DOS, and Linux; knowledge of software engineering and software quality assurance (SQA) Knowledge of using LaTeX (lualatex)/python to maintain PARCS documentation
Engineer	Completion of graduate level courses in numerical methods, neutronic methods, reactor physics, and thermal-hydraulics Knowledge of core nuclear analysis algorithms and application; nuclear analysis methods development; numerical algorithms for the solution of systems of equations; and the numerical methods and algorithms which make up PARCS Knowledge of the PARCS/PATHS source code and the GenPMAXS source code Knowledge of nuclear analysis code structure, algorithms, and code compilation/build systems Experience in coding with modern FORTRAN standards and in working with DOS, Linux, UNIX, and scripting languages such as Perl and Python; experience in software engineering and software quality assurance (SQA) Experience with the following lattice physics packages: HELIOS, CASMO, SCALE/TRITON, SCALE/Polaris, SCALE/Shift, and Serpent Knowledge of using LaTeX (lualatex)/python to maintain PARCS documentation Experience performing quasi-steady state, fuel cycle calculations with PARCS/PATHS Experience in using PARCS/PATHS to model cores with advanced fuel forms (Accident Tolerant Fuel) Experience in adding advanced fuel thermo-mechanical capabilities to

	PARCS/PATHS Experience in testing GenPMAXS versions within the Perl-based regression testing harness Experience in mounting PARCS onto a version control system (such as CVS and SVN) and making changes and modifications to the version control system Experience developing and maintaining python scripts to compare PARCS/PATHS versions to measured detector power responses as part of PARCS/PATHS assessment Experience in developing/maintaining bash scripts to regression test PARCS/PATHS versions Experience in developing TRACE updates for changes to PARCS source Experience in developing input decks to test PARCS/PATHS features

C.7 Data Rights

The NRC shall have unlimited rights to and ownership of all deliverables provided under this contract/order, including reports, recommendations, briefings, work plans and all other deliverables. All documents and materials, to include the source codes of any software, produced under this contract/order are the property of the Government with all rights and privileges of ownership/copyright belonging exclusively to the Government. These documents and materials may not be used or sold by the contractor without written authorization from the CO. All materials supplied to the Government shall be the sole property of the Government and may not be used for any other purpose. This right does not abrogate any other Government rights. The definition of “unlimited rights” is contained in Federal Acquisition Regulation (FAR) 27.401, “Definitions.” FAR clause at FAR 52.227-14, “Rights in Data-General,” is included in this contract/order.

C.8 Section 508 – Information and Communication Technology Accessibility

N/A

C.9 Incremental Development for Software

The Contractor shall use an incremental build model for software development. The Agency defines an incremental build model as a method of software development where the product is designed, implemented, and tested incrementally, with increasing functionality and/or capability added in each increment until the product is finished.

C.10 Place of Performance

The work to be performed under this contract shall be primarily performed at the contractor’s site.

C.11 Contractor Travel

None

C.12 Applicable Publications (Current Editions)

The contractor shall comply with the following applicable regulations, publications, manuals, and local policies and procedures:

· NUREG-1737: Software Quality Assurance Procedures for NRC Thermal Hydraulic Codes

C.13 Security Requirements

The following regulations/requirements are applicable to this task order:

· Management Directive 12.6 - MD 12.6 - NRC Sensitive Unclassified Information Security Program (SUNSI-Proprietary), IT Level II clearance

· All work under this task order and all devices used to process NRC sensitive information shall comply with the National Institute of Standards and Technology (NIST), Special Publication (SP) 800-171r2, “Protecting Controlled Unclassified Information in Nonfederal Information Systems and Organizations,” and NRC guidance for the identification and documentation of minimum security controls. Upon request, the contractor shall participate with the NRC to review the contractor’s compliance with NIST 800-171r2 (i.e., provide requested documentation, participate in meetings, etc.).

· The contractor shall ensure that the software does not contain undocumented functions and undocumented methods for gaining access to the software or to the computer system on which it is installed. This includes, but is not limited to, master access keys, back doors, or trapdoors.

C.14 License Fee Recoverable

All the tasks listed in this SOW are NOT license fee recoverable.

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Section F - Deliveries or Performance was revised as follows.

Summary of Clause Changes:

Clause titled **TASK/DELIVERY ORDER PERIOD OF PERFORMANCE (SEP 2013)** is incorporated as follows:

TASK/DELIVERY ORDER PERIOD OF PERFORMANCE (SEP 2013)

This order shall commence on **09/03/2021** and will expire on **12/31/2022**.

All other terms and conditions of the task order remain the same.