

ORDER FOR SUPPLIES OR SERVICES


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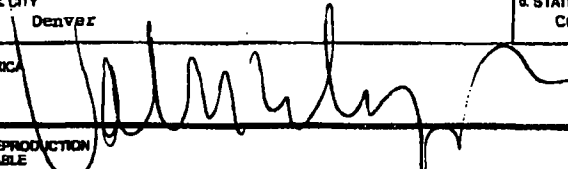
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IMPORTANT: Mark all packages and papers with contract and/or order numbers.

BPA NO.

1. DATE OF ORDER 9/28/12		2. CONTRACT NO. (if any) NRC-HQ-12-C-02-0089		6. SHIP TO:	
3. ORDER NO. T006		MODIFICATION NO.		a. NAME OF CONSIGNEE U.S. Nuclear Regulatory Commission	
4. REQUISITION/REFERENCE NO.		b. STREET ADDRESS Darrell Dunn Mail Stop CSB 5A24M		c. CITY Washington	
5. ISSUING OFFICE (Address correspondence to) U.S. Nuclear Regulatory Commission Div. of Contracts Attn: Valerie Whipple Mail Stop: TWB-01-B10M Washington, DC 20555		7. TO:		d. STATE DC	
a. NAME OF CONTRACTOR SOUTHWEST RESEARCH INSTITUTE S W R I		DUNS: 007936842		e. ZIP CODE 20555	
b. COMPANY NAME		c. TYPE OF ORDER		f. SHIP VIA	
c. STREET ADDRESS 6220 COLEBRA RD		<input type="checkbox"/> a. PURCHASE REFERENCE YOUR Please furnish the following on the terms and conditions specified on both sides of this order and on the attached sheet, if any, including delivery as indicated.		<input checked="" type="checkbox"/> b. DELIVERY Except for billing instructions on the reverse, this delivery order is subject to instructions contained on this side only of the form and is issued subject to the terms and conditions of the above-numbered contract.	
d. CITY SAN ANTONIO		e. STATE TX		f. ZIP CODE 782385166	
9. ACCOUNTING AND APPROPRIATION DATA RFPA: RES-12-254; FAIMIS: 123204 122830 B&R: 2012-60-33-6-199; Job Code: V6355; BOC: 252A Approp. No.: 31X0200; obligation: \$349,995; DUNS: 007936842		10. REQUISITIONING OFFICE RMS		12. F.O.B. POINT N/A	
11. BUSINESS CLASSIFICATION (Check appropriate box(es))		13. PLACE OF		14. GOVERNMENT BIL. NO.	
<input type="checkbox"/> a. SMALL <input checked="" type="checkbox"/> b. OTHER THAN SMALL <input type="checkbox"/> c. DISADVANTAGED <input type="checkbox"/> d. WOMEN-OWNED <input type="checkbox"/> e. HUBZone <input type="checkbox"/> f. SERVICE-DISABLED VETERAN-OWNED <input type="checkbox"/> g. WOMEN-OWNED SMALL BUSINESS (WOSB) ELIGIBLE UNDER THE WOSB PROGRAM <input type="checkbox"/> h. EDWOSB		a. INSPECTION		b. ACCEPTANCE	
15. DELIVER TO F.O.B. POINT ON OR BEFORE (Date)		16. DISCOUNT TERMS		17. SCHEDULE (See reverse for Rejections)	

ITEM NO. (a)	SUPPLIES OR SERVICES (b)	QUANTITY ORDERED (c)	UNIT (d)	UNIT PRICE (e)	AMOUNT (f)	QUANTITY ACCEPTED (g)
	The Contractor shall provide services in accordance with the attached Statement of Work, entitled: "Technical Assistance for the Review and Development of a Summary Report on Availability Methods for Functional Monitoring of Dry Cask Storage." Total CPAF Amount: \$349,995; Total Obligated Amount: \$349,995 Period of Performance: 10-1-2012 through 5-31-2013 NRC COR: Deborah DeMarco 301-492-3143 NRC Task Order COR: Darrell Dunn 301-251-7621 DUNS: 007936842 NAICS: 562211 FSC: R499 ACCEPTED: Signature:  Print Name/Title: 9/28/2012 R.B. Kalmbach Executive Director, Contracts					

18. SHIPPING POINT		19. GROSS SHIPPING WEIGHT		20. INVOICE NO.	
21. MAIL INVOICE TO:					
a. NAME Department of Interior / NRC NRCPayments NRCDenver@NRC.gov					
b. STREET ADDRESS (or P.O. Box) Attn: Fiscal Services Branch - D2770 7301 W. Mansfield Avenue				PHONE: FAX:	
c. CITY Denver		d. STATE CO		e. ZIP CODE 80235-2230	
22. UNITED STATES OF AMERICA BY (Signature) 				23. NAME (Typed) Valerie Whipple Contracting Officer, MSA TITLE: CONTRACTING/ORDERING OFFICER	

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OPTIONAL FORM 347 (REV. 2/2012) PRESCRIBED BY GSA/FAR 48 CFR 53.213(f)

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STATEMENT OF WORK.....Attachment 1

DELIVERY ORDER TERMS AND CONDITIONS NOT SPECIFIED IN THE CONTRACT

A.1 BRIEF PROJECT TITLE AND WORK DESCRIPTION (AUG 2011)

(a) The title of this project is: TECHNICAL ASSISTANCE FOR THE REVIEW AND DEVELOPMENT OF A SUMMARY REPORT ON AVAILABLE METHODS FOR FUNCTIONAL MONITORING OF DRY CASK STORAGE SYSTEMS

(b) Summary work description:

The objectives of this project are to:

(a) Review the currently available monitoring technologies as they apply to the degradation of dry cask SSCs.

(b) Identify functional requirements for dry storage systems, and match monitoring techniques to these functions. Assess where advances in technology are likely to improve functional monitoring.

The results of this project will be used to support the development of regulatory guidance, including the technical basis for monitoring requirements and evaluation of proposed industry actions to mitigate degradation of safety significant SSCs in dry cask storage systems.

A.2 CONSIDERATION AND OBLIGATION--COST-PLUS-AWARD-FEE (AUG 2011)

(a) The total estimated cost to the Government for full performance of this task order is **\$349,995**, of which the sum of \$. } represents the estimated reimbursable costs, and of which \$ represents the base fee.

(b) An award fee pool of \$. 's hereby established for this task order. Evaluation of award fee earned will be accomplished in accordance with the Award Fee Plan (AFP) attached as Attachment 8 to the Contract. The Government reserves the right to unilaterally change the content of the AFP at any time during the life of this contract. Any changes to the plan will be furnished to the Contractor prior to the date they become effective. The amount of award fee available for each period of evaluation and the amount of time for each period will be set forth in the AFP. The final evaluation and determination as to the amount of award fee earned during an evaluation period shall be made unilaterally by the Fee Determination Official (FDO). The Contractor shall be advised of the award fee decision by letter which shall include the rationale for reaching the decision.

(c) The amount obligated by the Government with respect to this task order is **\$349,995**.

(d) This is a fully-funded contract and FAR 52.232-20 - "Limitation of Cost" applies.

A.3 PACKAGING AND MARKING (AUG 2011)

(a) The Contractor shall package material for shipment to the NRC in such a manner that will ensure acceptance by common carrier and safe delivery at destination. Containers and closures shall comply with the Surface Transportation Board, Uniform Freight Classification Rules, or regulations of other carriers as applicable to the mode of transportation.

(b) On the front of the package, the Contractor shall clearly identify the contract number under which the product is being provided.

(c) Additional packaging and/or marking requirements are as follows: N/A

A.4 PLACE OF DELIVERY--REPORTS (AUG 2011)

The items to be furnished electronically to:

Deborah.DeMarco@nrc.gov
Darrell.Dunn@nrc.gov
Mirela.Gavrilas@nrc.gov
Valerie.whipple@nrc.gov

A.5 TASK/DELIVERY ORDER PERIOD OF PERFORMANCE (AUG 2011)

This order shall commence on October 1, 2012 and will expire on May 31, 2013.

A.6 2052.215-70 KEY PERSONNEL (JAN 1993)

(a) The following individuals are considered to be essential to the successful performance of the work hereunder:

Dr. Yi-Ming Pan	Project Manager
Dr. Xihua He	Principal Investigator
Dr. Lynn Tipton	Research Engineer
Dr. Robert Pabalan	Geochemist

The contractor agrees that personnel may not be removed from the contract work or replaced without compliance with paragraphs (b) and (c) of this section.

(b) If one or more of the key personnel, for whatever reason, becomes, or is expected to become, unavailable for work under this contract for a continuous period exceeding 30 work days, or is expected to devote substantially less effort to the work than indicated in the proposal or initially anticipated, the contractor shall immediately notify the contracting officer and shall, subject to the concurrence of the contracting officer, promptly replace the personnel with personnel of at least substantially equal ability and qualifications.

(c) Each request for approval of substitutions must be in writing and contain a detailed explanation of the circumstances necessitating the proposed substitutions. The request must also contain a complete resume for the proposed substitute and other information requested or needed by the contracting officer to evaluate the proposed substitution. The contracting officer and the project officer shall evaluate the contractor's request and the contracting officer shall promptly notify the contractor of his or her decision in writing.

(d) If the contracting officer determines that suitable and timely replacement of key personnel who have been reassigned, terminated, or have otherwise become unavailable for the contract work is not reasonably forthcoming, or that the resultant reduction of productive effort would be so substantial as to impair the successful completion of the contract or the service order, the contract may be terminated by the contracting officer for default or for the convenience of the Government, as appropriate. If the contracting officer finds the contractor at fault for the condition, the contract price or fixed fee may be equitably adjusted downward to compensate the Government for any resultant delay, loss, or damage.

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A.7 2052.215-71 CONTRACTING OFFICER'S REPRESENTATIVE AUTHORITY (NOVEMBER 2006)

(a) The contracting officer's authorized representative (hereinafter referred to as the COR) for this contract is:

Name: Darrell Dunn

Address: Mail Stop CSB 5A24M
Washington, DC 20555

Telephone Number: 301-251-7621

(b) Performance of the work under this contract is subject to the technical direction of the NRC COR. The term "technical direction" is defined to include the following:

(1) Technical direction to the contractor which shifts work emphasis between areas of work or tasks, authorizes travel which was unanticipated in the Schedule (i.e., travel not contemplated in the Statement of Work (SOW) or changes to specific travel identified in the SOW), fills in details, or otherwise serves to accomplish the contractual SOW.

(2) Provide advice and guidance to the contractor in the preparation of drawings, specifications, or technical portions of the work description.

(3) Review and, where required by the contract, approval of technical reports, drawings, specifications, and technical information to be delivered by the contractor to the Government under the contract.

(c) Technical direction must be within the general statement of work stated in the contract. The COR does not have the authority to and may not issue any technical direction which:

(1) Constitutes an assignment of work outside the general scope of the contract.

(2) Constitutes a change as defined in the "Changes" clause of this contract.

(3) In any way causes an increase or decrease in the total estimated contract cost, the fixed fee, if any, or the time required for contract performance.

(4) Changes any of the expressed terms, conditions, or specifications of the contract.

(5) Terminates the contract, settles any claim or dispute arising under the contract, or issues any unilateral directive whatever.

(d) All technical directions must be issued in writing by the COR or must be confirmed by the COR in writing within ten (10) working days after verbal issuance. A copy of the written direction must be furnished to the contracting officer. A copy of NRC Form 445, Request for Approval of Official Foreign Travel, which has received final approval from the NRC must be furnished to the contracting officer.

(e) The contractor shall proceed promptly with the performance of technical directions duly issued by the COR in the manner prescribed by this clause and within the COR's authority under the provisions of this clause.

(f) If, in the opinion of the contractor, any instruction or direction issued by the COR is within one of the categories as defined in paragraph (c) of this section, the contractor may not proceed but shall notify the contracting officer in writing within five (5) working days after the receipt of any instruction or direction and shall request the contracting officer to modify the contract accordingly. Upon receiving the notification from the contractor, the contracting officer shall issue an appropriate contract modification or advise the contractor in writing that, in the contracting officer's

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opinion, the technical direction is within the scope of this article and does not constitute a change under the "Changes" clause.

(g) Any unauthorized commitment or direction issued by the COR may result in an unnecessary delay in the contractor's performance and may even result in the contractor expending funds for unallowable costs under the contract.

(h) A failure of the parties to agree upon the nature of the instruction or direction or upon the contract action to be taken with respect thereto is subject to 52.233-1 -Disputes.

(i) In addition to providing technical direction as defined in paragraph (b) of the section, the COR shall:

(1) Monitor the contractor's technical progress, including surveillance and assessment of performance, and recommend to the contracting officer changes in requirements.

(2) Assist the contractor in the resolution of technical problems encountered during performance.

(3) Review all costs requested for reimbursement by the contractor and submit to the contracting officer recommendations for approval, disapproval, or suspension of payment for supplies and services required under this contract.

(4) Assist the contractor in obtaining the badges for the contractor personnel.

(5) Immediately notify the Security Branch, Division of Facilities and Security (SB/DFS) (via e-mail) when a contractor employee no longer requires access authorization and return of any NRC issued badge to SB/DFS within three days after their termination.

(6) Ensure that all contractor employees that require access to classified Restricted Data or National Security Information or matter, access to sensitive unclassified information (Safeguards, Official Use Only, and Proprietary information) access to sensitive IT systems or data, unescorted access to NRC controlled buildings/space, or unescorted access to protected and vital areas of nuclear power plants receive approval of SB/DFS prior to access in accordance with Management Directive and Handbook 12.3.

(7) For contracts for the design, development, maintenance or operation of Privacy Act Systems of Records, obtain from the contractor as part of closeout procedures, written certification that the contractor has returned to NRC, transferred to the successor contractor, or destroyed at the end of the contract in accordance with instructions provided by the NRC Systems Manager for Privacy Act Systems of Records, all records (electronic or paper) which were created, compiled, obtained or maintained under the contract.

A.8 2052.215-78 TRAVEL APPROVALS AND REIMBURSEMENT -ALTERNATE 1 (OCT 1999)

(a) Total expenditure for travel may not exceed \$1,031 without the prior approval of the contracting officer.

(b) All foreign travel must be approved in advance by the NRC on NRC Form 445, Request for Approval of Official Foreign Travel, and must be in compliance with FAR 52.247-63 Preference for U.S. Flag Air Carriers. The contractor shall submit NRC Form 445 to the NRC no later than 30 days prior to the commencement of travel.

(c) The contractor will be reimbursed only for those travel costs incurred that are directly related to this contract and which are allowable subject to the limitations prescribed in FAR 31.205-46.

(d) It is the responsibility of the contractor to notify the contracting officer in accordance with the FAR Limitations of Cost clause of this contract when, at any time, the contractor learns that travel expenses will cause the contractor to exceed the travel ceiling amount identified in paragraph (a) of this clause.

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(e) Reasonable travel costs for research and related activities performed at State and nonprofit institutions, in accordance with Section 12 of Pub. L. 100-679, shall be charged in accordance with the contractor's institutional policy to the degree that the limitations of Office of Management and Budget (OMB) guidance are not exceeded. Applicable guidance documents include OMB Circular A-87, Cost Principles for State and Local Governments; OMB Circular A-122, Cost Principles for Nonprofit Organizations; and OMB Circular A-21, Cost Principles for Educational Institutions.

A.9 ELECTRONIC PAYMENT (AUG 2011)

The Debt Collection Improvement Act of 1996 requires that all payments except IRS tax refunds be made by Electronic Funds Transfer. Payment shall be made in accordance with FAR 52.232-33, entitled "Payment by Electronic Funds- Central Contractor Registration".

To receive payment, the contractor shall prepare invoices in accordance with NRC's Billing Instructions. Claims shall be submitted on the payee's letterhead, invoice, or on the Government's Standard Form 1034, "Public Voucher for Purchases and Services Other than Personal," and Standard Form 1035, "Public Voucher for Purchases Other than Personal - Continuation Sheet." The preferred method of submitting invoices is electronically to the Department of the Interior at NRCPayments_NBCDenver@nbc.gov. If the contractor submits a hard copy of the invoice, it shall be submitted to the following address:

Department of the Interior
National Business Center
Attn: Fiscal Services Branch - D2770
7301 West Mansfield Avenue
Denver, CO 80235-2230

A.10 WHISTLEBLOWER PROTECTION FOR NRC CONTRACTOR AND SUBCONTRACTOR EMPLOYEES (AUG 2011)

(a) The U.S. Nuclear Regulatory Commission (NRC) contractor and its subcontractor are subject to the Whistleblower Employee Protection public law provisions as codified at 42 U.S.C. 5851. NRC contractor(s) and subcontractor(s) shall comply with the requirements of this Whistleblower Employee Protection law, and the implementing regulations of the NRC and the Department of Labor (DOL). See, for example, DOL Procedures on Handling Complaints at 29 C.F.R. Part 24 concerning the employer obligations, prohibited acts, DOL procedures and the requirement for prominent posting of notice of Employee Rights at Appendix A to Part 24 entitled: "Your Rights Under the Energy Reorganization Act".

(b) Under this Whistleblower Employee Protection law, as implemented by regulations, NRC contractor and subcontractor employees are protected from discharge, reprisal, threats, intimidation, coercion, blacklisting or other employment discrimination practices with respect to compensation, terms, conditions or privileges of their employment because the contractor or subcontractor employee(s) has provided notice to the employer, refused to engage in unlawful practices, assisted in proceedings or testified on activities concerning alleged violations of the Atomic Energy Act of 1954 (as amended) and the Energy Reorganization Act of 1974 (as amended).

(c) The contractor shall insert this or the substance of this clause in any subcontracts involving work performed under this contract.

A.11 GREEN PURCHASING (JUN 2011)

(a) In furtherance of the sustainable acquisition goals of Executive Order 13514, "Federal Leadership in Environmental, Energy, and Economic Performance" products and services provided under this contract/order shall be energy- efficient (Energy Star or Federal Energy Management Program (FEMP) designated), water-efficient,

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biobased, environmentally preferable (e.g., Electronic Product Environmental Assessment Tool (EPEAT) certified), non-ozone depleting, contain recycled content, or are non-toxic or less toxic alternatives, where such products and services meet agency performance requirements. <http://www.fedcenter.gov/programs/eo13514/>

(b) The contractor shall flow down this clause into all subcontracts and other agreements that relate to performance of this contract/order.

A.12 USE OF AUTOMATED CLEARING HOUSE (ACH) ELECTRONIC PAYMENT/REMITTANCE ADDRESS (AUG 2011)

The Debt Collection Improvement Act of 1996 requires that all Federal payments except IRS tax refunds be made by Electronic Funds Transfer. It is the policy of the Nuclear Regulatory Commission to pay government vendors by the Automated Clearing House (ACH) electronic funds transfer payment system. Item 15C of the Standard Form 33 may be disregarded.

PROJECT TITLE: OPERATION OF THE CENTER FOR NUCLEAR WASTE ANALYSES
AS THE NRC'S FEDERALLY FUNDED RESEARCH AND
DEVELOPMENT CENTER (FFRDC) – FIFTH RENEWAL

TASK TITLE: TECHNICAL ASSISTANCE FOR THE REVIEW AND
DEVELOPMENT OF A SUMMARY REPORT ON AVAILABLE
METHODS FOR FUNCTIONAL MONITORING OF DRY CASK
STORAGE SYSTEMS

TASK ORDER NUMBER: 006
JOB CODE: V6355
B&R NUMBER: 2011-60-33-6-199
ISSUING OFFICE: RES
**NRC CONTRACTING OFFICER'S
REPRESENTATIVE (COR):** Deborah DeMarco
NRC TASK ORDER COR: Darrell Dunn (301) 251-7621
FEE RECOVERABLE: No
TAC NUMBER: N/A
DOCKET NUMBER: N/A

1.0 BACKGROUND

Presently, there are 60 independent spent fuel storage installations (ISFSI) in the United States have onsite dry cask storage systems for the storage of SNF. The dry cask storage systems in use vary by design but include a canister or cask with internal structure for maintaining fuel geometry and criticality control, and either a concrete vault or an overpack with concrete or other shielding materials. Originally these systems were licensed for up to 20 years. The absence of a final disposal program has led to the need to extend the initial license of the ISFSIs. Presently, the initial licensing period may be up to 40 years with up to 40 year license extension periods. Because the dry cask storage systems in use at operating ISFSIs were originally licensed for relatively short periods prior to transportation to a final disposal site, degradation processes that could affect the long-term integrity of the dry storage structures, systems, and components (SSCs) were not considered. The required inspections and limiting conditions of operation (LCOs) were primarily based on visual inspection of readily observable SSCs. With the possibility of having these same or similar storage systems in use for many decades through multiple license extensions, the effect of degradation processes on the long term integrity of the important to safety SSC must be considered.

There are multiple challenges to monitoring dry cask storage systems including high gamma and neutron dose rates, lack of accessibility to the canister or cask interior to assess the condition of the fuel, cladding and internal components, and the requirement for containment and maintaining an inert environment within the canisters and casks for extended periods. Presently available technologies may be applicable for monitoring the conditions or predicting degradation of readily accessible dry cask SSCs. A recent survey of potentially applicable techniques is contained in the draft NUREG/CR (ANL/NE-12/18), "NRC Job Code V6060: Extended In-Situ and Real Time monitoring Task 3: Long-Term Dry Cask Storage of Spent Nuclear Fuel," (expected publication in 2012). Specific high priority degradation mechanisms that would benefit from potential monitoring of both onset and progression are identified in draft "Identification and Prioritization of the Technical Information Needs Affecting Potential Regulation of Extended Storage and Transportation of Spent Nuclear Fuel" (ML120580143). The evaluation of the present state of knowledge in technology to effectively monitor and assess

conditions to prevent significant degradation of dry storage SSCs will provide information required to gauge proposed industry actions and possible future inspection requirements.

2.0 OBJECTIVES

The objectives of this project are to:

- (a) Review the currently available monitoring technologies as they apply to the degradation of dry cask SSCs.
- (b) Identify functional requirements for dry storage systems, and match monitoring techniques to these functions. Assess where advances in technology are likely to improve functional monitoring.

The results of this project will be used to support the development of regulatory guidance, including the technical basis for monitoring requirements and evaluation of proposed industry actions to mitigate degradation of safety significant SSCs in dry cask storage systems.

3.0 STAFFING

The contractor shall ensure that the technical staff performing under this task order possess the necessary experience and expertise in the technical areas assigned to them. The NRC reserves the right to approve the Project Manager and the individual technical staff assigned to each task from the necessary technical disciplines. The contractor's Project Manager shall have in-depth expertise on monitoring or sensor development. The contractor's Project Manager and technical staff shall have knowledge of the designs of dry cask storage systems presently in use at operating independent spent fuel storage installations (ISFSIs) licensed by the NRC. The contractor's technical staff shall have experience to include greater than 5 years experience in conducting reviews for spent fuel storage and/or spent fuel transportation systems and shall have an appropriate combination of education, training, and experience in evaluating aging and degradation processes that may affect the structures systems and components (SSCs) of dry cask storage systems including spent nuclear fuel (SNF), cladding, cask internals, and materials used in canisters, casks, overpacks, and shielding. The contractor's technical staff shall also have experience presenting technical information and be able to provide a written reports and oral communications with the NRC staff as needed. The NRC considers the following technical staff to be essential for this effort:

1. Project Manager
2. Task Manager
3. Materials Engineer/Chemical Engineer

4.0 SCOPE OF WORK AND DELIVERABLES

The contractor shall review and provide an assessment of monitoring methods for the safety significant dry storage cask SSCs including spent nuclear fuel (SNF), cladding, cask internals, and materials used in canisters, casks, overpacks, and shielding. This work is part of NRC's Extended Storage and Transportation (EST) project plan. The work required is described in detail below and in Appendix A.

4.1 TASK 1: ASSESS CURRENTLY AVAILABLE MONITORING TECHNOLOGIES

The currently available technologies applicable for monitoring the safety significant SSCs in dry cask storage systems will be reviewed and assessed. The contractor shall identify the specific component/degradation pairs that may be significant for extended storage and transportation of dry cask storage systems. Information on component degradation is available in the draft report "Identification and Prioritization of the Technical Information Needs Affecting Potential Regulation of Extended Storage and Transportation of Spent Nuclear Fuel" (ML120580143). In addition a previous assessment of potentially applicable techniques is available in the draft NUREG/CR (ANL/NE-12/18) "NRC Job Code V6060: Extended In-Situ and Real Time monitoring Task 3: Long-Term Dry Cask Storage of Spent Nuclear Fuel," 2012. For each of the needs identified in ML120580143, the contractor will review monitoring methods that currently exist and that are applicable to the information needs.

Relevant methods may include detection of conditions that may promote degradation (i.e., temperature, relative humidity, moisture, and accumulation of aggressive species), detection of degradation processes on the actual SSCs of interest, or detection of degradation processes on sensing elements in proximity to the SSCs of interest. For each method identified, the contractor will assess the current capability and its applicability for dry cask SSCs of interest. This should include a description of the methodology and how the monitoring methods detect changes in condition or degradation of the SSCs along with details of the monitoring technique such as sensitivity, longevity, area that can be monitored whether the system is active or passive, and whether data collection is continuous or intermittent. Operational limitations including temperature and radiation tolerance of the currently available methods for monitoring dry cask SSCs will be described as well as the calibration, space and power requirements.

The contractor shall also evaluate the applicability of the identified methods to monitor the potential degradation modes for dry cask SSCs that are possible during extended storage and transportation. This should include a consideration of the evolution of the environmental conditions and temperatures of the SSCs and the corresponding effects on the rate of degradation. The applicability assessment should consider the time dependent evolution of the relevant degradation processes along with the capabilities and limitations of the monitoring systems to identify when monitoring should be initiated and how frequently monitoring should be performed. Finally, potential modifications to the existing dry cask storage systems to accommodate the monitoring methods shall be identified.

The effort will be limited to monitoring systems and will not be focused on non-destructive evaluation (NDE) technologies that may be applicable for the identification or quantification of SSC degradation such as localized corrosion and stress corrosion cracking or NDE methods to assess the condition of other dry cask SSC that are already assessed in ANL/NE-12/18.

A summary of the currently available monitoring technologies, their applicability and limitations for dry cask SSCs will be prepared by the contractor. The summary will include a table of the technologies reviewed and a description of the limitations identified in the assessment. The contractor will provide the draft summary to the NRC for review 4 months after contract award.

4.2 TASK 2: IDENTIFY MONITORING TECHNOLOGY ADVANCEMENTS REQUIRED FOR DRY CASK SYSTEMS

Based on the review and assessment conducted in Task 1, the contractor will identify the functional requirements for dry storage systems, and match monitoring techniques to these functions. This will include an assessment of where likely advances in monitoring technologies will improve the monitoring capabilities for dry cask SSCs during extended storage prior to eventual transportation. The advances in technology should be connected to the specific component/degradation pairs that may be significant for extended storage and transportation of dry cask storage systems, the limitations in the currently available technologies identified in Task 1, as well as the needs identified in ML120580143. To the extent possible, the likely advances should address beneficial improvements in monitoring capabilities such as measurement resolution, stability, signal transmission, and radiation induced interference.

The contractor will prepare a draft report that includes the summary of presently available monitoring methods prepared in Task 1 along the functional requirements for dry storage systems monitoring techniques and an assessment of where advances in technology are likely to improve functional monitoring of dry cask SSCs. The report will be submitted to the NRC for review. The contractor will then prepare a final report that addresses all NRC questions and comments.

5.0 PROJECT MANAGEMENT

Maintain Effective Communication with NRC Staff

The contractor shall maintain effective communication with the NRC TO COR to help coordinate and integrate necessary information into the review of available monitoring methods. For the duration of this task order, the contractor shall participate in a weekly telephone call with the NRC's TO COR to discuss the progress to date. The contractor's Project Manager and NRC TO COR shall participate in quarterly progress meetings either in Rockville, MD or at the contractor's place of business, as may be requested by the NRC TO COR.

For All Communications

The contractor shall coordinate all necessary NRC communication for the specific task through the NRC's TO COR or designee (as may be temporarily established via electronic or hard-copy written communication from the NRC TO COR).

NRC Comments

The contractor shall resolve NRC comments through the NRC TO COR when making revisions to any deliverable under each task in this task description.

Quality Assurance for the Project

The contractor shall implement and maintain quality assurance requirements for the project in accordance with Section 14.0 below.

6.0 ACCEPTANCE CRITERIA

The contractor shall document the preparation of the technical letter report on functional

monitoring and maintain appropriate records. An inventory list or copies of such records shall be provided upon request by the NRC TO COR.

The draft and final technical letter report shall provide sufficient detail for members of the public to understand the basis of the conclusions reached. The text of these documents shall be supported by appropriate tables and graphics. Each deliverable provided by the contractor shall include directly or be accompanied by enough technical detail so that the NRC may confirm the contractor's methodologies and calculations.

7.0 LEVEL OF EFFORT

7.0 LEVEL OF EFFORT

The total level of effort for all tasks is 1.0 FTE.

7.1 TASK 1: ASSESS CURRENTLY AVAILABLE MONITORING TECHNOLOGIES

The estimated level of effort for Task 1 is approximately 0.75 FTE.

7.2 TASK 2: IDENTIFY MONITORING TECHNOLOGY ADVANCEMENTS REQUIRED FOR DRY CASK SYSTEMS

The estimated level of effort for Task 2 is approximately 0.25 FTE.

8.0 MEETINGS AND TRAVEL

It is anticipated that one (1) technical staff shall travel to NRC headquarters one (1) time for a program review of duration one (1) day. To the extent practicable, other meetings shall be conducted using video teleconferencing and/or web meeting capabilities. No foreign travel is expected.

<u>Topic</u>	<u>Location</u>	<u>Trips</u>	<u>Days</u>	<u>Contractor Staff</u>
Review Meeting	Rockville, MD		1	1

9.0 NRC FURNISHED MATERIAL

The NRC TO COR will provide the following materials to the contractor at the beginning of Task 1 in electronic format unless otherwise specified:

- Identification and Prioritization of the Technical Information Needs Affecting Potential Regulation of Extended Storage and Transportation of Spent Nuclear Fuel" (ML120580143)
- Draft NUREG/CR (ANL/NE-12/18) "NRC Job Code V6060: Extended In-Situ and Real Time monitoring Task 3: Long-Term Dry Cask Storage of Spent Nuclear Fuel," 2012

The NRC TO COR will continue to provide related documents from the docket file throughout the completion of this task order.

10.0 CONTRACTOR ACQUIRED MATERIAL

No materials are expected to be acquired.

11.0 REPORTS

Five hard copies of the draft and final versions of all reports covering each task shall be forwarded to the NRC TO COR, as well as an electronic version (via electronic mail with electronic attachments) consistent with the word processor in use at the NRC (currently Microsoft Word 2003) or in portable document format (i.e., *.pdf), as appropriate. Additionally, one hard copy shall be sent to the NRC Contracting Officer (CO) as soon as the documents are required to be available.

12.0 TECHNICAL/PROJECT DIRECTION

The NRC TO Contracting Officer's Representative is Darrell Dunn. He is the focal point for all task order-related activities.

Technical direction may be provided by the NRC TO COR to the contractor during the duration of this task order. Technical direction shall not constitute new assignments of work or changes of such a nature as to justify an adjustment in cost or period of performance. Directions, if any, for changes in scope of work, cost, or period of performance will be issued by the NRC CO.

13.0 STANDARD WORK PRACTICES

For all draft and final reports under this agreement, the contractor shall assure that an independent review of numerical computations, mathematical equations, and derivations is performed by qualified technical staff other than the original author(s) of the reports and other than the person who performed the original calculation. If the contractor proposes to check less than 100 percent of all computations, mathematical equations, and derivations in the report(s) (such as may be the case when there is a large number of routine, repetitive calculations), the contractor must first obtain written approval from the NRC TO COR. In addition, all reports, including those which do not contain numerical analyses must be reviewed for consistency and readability by the contractor's management and approved with two signatures. One signature must be from the contractor's Project Manager, and one signature must be from a manager at a higher level than the contractor's Project Manager. Informal submittals/deliverables must be reviewed and forwarded from at least the Project Manager level.

When revisions for reports are issued, a section must be included in the revised report to document dates of, reasons for, and scope of all changes made since the issuance of the first contractor's approved report.

NRC has the option of appointing a Peer Group to review, comment, and recommend changes to the draft and final reports. The contractor may recommend candidates for the Peer Group for approval by the NRC TO COR.

In the case of dissent in the content of the final report, the dissenting party shall have the option of stating its viewpoints and findings. Such statements may appear in the report as decided by the NRC.

This section does not intend to create the development of a formal quality assurance program nor does it require formal quality assurance program documentation or review.

**APPENDIX A
SCHEDULE AND DELIVERABLES**

The schedule of deliverables for Tasks 1 through 5 is outlined below.

TASK	DELIVERABLE	SCHEDULE (business days)
1	Draft Summary of currently available monitoring technologies	90 (4 months)
2	Draft report identifying monitoring technologies advancements required for dry cask storage systems	130 (6 months)
	Final report identifying monitoring technologies advancements required for dry cask storage systems	150 (8 months)