



19. ITEM NO.	20. SCHEDULE OF SUPPLIES/SERVICES	21. QUANTITY	22. UNIT	23. UNIT PRICE	24. AMOUNT

32a. QUANTITY IN COLUMN 21 HAS BEEN  RECEIVED  INSPECTED  NOTED: \_\_\_\_\_ ACCEPTED, AND CONFORMS TO THE CONTRACT, EXCEPT AS

32b. SIGNATURE OF AUTHORIZED GOVERNMENT REPRESENTATIVE \_\_\_\_\_ 32c. DATE \_\_\_\_\_ 32d. PRINTED NAME AND TITLE OF AUTHORIZED GOVERNMENT REPRESENTATIVE \_\_\_\_\_

32e. MAILING ADDRESS OF AUTHORIZED GOVERNMENT REPRESENTATIVE \_\_\_\_\_ 32f. TELEPHONE NUMBER OF AUTHORIZED GOVERNMENT REPRESENTATIVE \_\_\_\_\_

32g. E-MAIL OF AUTHORIZED GOVERNMENT REPRESENTATIVE \_\_\_\_\_

33. SHIP NUMBER \_\_\_\_\_ 34. VOUCHER NUMBER \_\_\_\_\_ 35. AMOUNT VERIFIED CORRECT FOR \_\_\_\_\_ 36. PAYMENT  COMPLETE  PARTIAL  FINAL \_\_\_\_\_ 37. CHECK NUMBER \_\_\_\_\_

38. S/R ACCOUNT NUMBER \_\_\_\_\_ 39. S/R VOUCHER NUMBER \_\_\_\_\_ 40. PAID BY \_\_\_\_\_

41a. I CERTIFY THIS ACCOUNT IS CORRECT AND PROPER FOR PAYMENT \_\_\_\_\_ 42a. RECEIVED BY (*Print*) \_\_\_\_\_

41b. SIGNATURE AND TITLE OF CERTIFYING OFFICER \_\_\_\_\_ 41c. DATE \_\_\_\_\_ 42b. RECEIVED AT (*Location*) \_\_\_\_\_

42c. DATE REC'D (*YY/MM/DD*) \_\_\_\_\_ 42d. TOTAL CONTAINERS \_\_\_\_\_

**PGNA Demonstration**  
**Feasibility Study of PGNA for Perlite Insulation Density Measurement for**  
**Kennedy Space Center Cryogenic Tank Applications**

**Statement of Work**

*July 26th, 2010*

**1.0 Background**

We are requesting assistance in analysis and design of test articles that can be used to demonstrate the feasibility of using prompt gamma neutron activation (PGNA) as a means to non-intrusively determine the density and/or existence of perlite insulation contained in the annular region of doubled-walled cryogenic vessels.

NASA Kennedy Space Center has four large cryogenic tanks (~850,000 gallons – 70 foot diameter) built in 1965 that support launch activities. The tanks are a “Horton Sphere” type of design. An inner tank holds the cryogen. There is a 4 foot annular region filled with perlite insulation between the outer and inner spheres. As changes are made from one program to another we have the opportunity now to perform servicing and maintenance. Part of the process to understand the health of the tanks is to determine the state of the insulation in the annular region. It is desired that a single-sided non-destructive evaluation method be used to determine the state of the insulation.

There are suspect areas on some of the tanks where it is believed that settling through use and launch vibrations has caused a void in the insulation. This void of insulation may have resulted in compaction of the perlite in other areas. We are looking to a) confirm the existence of Perlite in suspect regions, and b) determine if perlite falls in the normal range or if it is denser in regions where compaction would be likely to occur.

**2.0 Scope**

Establish whether it is feasible to use the technique of prompt gamma neutron activation (PGNA) analysis to non-intrusively determine the existence and/or density of perlite insulation in a double-walled steel cryogenic sphere with a 4 foot annular region between the inner and outer sphere and develop a design and test plan to demonstrate the technique.

**3.0 Objectives**

KSC intends to investigate the PGNA technique as a method for non-intrusive measurement of insulation density in cryogenic tanks. The results of the study will determine the follow-on effort and demonstration tests that should be performed.

**4.0 Tasks**

NASA, KENNEDY SPACE CENTER  
RFQ #NNK10343394Q

The Principal Investigator shall spend the appropriate amount of time required to perform each of the following tasks

1. **Monte Carlo Calculation Interpretation:** Analysis of Monte Carlo simulations provided by NASA Kennedy Space Center to determine feasibility and desired exposure time needed to determine if the perlite insulation has been compacted resulting in a higher than normal density, if the insulation has normal density, or if the insulation is missing based on simulated results of PGNA. Conclusions drawn from analysis shall be presented to KSC in the form of a written report.
2. **Collaborative Development of Test Article and Test Plan:** Consultation with Kennedy Space Center on the design of a test article and test plan that can demonstrate the response of PGNA to varying degrees of perlite insulation densities that mimic the possible current conditions of the insulation in the cryogenic storage vessels.
  - **Test Article** – The test article should be capable of demonstrating PGNA response to varying perlite densities. The test article will be fabricated at and by Kennedy Space Center employees, the desired consultation will be for determining the materials, size and geometry of the test article so that results will be comparable to tests that may be performed on the Launch Complex-39 cryogenic storage vessels.
  - **Test Plan** – The test plan shall outline the tests needed to demonstrate PGNA response to varying perlite densities similar to test cases used for Monte Carlo calculations. The plan shall address the number of tests, the consistency of the perlite in the test article, the duration of the test, pertinent details for the control of the neutron source and detectors. The developed plan shall be consistent with the safety guidelines for the use of the MP320 Neutron Generator at the Goddard Space Flight Center Geophysical and Astronomical Observatory (GGAO) Test Facility.
3. **PGNA Demonstration Tests:** Tests shall be performed at Goddard Space Flight Center using the test article developed in collaboration provided under Task 2 and in accordance with the test plan collaboratively developed under Task 2. It is desired that the vendor provide on-site observation of the tests performed by NASA Goddard and NASA Kennedy Space Center employees to ensure that tests are consistent with the plan developed in task 2.
4. **Scope Extension:** Within the schedule and funding provided, the vendor may further analyze the results of task 3 should the effort for tasks 1 through 3 require less time than originally budgeted.

## **5.0 Delivery**

- **Report outlining the conclusions drawn from analysis of Monte Carlo simulations.**
- **Delivery To:** Ellen Arens, NASA, Kennedy Space Center

**6.0 Government-Furnished Property (Part List)**

- Monte Carlo simulations results

**7.0 Security**

- Must have access to the neutron instrumentation testing facility located at the Geophysical and Astronomical Observatory at the NASA Goddard Space Flight Center.

**8.0 Place of Performance**

- Vendor is authorized to perform the work at his facilities but shall be-onsite at Goddard Space Flight Center for the performance of tests detailed in task 3.

**9.0 Period of Performance**

- 6 months after Contract Award

**TERMS AND CONDITIONS OF ORDER**

**GENERAL - OTHER THAN COMMERCIAL ITEMS**

Open Market Supply or Service: This is an order for a non-commercial item or service subject to the terms and conditions of FAR 52.213-4, Terms and Conditions - Simplified Acquisitions (Other Than Commercial Items), incorporated by reference, and any additional terms and conditions incorporated by reference or included in full text.

This order incorporates the following FAR and NASA FAR Supplement (NFS) clauses by reference. See paragraph (c) of FAR 52.213-4.

**FAR, NASA FAR SUPPLEMENT (NFS), AND OTHER CLAUSES APPLICABLE TO ORDER**

**52.204-7 Central Contractor Registration. (APR 2008)**

**52.204-9 Personal Identity Verification of Contractor Personnel. (SEP 2007)**

**52.213-4 Terms and Conditions - Simplified Acquisitions (Other Than Commercial Items). (JUL 2010)**

**52.219-6 Notice of Total Small Business Set-Aside. (JUN 2003)**

**52.219-28 Post-Award Small Business Program Rerepresentation. (APR 2009)**

**52.222-50 Combating Trafficking in Persons. (FEB 2009)**

**52.223-6 Drug-Free Workplace. (MAY 2001)**

**52.227-14 Rights in Data--General. (DEC 2007)**

**52.242-15 Stop-Work Order. (AUG 1989)**

**52.243-1 Changes - Fixed-Price. (AUG 1987) - Alternate I (APR 1984)**

**52.244-6 Subcontracts for Commercial Items. (JUN 2010)**

**52.252-2 Clauses Incorporated by Reference. (FEB 1998)**

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at this/these address(es): Federal Acquisition Regulation (FAR) clauses:

<http://www.acqnet.gov/far/>

NASA FAR Supplement (NFS) clauses:

<http://www.hq.nasa.gov/office/procurement/regs/nfstoc.htm>

(End of clause)

**1852.215-84 Ombudsman. (OCT 2003)**

(a) An ombudsman has been appointed to hear and facilitate the resolution of concerns from offerors, potential offerors, and contractors during the preaward and postaward phases of this acquisition. When requested, the ombudsman will maintain strict confidentiality as to the source of the concern. The existence of the ombudsman is not to diminish the authority of the contracting officer, the Source Evaluation Board, or the selection official. Further, the ombudsman does not participate in the evaluation of proposals, the source selection process, or the adjudication of formal contract disputes. Therefore, before consulting with an ombudsman, interested parties must first address their concerns, issues, disagreements, and/or recommendations to the contracting officer for resolution.

(b) If resolution cannot be made by the contracting officer, interested parties may contact the installation ombudsman, Kelvin M. Manning  
Kennedy Space Center, FL 32899  
Mail Code: AA-B  
(321) 867-7246  
Kelvin.M.Manning@nasa.gov

Concerns, issues, disagreements, and recommendations which cannot be resolved at the installation may be referred to the NASA ombudsman, the Director of the Contract Management Division, at 202-358-0445, facsimile 202-358-3083, e-mail james.a.balinskas@nasa.gov. Please do not contact the ombudsman to request copies of the solicitation, verify offer due date, or clarify technical requirements. Such inquiries shall be directed to the Contracting Officer or as specified elsewhere in this document.

(End of clause)

**1852.216-78 Firm Fixed Price. (DEC 1988)**

The total firm fixed price of this contract is \$[Insert the appropriate amount].

(End of clause)

**1852.223-72 Safety and Health (Short Form). (APR 2002)**

**1852.227-14 Rights In Data - General.**

**1852.237-72 Access to Sensitive Information. (JUN 2005)**

(a) As used in this clause, "sensitive information" refers to information that a contractor has developed at private expense, or that the Government has generated that qualifies for an exception to the Freedom of Information Act, which is not currently in the public domain, and which may embody trade secrets or commercial or financial information, and which may be sensitive or privileged.

(b) To assist NASA in accomplishing management activities and administrative functions, the Contractor shall provide the services specified elsewhere in this contract.

(c) If performing this contract entails access to sensitive information, as defined above, the Contractor agrees to--

(1) Utilize any sensitive information coming into its possession only for the purposes of performing the services specified in this contract, and not to improve its own competitive

position in another procurement.

(2) Safeguard sensitive information coming into its possession from unauthorized use and disclosure.

(3) Allow access to sensitive information only to those employees that need it to perform services under this contract.

(4) Preclude access and disclosure of sensitive information to persons and entities outside of the Contractor's organization.

(5) Train employees who may require access to sensitive information about their obligations to utilize it only to perform the services specified in this contract and to safeguard it from unauthorized use and disclosure.

(6) Obtain a written affirmation from each employee that he/she has received and will comply with training on the authorized uses and mandatory protections of sensitive information needed in performing this contract.

(7) Administer a monitoring process to ensure that employees comply with all reasonable security procedures, report any breaches to the Contracting Officer, and implement any necessary corrective actions.

(d) The Contractor will comply with all procedures and obligations specified in its Organizational Conflicts of Interest Avoidance Plan, which this contract incorporates as a compliance document.

(e) The nature of the work on this contract may subject the Contractor and its employees to a variety of laws and regulations relating to ethics, conflicts of interest, corruption, and other criminal or civil matters relating to the award and administration of government contracts. Recognizing that this contract establishes a high standard of accountability and trust, the Government will carefully review the Contractor's performance in relation to the mandates and restrictions found in these laws and regulations. Unauthorized uses or disclosures of sensitive information may result in termination of this contract for default, or in debarment of the Contractor for serious misconduct affecting present responsibility as a government contractor.

(f) The Contractor shall include the substance of this clause, including this paragraph (f), suitably modified to reflect the relationship of the parties, in all subcontracts that may involve access to sensitive information

(End of clause)

**1852.237-73 Release of Sensitive Information. (JUN 2005)**

(a) As used in this clause, "Sensitive information" refers to information, not currently in the public domain, that the Contractor has developed at private expense, that may embody trade secrets or commercial or financial information, and that may be sensitive or privileged.

(b) In accomplishing management activities and administrative functions, NASA relies heavily on the support of various service providers. To support NASA activities and functions, these service providers, as well as their subcontractors and their individual employees, may need access to sensitive information submitted by the Contractor under this contract. By submitting this proposal or performing this contract, the Contractor agrees that NASA may release to its service providers, their subcontractors, and their individual employees, sensitive information submitted during the course of this procurement, subject to the enumerated protections mandated by the clause at 1852.237-72, Access to Sensitive Information.

(c) (1) The Contractor shall identify any sensitive information submitted in support of this proposal or in performing this contract. For purposes of identifying sensitive information, the Contractor may, in addition to any other notice or legend otherwise required, use a notice similar to the following:

Mark the title page with the following legend:

This proposal or document includes sensitive information that NASA shall not disclose outside the Agency and its service providers that support management activities and administrative functions. To gain access to this sensitive information, a service provider's contract must contain the clause at NFS 1852.237-72, Access to Sensitive Information. Consistent with this clause, the service provider shall not duplicate, use, or disclose the information in whole or in part for any purpose other than to perform the services specified in its contract. This restriction does not limit the Government's right to use this information if it is obtained from another source without restriction. The information subject to this restriction is contained in pages [*insert page numbers or other identification of pages*]. Mark each page of sensitive information the Contractor wishes to restrict with the following legend:

Use or disclosure of sensitive information contained on this page is subject to the restriction on the title page of this proposal or document.

(2) The Contracting Officer shall evaluate the facts supporting any claim that particular information is "sensitive." This evaluation shall consider the time and resources necessary to protect the information in accordance with the detailed safeguards mandated by the clause at 1852.237-72, Access to Sensitive Information. However, unless the Contracting Officer decides, with the advice of Center counsel, that reasonable grounds exist to challenge the Contractor's claim that particular information is sensitive, NASA and its service providers and their employees shall comply with all of the safeguards contained in paragraph (d) of this clause.

(d) To receive access to sensitive information needed to assist NASA in accomplishing management activities and administrative functions, the service provider must be operating under a contract that contains the clause at 1852.237-72, Access to Sensitive Information. This clause obligates the service provider to do the following:

(1) Comply with all specified procedures and obligations, including the Organizational Conflicts of Interest Avoidance Plan, which the contract has incorporated as a compliance document.

(2) Utilize any sensitive information coming into its possession only for the purpose of performing the services specified in its contract.

(3) Safeguard sensitive information coming into its possession from unauthorized use and disclosure.

(4) Allow access to sensitive information only to those employees that need it to perform services under its contract.

(5) Preclude access and disclosure of sensitive information to persons and entities outside of the service provider's organization.

(6) Train employees who may require access to sensitive information about their obligations to utilize it only to perform the services specified in its contract and to safeguard it from unauthorized use and disclosure.

(7) Obtain a written affirmation from each employee that he/she has received and will comply with training on the authorized uses and mandatory protections of sensitive information needed in performing this contract.

(8) Administer a monitoring process to ensure that employees comply with all reasonable security procedures, report any breaches to the Contracting Officer, and implement any necessary corrective actions.

(e) When the service provider will have primary responsibility for operating an information technology system for NASA that contains sensitive information, the service provider's contract shall include the clause at 1852.204-76, Security Requirements for Unclassified Information Technology Resources. The Security Requirements clause requires the service provider to implement an Information Technology Security Plan to protect information processed, stored, or transmitted from unauthorized access, alteration, disclosure, or use. Service provider personnel requiring privileged access or limited privileged access to these information technology systems are subject to screening using the standard National Agency Check (NAC) forms appropriate to the level of risk for adverse impact to NASA missions. The Contracting Officer may allow the service provider to conduct its own screening, provided the service provider employs substantially equivalent screening procedures.

(f) This clause does not affect NASA's responsibilities under the Freedom of Information Act.

(g) The Contractor shall insert this clause, including this paragraph (g), suitably modified to reflect the relationship of the parties, in all subcontracts that may require the furnishing of sensitive information.

(End of clause)

**REPRESENTATIONS, CERTIFICATIONS AND OTHER STATEMENTS OF OFFEROR  
(SIMPLIFIED ACQUISITIONS)**

The completed provision 52.204-8, Annual Representations and Certifications, including any amended representation(s) made at paragraph (b) of the provision submitted as part of the quote are hereby incorporated by reference in this resulting order.

(End of Clause)

**EVALUATION OF QUOTES**

**1852.213-71 Evaluation - Other Than Commercial Items. (JUN 2002)**

(a) The Government will award a contract resulting from this solicitation to the responsible offeror whose offer conforming to the solicitation will be most advantageous to the Government, price and other factors considered. The following factors shall be used to evaluate offers:

Lowest price technically acceptable

(b) Options. The Government will evaluate offers for award purposes by adding the total price for all options to the total price for the basic requirement. The Government may determine that an offer is unacceptable if the option prices are significantly unbalanced. Evaluation of options shall not obligate the Government to exercise the option(s).

(End of provision)

**BASIS FOR SELECTION -- LOWEST PRICED-TECHNICALLY ACCEPTABLE**

Selection and award will be made to the lowest priced, technically acceptable quoter. Technical acceptability will be determined from information submitted by the quoter, which must provide sufficient details to show that the quote meets the Government's requirements.