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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

DEC 09 1999

21st Century Industries, Inc.  
Attn: Sam McDowell  
444 North Frederick Ave., Suite 317  
Gaithersburg, MD 20877

SUBJECT: TASK ORDER NO. 6 ENTITLED "PLUTONIUM MC&A GUIDANCE" UNDER  
CONTRACT NO. NRC-02-98-008

Dear Mr. McDowell:

In accordance with Section G.5, Task Order Procedures, of the subject contract, this letter definitizes Task Order No. 6. This effort shall be performed in accordance with the enclosed Statement of Work.

Task Order No. 6 shall be in effect from December 9, 1999 to July 31, 2000. The total cost plus fixed fee for this task order is \$46,954, in which the amount of \$44,718 represents the reimbursable costs, and the amount of \$2,236 represents the fixed fee. Funds in the amount of \$46,954 are obligated to fully fund this task order.

Accounting data for this task order is as follows:

B&R No.: 05015201125  
BOC: 252A  
JCN.: J5247  
APPN No.: 31X0200  
FFS: 5000R028  
OBLIGATED AMOUNT THIS ACTION: \$46,954

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

James Lovett, Darryl Jackson

The Contractor agrees that such personnel shall not be removed from the effort under the task order without compliance with Contract Clause H.2, Key Personnel.

Your contacts during the course of this task order are:

Technical Matters: Donna Umbel - Project Officer  
301/415-7819  
Yen-Ju Chen- Task Order Technical Monitor  
301/415-5615

PDR CONTR NRC-02-98-008

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Any contractual matters should be referred to me on 301/415-8168. The issuance of this task order does not amend any terms or conditions of the subject contract. Please indicate your acceptance of this task order by having an official who is authorized to bind your organization, execute three copies of this document in the spaces provided below and return two fully executed copies to me. You should retain the third copy for your records.

Sincerely,

  
Stephen M. Pool, Contracting Officer  
Division of Contracts and  
Property Management

Enclosure:  
As stated

ACCEPTED T.O. #6 NRC-02-98-008

Arnold C.T. Osborne  
NAME  
Exec. Vice President  
TITLE  
12-13-99  
DATE

## STATEMENT OF WORK

**PROJECT TITLE:** Update Fuel Cycle Safety and Safeguards Regulatory Guidance Documents: Material Control and Accounting - Plutonium MC&A Guidance  
**JOB CODE:** J5247  
**NRC OFFICE/DIVISION:** NMSS/FCSS  
**NRC PROJECT OFFICER:** Donna Umbel  
**NRC TECHNICAL PROJECT MANAGER:** Yen-Ju Chen  
**CONTRACT NUMBER:** NRC-02-98-008

### 1.0 BACKGROUND

Title 10 of the Code of Federal Regulations, Part 74, *Material Control and Accounting of Special Nuclear Material*, Subpart E, requires licensees that possess or use formula quantities of strategic special nuclear material to establish, implement, and maintain material control and accounting (MC&A) systems that will promptly detect losses of material. These MC&A systems must include process monitoring, item monitoring, alarm resolution, and quality assurance and accounting capabilities. Licensees must substantiate the plutonium and uranium mass and isotopic content of SNM received, produced, transferred between areas of custodial responsibility, on inventory or shipped, and discarded or otherwise removed from inventory. For those material forms that are not sufficiently homogeneous to enable representative sampling, licensees must use reliable destructive and nondestructive assay (NDA) methods to establish the isotopic and derived elemental content of the materials. As the regulatory requirements and state-of-the-art technology change, the guidance provided to applicants and licensees must be updated.

### 2.0 OBJECTIVES

The objective of this task order is to provide the NRC technical assistance to update regulatory guidance on methods of destructive and nondestructive assay of the plutonium mass and isotopic content of licensed material and of uranium mass and isotopic content in licensed materials containing plutonium.

The update should account for changes in regulations, changes to acceptable standards, and advancement in technologies for analysis of these materials.

### 3. STAFFING

The contractor task leaders shall have in-depth knowledge of NRC regulatory requirements and up-to-date destructive and nondestructive assay systems applicable to measurement of plutonium and uranium isotopes in metal, oxide, solution, scrap, and waste forms, as well as current knowledge of available reference standards.

#### 4. SCOPE OF WORK AND DELIVERABLES

The contractor shall provide technical assistance to the Office of Nuclear Material Safety and Safeguards by recommending guidance on methods for destructive and nondestructive assays of the plutonium content of licensed material and of uranium mass and isotopic content in licensed materials containing plutonium. The scope of this effort includes:

- (a) Update Regulatory Guide 5.23, *In Situ Assay of Plutonium Residual Holdup*, Revision 1, dated February 1984, to include updated NDA methods for plutonium holdup measurement.
- (b) Revise Regulatory Guide 5.34, *Nondestructive Assay for Plutonium in Scrap Material by Spontaneous Fission Detection*, Revision 1, May 1984. The revision will expand the scope of this guide to include NDA measurement of plutonium and uranium isotopes in metal, oxide, solution, scrap, and waste forms.
- (c) Prepare a Regulatory Guide to discuss chemical analytic methods for measurement of plutonium and of uranium in materials containing plutonium. This guide should include measurement of plutonium and uranium isotopes in metal, oxide, solution, scrap, and waste forms.
- (d) For all three Regulatory Guides, address latest developments in NDA or chemical analytic methods for measurement of plutonium and of uranium in materials containing plutonium, that NRC licensing and inspection staff can adopt as acceptable alternatives to the other methods endorsed or referenced by these guides.
- (e) For all three Regulatory Guides, update references to current regulations, particularly 10 CFR 70.57, 10 CFR 70.58, and 10 CFR Part 74; and update references to the regulatory agency from the Regulatory Division of the Atomic Energy Commission to the Nuclear Regulatory Commission.
- (f) For all three Regulatory Guides, recommend for endorsement or reference of current versions of national standards and technical reports for plutonium measurement.

The contractor shall prepare all deliverables in WordPerfect 8, unless directed otherwise, and submit all deliverables to NRC with a hard paper copy and electronic files as detailed in the schedule below. Letter reports, draft reports, and final technical reports shall be edited and reviewed by the contractor and checked in accordance with good document quality assurance practices prior to delivery to the NRC. Draft products will be noted as such. Final technical reports shall be presented to NRC in "camera-ready" form and ready for NRC publication.

- (a) Within 20 working days after issuance of this task order, the contractor shall provide NRC a letter report describing national standards and technical reports that the contractor proposes to be endorsed or referenced by the subject guides and reasons for recommendations.
- (b) Within 20 working days after receipt of (a) above, NRC shall review and provide comments to the contractor.

- (c) Within 10 working days after (b) above, the contractor shall provide NRC a detailed outline of these three Regulatory Guides.
- (d) Within 20 working days after receipt of (c) above, NRC shall review and provide comments to the contractor.
- (e) Within 40 working days after receipt of NRC comments in (d) above, the contractor shall provide the first draft of the Regulatory Guides to NRC.
- (f) Within 20 working days after receipt of (e) above, NRC shall review and provide comments to the contractor.
- (g) Within 20 working days after receipt of NRC comments in (f) above, the contractor shall provide NRC the final draft of the Regulatory Guides that has incorporated the comments in (f) above.

## **5.0 PROJECT MANAGEMENT**

The contractor shall maintain effective communication with NRC staff. For the duration of this task, the contractor shall participate in biweekly telephone calls with the NRC's TPM to discuss the progress of the work. The contractor's task leader and NRC TPM shall participate in quarterly progress meetings to be held in Rockville, Maryland. Other meetings to address the task planning and NRC comments will be scheduled on an ad hoc basis consistent with the availability of pertinent staff.

The contractor shall coordinate all necessary communication with entities other than the NRC's TPM and Project Officer through the NRC TPM. The contractor shall resolve all NRC comments through the NRC TPM when making revisions to any deliverable under this Task.

The contractor shall implement and maintain quality assurance requirements for the project in accordance with Section 14 of this SOW.

## **6.0 ACCEPTANCE CRITERIA**

The contractor shall provide deliverables on time to meet NRC's schedule. Each deliverable provided by the contractor shall include a level of technical detail sufficient to provide technical support in the event of a challenge or hearing.

## **7.0 LEVEL OF EFFORT**

It is estimated that this project will take approximately 600 hours to complete.

## **8.0 MEETINGS AND TRAVEL**

All travel associated with this task order shall result in trip reports, which may be issued separately or as part of the next monthly letter status report. Copies of separately issued trip reports shall be submitted within 15 days of the completion of travel. For planning purpose, it is estimated that a minimum of two trips to NRC Headquarters will be needed. When practical, telephonic or video conference calls shall be held in lieu of meetings at NRC Headquarters.

It is estimated that this Task Order may require contractor travel for attendance at the following meetings, as needed.

- (a) One-day kick off meeting at NRC headquarters to discuss the contractor's technical approach and milestones, and for contractor discussions with knowledgeable NRC MC&A inspection and/or licensing staff.
- (b) One-day meeting at NRC headquarters to discuss NRC comments on the first draft of these guides.

## 9.0 NRC-FURNISHED MATERIAL

NRC shall provide the contractor with the following materials:

- (a) Title 10 of CFR, Part 74,
- (b) Regulatory Guide 5.23, *In Situ Assay of Plutonium Residual Holdup*, Revision 1,
- (c) Regulatory Guide 5.34, *Nondestructive Assay for Plutonium in Scrap Material by Spontaneous Fission Detection*, Revision 1,
- (d) NUREG-0256, *Methods for the Accountability of Mixed Oxide*, April 1977,
- (e) NUREG/CR-0602, *Active Nondestructive Assay of Nuclear Materials*, January 1981, and
- (f) 4NUREG/CR-5550, *Passive Nondestructive Assay of Nuclear Materials*, March 1991.

## 10. PERIOD OF PERFORMANCE

The period of performance for the work specified in this task order shall commence on the effective date of this task order and shall continue for approximately 7 months.

## 11. CONTRACTOR ACQUIRED MATERIAL

No materials are expected to be acquired under this task.

## 12. REPORTS

All deliverables shall be submitted in hard copy and in electronic medium (files in WordPerfect 8).

## 13. TECHNICAL DIRECTION

Yen-Ju Chen is the designated NRC TPM for this project, and Donna Umbel is the designated NRC Project Officer. Technical instructions may be provided to the contractor during the duration of the project. Technical instructions shall not constitute a new assignment of work or changes of such 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 Contracting Officer.

## 14. QUALITY ASSURANCE

All deliverable reports must be reviewed by the contractor's management and approved with two signatures. One signature must be from the contractor's Task Leader, and one signature must be from a manager at a higher level than the contractor's Task Leader.

When revisions for the 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's TPM or Project Officer.

In the event of dissent in the content of the final reports, the dissenting party shall have the option of stating its viewpoints and findings in a section of the report.