



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D C. 20555-0001

February 8, 2002

National Institute of Standards Technology
Attn: Sharon Rinehart
100 Bureau Drive
Mail Stop 8602
Gaithersburg, MD 20899

SUBJECT: REQUEST FOR PROPOSAL FOR INTERAGENCY AGREEMENT NO. NRC-02-02-007 ENTITLED, "RAIL TUNNEL FIRE ANALYSIS FOR SPENT FUEL TRANSPORTATION CASK" JOB CODE J5414

Dear Ms. Rinehart:

The U. S. Nuclear Regulatory Commission is interested in establishing an Interagency Agreement with National Institute of Standards and Technology for services as described in the enclosed statement of work (SOW).

If you are interested in this work, please submit an original and two copies of a technical and cost proposal to:

U. S. Nuclear Regulatory Commission
Attn: Penelope Kinney
Nuclear Material Safety and Safeguards
Mail Stop T8A23
Washington, D.C. 20555

Your technical proposal should include the following: (1) the names of personnel you will assign to the project, (2) discussions of an understanding of the SOW, (3) discussions of anticipated major difficulties, problem areas, and approaches for their resolution, (4) statements of any interpretations, requirements, or assumptions, (5) procedures for project management's review of work in progress and for coordinating with the NRC Technical Project Manager (TPM); and (6) resumes for all personnel proposed for the effort (inclusive of subcontractors or consultants) that address any conflict of interest concerns.

Your cost proposal should include a breakdown of proposed labor hours, categories, and rates, material, travel, and any other costs associated with the proposed effort. Also submit a spending plan as part of your cost proposal. The spending plan will enable cognizant personnel to track costs and technical progress against the projected spending and percentage of completion for the project. Consequently, the spending plan should contain a projection of the level of cost expenditure that is as accurate as possible, given all currently available information (i.e., costs should not be straight-lined as a matter of convenience).

A/6

We would appreciate receiving your proposal on or before February 25, 2002. If you have any questions regarding this proposed requirement, please contact Penelope Kinney of my staff at (301)415-7805.

Sincerely,

Original signed by:

John J. Linehan, Director
 Program Management, Policy Development
 and Analysis Staff
 Office of Nuclear Material Safety
 and Safeguards

Enclosure: Statement of Work

cc: Anthony Hammins (fax)

Distribution:
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Statement of Work

PROJECT TITLE: Rail Tunnel Fire Analysis for Spent Fuel Transportation Cask
JOB CODE NUMBER: J5414
B&R NUMBER: 25015308270
NRC ISSUING OFFICE: Office of Nuclear Material Safety and Safeguards (NMSS)
NRC TECHNICAL PROJECT
MANAGER (TPM): Christopher Bajwa, SFPO, (301) 415-1237
NRC TECHNICAL ASSISTANCE
PROJECT MANAGER (TAPM): Penelope Kinney, (301) 415-7805
FEE RECOVERABLE TASK: No

1. BACKGROUND:

In response to Congressional inquiries [e.g., Congressman Markey of Massachusetts, Senator Reid's staff of Nevada, and California and Maryland congressmen], and to the September 11, 2001, terrorist events at the World Trade Center in New York City and the Pentagon in Virginia, NRC staff has performed a thermal analyses of the consequences of a Baltimore tunnel fire event and evaluated spent nuclear fuel casks. Initial discussions with the National Transportation Safety Board (NTSB) indicated that they would be performing thermal analyses of the July 2001, Baltimore tunnel fire event and provide those results to the NRC by Spring 2002. The NRC would, in turn, confirm its safety evaluations of a spent fuel cask postulated to reside in the tunnel. Subsequent discussions with NTSB indicated that such analyses would not be provided since the fire was not the cause of the train derailment.

On a separate topic, the NRC staff and the Department of Transportation are performing assessments of potential terrorist acts on rail shipments. In preparation for addressing terrorist acts related to transport through tunnels, it may be necessary for NRC staff to perform thermal analyses of postulated terrorist events in a tunnel. Therefore, the NRC needs a computer model developed for performing thermal analyses of tunnels. This project will provide input for both programs.

1. OBJECTIVES:

The objectives of this project are as follows:

- 1) Develop a computer model of the Baltimore Tunnel that will replicate the thermal conditions that existed during the July 2001 fire. These thermal conditions will then be used by the NRC staff as boundary conditions on a certified spent fuel transportation cask.
- 2) Develop a detailed Computational Fluid Dynamics (CFD) computer model of a tunnel that could be used by the NRC staff for postulated terrorist event assessments. The computer models should include all parameters that would be present in a fire, including the flow of air through the tunnel itself and the heating of the tunnel walls surrounding the source of the fire and the spent fuel cask.

2. TECHNICAL and OTHER SPECIAL QUALIFICATIONS REQUIRED

The personnel performing this work must be experienced in modeling and validating CFD and fire analysis computer codes on enclosure fires.

3. LEVEL of EFFORT:

The estimated level of effort for this project is 20 staff weeks.

4. PERIOD of PERFORMANCE:

The period of performance for the work specified in this agreement shall begin on the date of execution and shall continue through August 31, 2002.

5. SCOPE of WORK:

The National Institute of Standards and Technology (NIST) shall perform thermal-hydraulic studies using a railroad tunnel model with railroad cars necessary to simulate the Baltimore Tunnel event which occurred in July 2001. A fire within the tunnel as well as railcars in the vicinity of the fire will be modeled. Results should include a time-temperature profile at the hottest tunnel cross section and a overall heat flux provided by the fire at the hottest cross section. Once the study and modeling activities have been completed, NIST shall provide to the NRC a technical report that documents the studies performed and provide training on the use of the computer code used to model the tunnel. The work to be performed is described in detail below.

- A. NIST staff shall develop 3-dimensional heat transfer models of the Baltimore rail tunnel fire event, incorporating a fire in either a CFD or fire analysis computer code. NRC personnel will provide the necessary information, including tunnel dimensions and fuel characteristics for the fire, rail cars, etc. NIST shall also determine the temperature gradient and heat flux in the tunnel and, if requested, on the outside of a spent fuel cask engulfed by the fire.

Deliverable date: May 23, 2002.

- B. The tunnel fire model shall be developed and documented by NIST to allow for future use of the model by Spent Fuel Project Office (SFPO) staff to assess possible terrorist event scenarios involving the transportation of spent nuclear fuel. Therefore, a draft and final report that addresses the development of the computer model, the results of the study and includes the temperature gradients within the tunnel and the temperature distribution on the surface of the transportation cask shall be completed.

Draft report due:	June 6, 2002
Final report due:	Two weeks following receipt of NRC staff comments on the draft report.

- C. Provide SFPO staff training on the use of the computer code used to model the Baltimore tunnel fire event.

Training Date:	Time to be negotiated between NIST and SFPO personnel's availability (between June and July 2002).
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6. MEETINGS and TRAVEL

Two, two (2) person trips for 2 days each to NRC headquarters to present and discuss findings is anticipated. Training will be provided to one member of SFPO's staff at the NRC in Rockville, Maryland or at the NIST office in Gaithersburg, Maryland. The NRC TPM will work with NIST personnel to determine the location of the one day training session.

7. NRC-FURNISHED MATERIALS:

The NRC TPM will provide NIST with all necessary information regarding the geometry of the spent fuel cask and tunnel, as well as the fuel for the fire to be analyzed. This effort will be coordinated with NTSB personnel.

8. UNCLASSIFIED WORK EFFORTS

It is mutually expected that the activities under this agreement must not involve classified or sensitive unclassified information or material. If, in the opinion of either party, this expectation changes, the party shall immediately notify the other party in writing. In any event, NIST shall handle and otherwise safeguard classified and sensitive unclassified information and material, including unclassified controlled nuclear information, in accordance with applicable law and NIST requirements, and shall promptly inform the NRC office in writing if and when classified or sensitive unclassified information or material becomes involved.

The NIST shall not permit any individual to have access to Restricted Data or other classified or sensitive unclassified information and material except in accordance with the Atomic Energy Act of 1954, as amended, and NIST and NRC regulations or requirements.

Except as specifically authorized by this agreement or as otherwise approved by the issuing authority, records or other information, documents, and materials furnished by the office in the performance of the agreement shall be used only in connection with the work performed under the agreement. Upon completion or termination of this agreement, the NIST shall transmit to the office all information that NRC requires.

All parties conducting activities under this agreement shall be responsible for the safeguarding from unauthorized disclosure any information or other documents and material exempt from public connection with the performance of work, or generated in the performance of this work under this agreement. Both parties agree to conform to all regulations, requirements, and directions of NRC with respect to this material.

9. PROPRIETARY INFORMATION

In connection with the performance of work under this agreement, the NRC may furnish for review, evaluation, or other use, certain trade secrets or confidential or privileged commercial or financial information determined by the office to be exempt from public inspection or disclosure. A synopsis of such information must be submitted in writing to the NIST contracting officer for reaching agreement with the office on the acceptance and use of the information. Guidance on the protection of proprietary information used in reports prepared by NIST and examples of proper marking of cover, title page, and back cover are contained in NRC MD 12.6.(a).

Proprietary or other privileged information may be provided by the office on an individual basis to NIST employees working as NRC consultants with the understanding that it shall be protected from disclosure and shall be returned to the office upon completion of the work. Any such claimed proprietary data will be appropriately identified and marked as such. The use of proprietary information in reports prepared by consultants requires the protection specified in NRC MD 12.6.(b).

10. DELIVERABLES/SCHEDULE:

The required deliverables shall be prepared and submitted to the NRC TPM in accordance with the anticipated schedule provided below.

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|----|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| a. | Provide a description of the CFD Tunnel fire models with boundary conditions for NRC comment/review and approval. | Prior to initiating calculations |
| b. | Develop the models
Provide the draft technical report | May 23, 2002
June 06, 2002 |
| c. | Provide the final technical report (both hardcopy and a electronic version) that incorporates NRC staff comments. | 2 weeks following receipt of NRC staff comments. |

11.0 SPECIAL REPORTING REQUIREMENTS

NIST shall provide monthly technical and financial status reports to the TPM, TAPM, and SFPO Project Coordinator each month. The technical report shall summarize the work performed each month, list efforts completed, identify any problems or delays encountered or anticipated, and make recommendations for resolution. In the financial report identify total agreement amount, total costs incurred each month, total costs incurred to date, and balance of funds remaining. The reports are due within 15 calendar after the end of the report period. In addition, a contractor spending plan (CSP) is required. The CSP should include a projection of expenditures for each month of performance and indicate the percentage of the project completed. The initial CSP must be submitted with the proposal for approval and should be included in each monthly report with a comparison of the planned to the actual expenditures. (see example below)

Costs	1 st Month	2 nd Month	etc.
Planned	\$	\$	
Actual	\$	\$	
Project Completion	%	%	

12.0 TECHNICAL/PROJECT DIRECTION

Penny Kinney is the NMSS TAPM and is the focal point for all contract-related activities. All work assignments and program funding actions are initiated by the NMSS TAPM. All proposed work scope or schedule changes must be processed through the NMSS TAPM.

Christopher Bajwa is designated the NMSS/SFPO TPM and is responsible for providing technical guidance to the performing organization regarding staff interpretations of the technical aspects of regulatory requirements, copies of interpretations of the technical aspects of regulatory requirements, and copies of relevant documents (e.g., Standard Review Plans and applicant TSARs) when requested by the performing organization. All work products must be reviewed and approved by the TPM before they are submitted as final documents. All technical directions given to the performing organization must be consistent with the work scope and schedule. The NMSS TPM is not authorized to unilaterally make changes to the approved work scope or schedule, or give the performing organization any direction that would increase costs over approved levels.

DETERMINATION AND FINDINGS UNDER THE ECONOMY ACT FOR
INTERAGENCY AGREEMENT NO. NRC-02-02-007 WITH THE
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY

The Spent Fuel Project Office (SFPO) in the Office of Nuclear Material Safety and Safeguards (NMSS) has requested that an interagency agreement be established with the National Institute of Standards and Technology (NIST) for procurement of services to develop a computer model of the Baltimore Tunnel fire which occurred in July 2001 for NRC staff to use for assessing terrorists events. The estimated cost for this work is \$40,000.00 for a 6 month period of performance.

FINDINGS

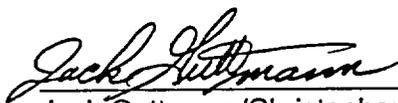
In 2001, the staff met with the National Transportation Safety Board (NTSB) to discuss the events of the July 2001 Baltimore tunnel fire. During that meeting, NTSB stated that it would provide the NRC temperature estimates of the fire within the tunnel. In a follow-on meeting with NTSB (January 2002), the staff was informed that NTSB would not provide the NRC temperature profiles, as originally projected. The reason cited was that the fire was not the initiator of the event. The staff was also informed that the NTSB report may not be released for another year or more (initially projected to be released in Summer of 2002). However, NTSB agreed to provide all information required by the staff to perform the tunnel fire analyses.

The staff is committed to provide Congress answers to the consequences of a spent fuel cask in the Baltimore tunnel fire. This commitment requires the staff to have a thorough understanding of the temperature profile that existed in the tunnel by June, 2002. NTSB recommended NIST as the expert in fire analyses for performing these analyses. In February, 2002, the staff (Chrisopher Bajwa and Jack Guttmann) and representatives from NTSB (Joe Kolly and Jay Kivowitz) met with NIST fire experts to discuss the complexities of the problem. NIST representatives (Anthony Hamins and Howard Baum) stated that they could provide the temperature profiles in time for the staff to perform its calculations and respond to the Commission and Congress on the committed schedules. The computer models and analysis techniques will be provided to both the NRC and NTSB for follow-on applications to terrorist event assessments. Both NRC and NTSB analysts will be trained on the use of the analytic models.

In order to meet the NRC's committed schedules, work on this program must be initiated immediately.

DETERMINATION

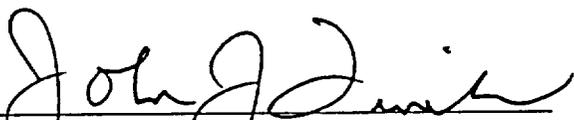
Based on the above findings, and, pursuant to the authority of the Economy Act of 1932, as amended, I hereby determine that, in view of NIST's unique expertise and time constraint to respond to Congressional questions, use of this interagency acquisition is in the Government's best interest and the services required cannot be obtained as conveniently, timely or economically by contracting directly with a private commercial source.



Jack Guttmann/Christopher Bajwa
Spent Fuel Project Office
NMSS

2-5-02

Date



John J. Linehan, Director
Program Management, Policy Development
and Analysis Staff
NMSS

2/11/02

Date