AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT	1. CONTRACT ID CODE	PAGE OF PAGES
		1 | 3

2. AMENDMENT/MODIFICATION NO	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO	5. PROJECT NO. (If applicable)
083	See Block 16C	11EM001536	

6. ISSUED BY	CODE	7. ADMINISTERED BY (If other than Item 6)	CODE
Savannah River Operations U.S. Department of Energy Savannah River Operations P.O. Box A Aiken SC 29802	00901	Savannah River Operations U.S. Department of Energy Savannah River Operations P.O. Box A Aiken SC 29802	00901

8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code)	(x)	9A. AMENDMENT OF SOLICITATION NO.
PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP INC. Attn: TODD WAGER 100 WEST WALNUT STREET PASADENA CA 911240001		9B. DATED (SEE ITEM 11)
	X	10A. MODIFICATION OF CONTRACT/ORDER NO. DE-AC09-02SR22210
		10B. DATED (SEE ITEM 13) 09/17/2002

CODE 006908511	FACILITY 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 Items 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 telegram 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 telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)
N/A

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 MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
X	Clause I-85 FAR 52.243-2 Changes Cost Reimbursement Alt III
	D. OTHER (Specify type of modification and authority)

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.)

Tax ID Number: 95-1415716
DUNS Number: 006908511
LIST OF CHANGES:

See Page 2
Period of Performance: 09/17/2002 to 11/15/2013

Except as provided herein, all terms and conditions of the document referenced in Item 9A 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 CONTRACTING OFFICER (Type or print)
Mark R. Breor, VP & Project Manager	Samuel A. Stewart

15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED
Mark R. Breor (Signature of person authorized to sign)	3/14/11	(Signature of Contracting Officer)	

NSN 7540-01-152-8070
Previous edition unusable

STANDARD FORM 30 (REV. 10-83)
Prescribed by GSA
FAR (48 CFR) 53.243

SECTION J – LIST OF ATTACHMENTS
ATTACHMENT L
DOE DIRECTED CHANGES TO THE STATEMENT OF WORK

The following Tasks are hereby incorporated into Section C.5(g) as follows:

2. **Modification 083:** Incorporate the work authorized by the Contracting Officer on August 17, 2010:

Modified Monosodium Titanate (mMST) Testing Implementation Plan (Statement of Work)

1.0 Introduction

Over the past few years, SRNL has been developing and testing a modified form of monosodium titanate (mMST), which provides better/faster sorption of the radionuclides of interest than the 'baseline' monosodium titanate (MST). However, the mMST also has slightly different physical characteristics than the baseline MST. DOE-SRS has directed Parsons to prepare a Baseline Change Proposal (BCP) to conduct additional testing on mMST, including evaluations of its erosive potential, the attrition of mMST particles, and its mixing characteristics.

Also over the past few years, the Parsons team has conducted a number of tests on surrogate waste streams containing MST to verify the design of various SWPF systems and components, to try to ensure that they will perform as expected in the actual facility. Portions of these tests will be repeated using mMST in place of the MST, to verify that the differences in the materials will not have any adverse impacts on the design or operation of the SWPF.

2.0 Test Scope, Schedule, and Estimated Costs

The three primary tests with mMST will consist of repeating pertinent portions of the previously performed erosion, mini-APA (air pulse agitation), and settled density tests. A fourth test will consist of preparing a number of surrogate streams (with and without mMST) that will be sent to SRNL for rheological testing. [Note: This rheological testing is being conducted to close out some open issues with the DNFSB.] Additional details on each test are provided below in Section 4.0.

In addition to the benefit of faster radionuclide sorption, SRNL found that improved performance was also noted when the mMST concentration was cut in half relative to the baseline MST concentration. In order to ensure an accurate comparison of the two materials and the test results, most of the tests will be conducted using two different mMST concentrations – at 100% and at 50% of the MST concentrations used in the original tests.

All of the testing will be performed at the Parsons Technology Center in Aiken, SC, except for the rheology testing, which will be conducted at SRNL. It is estimated that three dedicated full-time personnel will be required to conduct the tests. Three new personnel will be hired earlier than planned to either directly support this testing effort, or support other commissioning activities where existing personnel (with prior experience in these test activities) are planned. Additional resources from other project groups (engineering, ESH&Q, operations, procurement, project controls, etc.) are

included in the estimate as an apportioned percentage of the dedicated labor. Parsons will procure all of the necessary equipment, materials, subcontract resources, and other items required to perform the tests in accordance with existing project plans and procedures. A resource loaded schedule for the mMST testing program is provided in Attachment 2, and the details on the resources that are plugged into the schedule are provided in Attachment 3.

3.0 Test Objective

The overall objective of this test program is to verify that a potential conversion from MST to mMST will have little or no adverse impact on the current SWPF design, safety basis, or operating scheme, and will provide sufficient benefit in the form of improved safety, costs, plant throughput, and/or schedule to warrant the conversion. An evaluation of the risks and benefits of conducting the mMST testing is provided in Attachment 4.

4.0 Test Details

Upon approval of the BCP, Parsons will start the procurement of the mMST and sludge simulant, both of which are long lead items whose delivery schedule will drive the start of the actual tests. The Parsons team will also expedite the hiring process for the three new personnel. Work will then proceed on the planning, preparation, and set up for each of the four tests, including:

- preparation, review, and approval of the test plans, procedures, and supporting documents;
- completion of the detailed design of the test systems, and subsequent specification and procurement of the required equipment and materials;
- establishment or modification of subcontracts, such as analytical, consulting, and waste disposal services, required to support the test efforts;
- assembly, setup, and checkout/systemization of the test systems;
- validation of test procedures and training of the system operators; and
- completion of a management assessment of readiness to begin the test.

Upon successful completion of the management assessment, testing will begin, with each test being conducted in accordance with the approved test plan and procedures. At the conclusion of each test, a test report will be prepared and circulated for formal review and approval. The test results will be communicated to and discussed with the pertinent engineering, safety, operations, and other project groups to determine what changes, if any, may be required to make the conversion from MST to mMST in the SWPF. After all of the tests have been completed, a summary letter report will be prepared that provides the recommended path forward on the conversion.

4.1 Erosion Testing

Parsons has recently procured the services of MPR Associates to provide metallurgy and erosion/corrosion expertise for the SWPF project. Their first tasks were to review the test plan and report from the previous SWPF erosion test, plus a report generated by a previous consultant regarding that test, and develop recommendations for the conduct of follow-on erosion testing using mMST. A letter report containing their recommended path forward is provided in Attachment 5, and serves as the primary basis for the erosion portion of the mMST testing program.

The proposed mMST erosion testing is comprised of two distinct elements. The first involves the setup and operation of a full/pilot scale test loop that is similar to the previously tested system, but includes enhancements identified by MPR to rectify some noted deficiencies from the original test. This system is designed to evaluate the erosion/corrosion of the APA nozzles, pump, and piping that are planned for the Alpha Sorption Drain Tank (ASDT) system in the SWPF, using a test fluid of mMST, sludge simulant, and CSSX simulant. Features of the pilot scale test and its planned operation are as follows.

- System components that will be evaluated for erosion/corrosion include:
  - APA nozzle – 1" ID, 316L SS with weld-deposited Stellite 6 hardsurfacing
  - Wear plate – 304L SS plate mounted at prototypical orientation below the APA nozzle to simulate wear on tank bottom
  - Pipe elbows – 2" ID, 304L SS elbows with 3D and 5D bend radii
  - Pipe welds – prototypical welds in 2" ID 304L SS piping system
  - Pump – prototypical centrifugal pump that will deliver the required test system flows and pressures
- Other primary system components that are not being evaluated for erosion/corrosion effects include: nominal 100-gal polyethylene tank, in-line flowmeter, heat exchanger (to dissipate imparted pump energy), temperature and pressure instrumentation and controls, other piping, and structural materials.
- Permanently mounted analog-scan transducers (and meter system) will be installed to measure erosion at defined points over time.
- A particle size distribution (PSD) analyzer will be procured and setup in the PTC laboratory to provide short turnaround on these critical analyses.
- Flow rate through the system will correspond to a velocity of 50 ft/sec through the APA nozzle (1" ID).
- The first test series will consist of 2 months of operations with a test fluid that is comparable to that used in the previous test, i.e. – mMST concentration at 100% equivalent of the original MST concentration with a nominal 5 wt% suspended solids concentration. The second test series will also be operated for 2 months, but utilize a test fluid containing mMST at 50% of the original MST concentration. Each test will operate on a 24/7 basis for its 2-month duration.
- Attrition of the mMST will be evaluated by taking samples of the test fluid twice a week. It is expected that the test fluids will be changed out every 2 weeks during each test series.

- Subcontract analytical services will be used for particle hardness analysis, confirmation of on-site PSD analyses, and post-test destructive analysis of the key test components.

The second element of the erosion testing involves the setup and operation of three lab scale test loops to evaluate the potential erosion/corrosion effects of high velocity flows on materials that are being considered for the in-tank eductor mixing systems in the SWPF. Only one of the three tank systems includes MST/mMST – the ASDT – which is also being evaluated in the pilot scale test, but at a lower flow rate/velocity. The other two proposed systems – the Spent Oxalic Acid Storage Tank (SOAST) system and the Solvent Drain Tank (SDT) system – are being proposed for evaluation due to a review of project information by MPR Associates on other SWPF task orders that noted a lack of published information regarding the erosion/corrosion of materials in these unique chemical environments (oxalic acid with suspended solids and nitric acid, respectively).

Each of the three lab scale test loops will include three different primary test components – orifice elements made of cast Stellite 6, cast Stellite 12, and 316L SS – that are designed to evaluate the erosive/corrosive effects of the test solutions and conditions. Each loop will also contain a prototypical rotary lobe pump, tank, 304L SS tubing (1/2" ID), and instrumentation and controls to provide sufficient data to control and validate the test conditions.

Features of the lab scale tests and their planned operation are as follows.

- The flow rate through each test loop will correspond to a velocity of 75 ft/sec through the eductors.
- The first test series will consist of 2 months of operations with a test fluid that is prototypical of the expected SWPF fluid, with expected changeout of the fluids every two weeks.
- The second test series will also be operated for 2 months, but utilize a modified test fluid based on the results from the first series. As in the first series, the test fluids will be replaced every two weeks.
- Each test will operate on a 24/7 basis for the 2-month duration of the test.

4.2 Rheology Testing

As noted earlier, this testing is being conducted to close out some open issues with the DNFSB regarding the rheology of test fluids that have been used in previous SWPF tests. The actual rheology testing will be performed by SRNL, with direct funding from DOE (external to the Parsons SWPF contract). The Parsons team will provide the following for the rheology testing effort:

- Input and oversight on the preparation, review, and approval of the test plan and procedure (by SRNL);

- Procurement and preparation of 15-20 test solutions comprised of various combinations of kaolin clay, MST, mMST, sludge simulant, and CSSX simulant for delivery to SRNL;
- Monitoring and oversight of test conduct; and
- Input and oversight on the preparation, review, and approval of the test report (by SRNL).

4.3 APA Testing

Previous air pulse agitation (APA) testing, using a slurry comprised of baseline MST and sludge simulant at a nominal 5 wt% suspended solids concentration, was fairly extensive. A 1/5 scale "mini-APA" test rig was used for the majority of the testing, which was designed to provide basic data to validate the APA scale-up model and determine the optimum conditions for certain parameters, including: the number of pulse pots; the orientation and location of the nozzles relative to the tank bottom; air supply pressure and pulse/drive time; vacuum settings (pulse pot refilling); pulse pot sequencing and timing; and the effects of varying tank fluid levels. Additional testing was conducted in a 5/8 scale tank, using the optimized parameters, to further validate the scale-up model and SWPF design.

The proposed mMST APA testing will consist of performing a limited series of tests in the mini-APA test rig (located at the PTC), to determine if there is any significant difference in blend time and mixing effectiveness for slurries using mMST in place of the baseline MST. Features of the proposed mini-APA test and its planned operation are as follows.

- Two different mMST/sludge simulant slurries will be evaluated – one at the same (100%) concentration as the baseline MST that was used in the previous testing, and one at 50% of the baseline concentration.
- Each of the two mMST slurries will be evaluated in duplicate runs of four tests – two tests at a high tank level, and two at a low tank level – with minor variations in air pressure and vacuum settings. The slurry will be allowed to settle for at least 23 hours between tests.
- The parameters for each proposed test match those used in a previous test with baseline MST, so that a direct comparison of the blend times (time required to achieve 'uniform' mixing in the tank) for the different slurries can be made.
- The 100% mMST slurry will also be subjected to an extended (30-day) settling test, to allow comparison to a similar test performed on the baseline MST slurry.

The results from the mMST APA testing will be compared with those from the previous testing with baseline MST to determine if there are any potential adverse impacts on tank mixing in the SWPF from converting to the mMST.

4.4 Settled Density Testing

Previous lab scale testing was conducted to provide input to the calculations on the bounding value of settled MST density, and the corresponding potential concentrations of fissile material in SWPF tanks, for the Nuclear Criticality Safety Evaluation (NCSE). A centrifuge was used to "pack" the MST samples, which was judged to provide bounding conditions for the gravity settling found in the SWPF Alpha Strike Process (ASP) tanks. The previous testing evaluated the settled density of both a bulk MST solution, and a solution with an equivalent solids concentration that only contained the finer MST particles (< 10 micron). No significant difference was observed in the settled density results for the two solutions (bulk versus fines).

The proposed mMST settled density testing will be similar in scope to the previous testing, except that only the bulk solutions will be evaluated, due to the minimal difference noted between the settled bulk and fines solutions in the previous tests. Three test solutions will be prepared: 1) baseline MST at the same solids concentration used in the previous tests; 2) mMST at the same solids concentration as solution 1; and 3) mMST at 50% of the solids concentration used in solutions 1 and 2. Triplicate samples of these solutions will be centrifuged under the same conditions used in the previous tests to allow a comparative analysis of the 'bounding' settled density of the three solutions. Triplicate aliquots of each solution will also be poured into settling cones and allowed to settle by gravity for 3 months, to provide a comparative analysis of gravity settling versus the 'bounding' condition (centrifugation). The results from the test will then be used by the SWPF Nuclear Safety group to determine if there are any potential adverse impacts on the safety basis from converting to mMST in the ASP.

5.0 Summary / Deliverables

Test reports will be issued for each of the four tests described above, with conclusions about whether the conversion from MST to mMST will have any adverse impact on the current SWPF design, safety basis, or operating scheme.

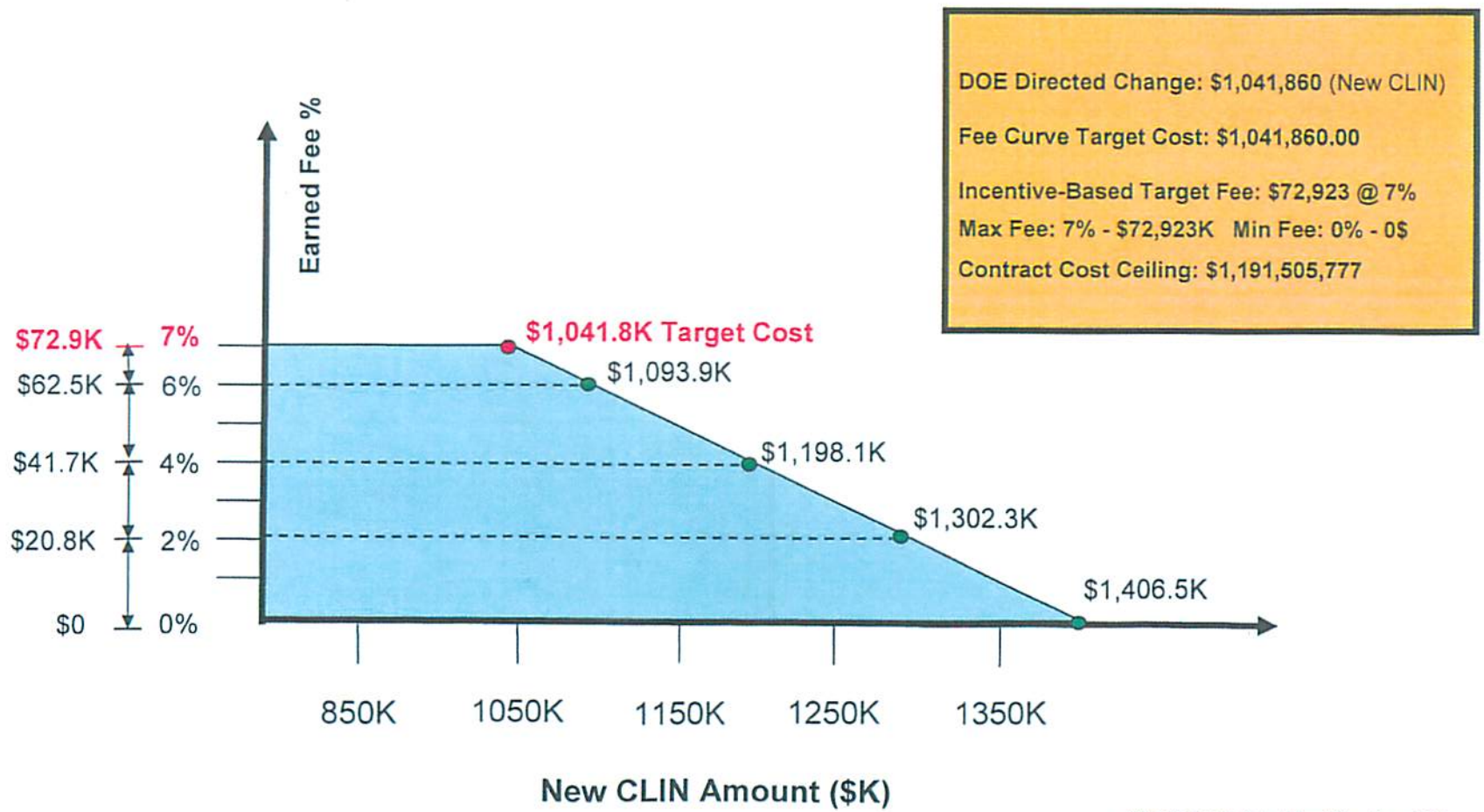
A summary letter report, containing an overall assessment of the test results and a risk/benefit analysis of the potential conversion to mMST in the SWPF, will then be prepared and submitted to DOE.

Attachment 7

SWPF CLIN 9 Cumulative

DOE Directed Changes at 7% Incentive-Based Fee

(80/20 Fee Adjustment Formula)



Attachment 2 to Modification 083