

TO: PENNY KINNEY

Ad 12  
4/18/09

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Exemptions           
FOIA/PA 2012-0311

MEMORANDUM TO: Chairman Klein

FROM: R. William Borchardt  
Executive Director for Operations

James Dyer  
Chief Financial Officer

SUBJECT: CHAIRMAN REVIEW OF AN ACQUISITION FOR SPENT FUEL TRANSPORT RISK ASSESSMENT

In accordance with the January 24, 2005, "Delegation of Contractual Authority" memorandum, you are requested to review the project described in the draft Statement of Work (SOW) (Enclosure 1) and to provide to the Director, Office of Nuclear Material Safety and Safeguards (NMSS), notification to proceed with the subject agreement. This project is an appropriate Agency action conforming to Commission budget and program management decisions, and does not duplicate any other U.S. Nuclear Regulatory Commission (NRC) work.

Sandia National Laboratories (SNL or Sandia) can best carry out efforts for the Spent Fuel Transport Risk Assessment (SFTRA) project described in the attached revised SOW, because SNL developed NUREG/CR-6672, "Reexamination of Spent Fuel Shipment Risk Estimates," published in March 2000. Additionally, SNL has developed the key transport campaign risk assessment code, RADTRAN, which has been used in reviews of environmental impact statements, environmental reports, and other transportation-related environmental reviews for licensing actions that involve spent fuel shipments. SNL is also recognized in the industry for its world-renowned expertise, familiarity, and credibility in transport package design, analysis, and evaluation, under normal and accident conditions.

This project is primarily intended to support NMSS/Division of Spent Fuel Storage and Transportation (SFST) reviews of environmental impact statements; environmental reports, and other transportation-related environmental reviews for future nuclear power plants--or other facility licensing actions that involve spent fuel shipments. This project would also further risk-inform the Commission's technical basis for conclusions regarding spent fuel shipment safety, increase public understanding of spent fuel shipment risks and may, through public participation in the NUREG comment process, help to alleviate public concerns in this area. In this regard, "...[s]takeholders are informed and involved in NRC processes as appropriate." Additionally, this project supports Commission direction that "...regulatory policy concerning transportation of radioactive material be subject to close and continuing review, (46 FR 21620, published April 13, 1981)." The Commission could use the updated SFTRA to review its conclusion that "...present regulations [i.e., 10 CFR Part 71] adequately protect the public against unreasonable risk from the transport of radioactive materials, (ibid.)." The

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Penelope Kinney, POC Lead, NMSS/PBPA, 301-492-3248

WHY  
CANT  
COMMERCIAL  
FIRM'S  
~~CONF.~~  
PERFORM  
- PROPRIETARY  
INFO?  
ACCUMULATED  
KNOWLEDGE?

RISK  
INFORM  
TECH  
BASIS  
FOR  
CONCLUSIONS  
= AWKWARD  
WORDING  
RATHER  
SUPPORT  
TECH BASIS?

JCH AS?

W  
OULD THE  
COMMISSION  
USE  
SFTRA?

WHICH NUREG?

SPILL OUT

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results of the project would also assist NMSS/SFST staff in the review of environmental assessments and impact statements related to interim spent fuel storage facilities.

- How?

Consideration was given to having the work done by in-house staff, other U.S. Department of Energy (DOE) laboratories, or a small business. However, none of these alternative organizations possesses all the requisite technical skills or the wealth and breadth of experience and technical competency to perform the work. Furthermore, SNL has completed 80 percent of the SFTRA project under job code J5546, as of March 2009. Using a source other than SNL would be inefficient, in that any new contractor would require time to become familiar with efforts already performed, as well as future tasks, delaying completion unnecessarily, and increasing the total costs. In addition, as noted above, there is no single entity, other than SNL, sufficiently familiar with the SFTRA cask modeling efforts already performed, and that possesses the technical skills and experience to perform the SFTRA. Using multiple contractors would similarly be inefficient, in that it would require additional NRC staff effort to integrate work from several contractors, thereby incurring schedule delays and cost increases.

WHAT TECH SKILLS

that is

Therefore, SNL is the only source with the necessary experience and knowledge to successfully complete all aspects of this project. [The NMSS/SFST staff: (1) managed the original NUREG-6672 effort, and is managing the existing risk assessment agreement, with SNL, that the revised SOW would modify; (2) has an established working relationship with SNL in the requisite spent nuclear fuel cask technical disciplines; and, (3) will be the principal user of the results. Accordingly, NMSS/SFST will manage the modified agreement.

EXPLAIN WORK RELATED TO NUREG 6672 EFFORT

EXPLAIN EXISTING RISK ASSESSMENT AGREEMENT THAT THE REVISED SOW WOULD MODIFY?

Why needed?

The desired outcome for SFTRA is an NRC NUREG document that summarizes spent fuel transportation safety (as detailed in the "Description/Scope" section below), and that has undergone public and peer review and comment. This modification is required to complete the SFTRA currently being performed under the existing agreement. This modification provides for: (1) an increase in the level of effort required to complete the analyses, which are more complex than originally estimated and stated in the initial SOW; (2) an increase in the level of effort required to resolve peer and public comments, because of the complexity of the analyses; (3) an increase in the Principal Investigator's level of effort in drafting the NUREG, because of the complexity of the analysis; and (4) the development of an electronic brochure.

EXPLAIN WHY MORE COMPLEX.

WHAT

IS THIS AGREEMENT ACTION GOING TO MODIFY THE UNIDENTIFIED SOW?

1ST TIME A MODIFICATION IS MENTIONED!

WHAT ENVISIONED IN ORIGINAL CONTRACT? - WAS A PEER REVIEW PART OF CONTRACT?

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Procurement Method: The project is an agreement with DOE's SNL.

Title: "Spent Fuel Transport Risk Assessment"

Type of Action: This is a modification to an existing interagency agreement.

Program/Contract Background:

There is no Staff Requirements Memorandum, policy guidance, or other authority directing the work. The original agreement required SNL to: (1) perform an updated analysis of the spent fuel transport risk estimates contained in NUREG/CR-6672, based on the collection of new data and estimates of the impact of inner spent fuel canisters on previous spent fuel shipment risk estimates; (2) document the findings in a draft NUREG report; (3) develop graphics and other presentation material to explain NRC's safety role in the transport of radioactive material, especially with regard to spent fuel transport; (4) issue the report for public comment; (5) support a technical peer review (under separate acquisition); (6) consider public and peer comments; and (7) prepare a Final Draft NUREG document to be employed in SFST transportation reviews and other licensing actions. Efforts began in June 2005 and have continued to date.

*Summarize on previous pages*

Staff is not aware of any related contracts within NMSS or throughout the Agency for this type of work. There were no conflicts of interest identified with SNL's current or past work for NRC. Since the agreement was initiated in the summer of 2005, and to date, SNL has not contracted to perform work in the same or similar technical areas as the efforts described, in the attached SOW, with any other entities. Work to date has focused on updating the analysis of spent fuel transport risk estimates, including modeling of spent fuel canisters and package impact limiters, and preparing a draft NUREG that will be issued for public comment in early calendar year 2010. SNL has also prepared an interactive web-based document entitled "Understanding Cask Basics" (SAND 2008-2901W). This document is anticipated to be released December 2009, as an electronic brochure (NUREG/BR) by NRC.

*NOT A COMPLETE SENTENCE!*

*So, How does this contract to propose a modification?*

Description/Scope:

The desired outcome for SFTRA remains unchanged: an NRC NUREG document that summarizes spent fuel transportation safety (including estimated spent fuel transportation impacts using best available technology), and that has undergone both public and peer review and comment. However, the estimated funds necessary to fully complete SFTRA are greater than previously estimated, necessitating the current modification, as described below.

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WHAT IS  
TASK 1-TITLE?

Task 1 modification. SFTRA differs from all prior transportation risk assessments in that it uses NRC certified casks instead of generic casks. For this reason, it is imperative that the analytical models very closely match the actual cask design. It is not possible to make simplifying assumptions about geometry or to leave out complex details. Results of NUREG/CR-6672 and subsequent analyses have indicated the two aspects of cask design that have the greatest influence on package behavior in extra-regulatory accident scenarios are the closure region and the impact limiter. For the HI-STAR 100 cask used in SFTRA, these are the two areas of the design that are the most complex. In the initial planning for SFTRA, it was recognized that the complexity of these two regions must be included in the cask models. The planning also included a change in the structural finite element analysis code that treats the interaction between different components (such as the impact limiter shell and energy-absorbing material) in a more physically correct manner. The interplay between the complexity of the structure and the added analysis code precision was not clearly understood by either the analysts or the code developers at SNL, and required substantial unplanned effort to adjust the cask model code to achieve analysis success.

~~How~~  
How  
does  
this  
discussion  
square  
with  
the  
desired  
outcome  
remaining  
unchanged?  
(previous  
page)

Why does  
it now  
need a  
greater role  
than PI  
in-charger?

Why?

In addition, the level of effort is being increased to provide a greater role, for the Principal Investigator, in drafting the NUREG document, and to provide increased support for the public comment and peer review phase of the project.

Sentence  
fragment!

Task 2 modification. To format the visualization tool. The original SOW focused on developing visual content to help explain transport safety. The SOW did not specify the format of this visual content. Sandia designed a website as a possible mechanism for providing access to this information; however, the website did not meet NRC web protocols. SNL developed an electronic brochure, to be issued by NRC, which will maintain the content and format of the information in the website. This modification will allow for completion of the electronic brochure.

WHAT  
IS TASK  
2?

→ WHAT?

1 million

FOR  
DATA

TABLES  
1 & 2?

This proposed modification, which requires a \$335,300 increase to the agreement ceiling from \$1,475,000 to \$1,810,300, will enable the SFTRA project to be brought to conclusion with additional benefits beyond those captured in the original SOW. No further increases are anticipated.

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Key Milestones/Outputs:

The agreement is nearing completion on the structural, thermal, source-term estimation, and consequence modeling of the NRC-certified casks. A complete write-up of the results of the series of analyses will be submitted in a draft NUREG report, to NRC, by January 2010. The period of performance will be extended from June 2010 to April 2011, to allow completion of these efforts, including incorporation of comments from stakeholders. Previous modifications were made in the summer of 2006 and 2008. There is no change in the expected outcome of this agreement. This will be a generic-risk assessment; however, specific package designs will be employed in the analysis. The assessment will be informed by results of relevant security assessments, but will not evaluate security-related scenarios nor impacts. This assessment will be performed primarily by computer analysis, will be useful in outreach efforts on communicating transport risks, and will complement the work done on the Baltimore and Caldecott tunnel fires (ADAMS Accession Nos. ML 090570742 and ML 070460351, respectively).

*S. Morris*  
*- what were they?*

Chairman's approval, to modify the agreement, was requested in 2006, and authorization to increase the ceiling above \$1 million was received on May 5, 2006, to obtain: (1) SNL's assistance on an updated analysis of transportation risk estimates; (2) documentation of the findings in a draft NUREG report; (3) support of the public comment period, peer review, and publication processes; and (4) technical support on public outreach, regarding the level of safety provided in NRC's transportation regulations.

The following are remaining milestones for deliverables and their completion dates.

Prepare and submit draft NUREG to NRC.	1/05/2010
Support public meeting.	7/05/2010
SNL presentation to peer review group.	9/23/2010
Public and peer review responses.	1/27/2011
Submit final report to NRC.	4/21/2011

Relationship of the Work  
To the Agency's Goals and  
Objectives:

The staff can use the results of SFTRA as a benchmark in its reviews of transportation sections of environmental impact assessments associated with reactor applications, or other future facilities involving spent fuel transport.

A secondary purpose is to support openness and outreach efforts associated with spent fuel transportation. NMSS/SFST staff previously studied spent fuel transport impacts and found that spent fuel shipment risks are low. However, the public remains concerned about spent fuel

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shipments in anticipation of shipment campaigns to storage and/or disposal facilities. Since publication of NUREG/CR-6672 in March 2000, staff has recently completed spent fuel cask security assessments, and believes those results can be leveraged to improve the assessment of spent fuel transport risk estimates. Staff also has a new capability to better model spent fuel cask components and their effects on transport risk estimates, and believes the results could be used to represent more realistic transportation risk assessments that would also further address public concerns. Staff believes that an updated assessment of spent fuel transport risk estimates should be completed soon, before future spent fuel shipments.

No change in desired outcome?

Period of Performance: The performance period of this agreement began on June 23, 2005, and currently ends on June 10, 2010. The proposed modification includes an extension until April 2011.

Chairman Action Needed by: July 14, 2009

Total Estimated Cost: \$335,300 [includes fiscal year (FY) 2009 funding of \$235,300]

Estimated Cost by FY: FY 2009: \$235,300  
FY 2010: \$25,000  
FY 2011: \$75,000

< 1 million

Budget Availability: NMSS has budgeted \$350,000 for this effort in FY 2009, of which \$114,700 will fully fund the current agreement up to the cost ceiling. Contract support of \$25,000 is included in the FY 2010 budget, and \$75,000 is included in the base budget request for FY 2011, as part of the Planning, Budgeting, and Performance management process. FY 2010 resource requirements decrease to reflect the completion of the SFTRA, and issuance of the draft NUREG for public comment. Efforts under this agreement during FY 2010 will principally be to support a separate peer review of the SFTRA. FY 2011 resource requirements increase to reflect incorporation of the peer review comments and issuance of the final NUREG report.

\$  
Down  
ADD  
UP!

I thought MOD = \$335,300?

All prior-year funds were expended by January 2009. FY 2009 budgeted funds are needed for completion of the original effort, and the expansion discussed in this paper. The FY 2009 budgeted funds are planned for obligation in August, but most of these funds will be carried over into FY 2010, for the reasons outlined below. These funds will provide for contractor support from September (estimated to be \$38,000) through the issuance of the draft NUREG in

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early January 2010 (estimated to be an additional \$127,000). Also, approximately \$65,000 will be carried over from FY 2009 into FY 2010, to allow continuation of contractor efforts from January through July 2010, to support the separate peer review. These efforts were originally anticipated and budgeted to occur during FY 2009, but are now deferred to FY 2010, to complete the Chairman Review process.

*Very  
Compelling*

Job Code/Program  
Planned Activity:

J5546/Spent Fuel Storage and Transportation/ Licensing



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NMSS will consider all pertinent requirements associated with the organizational conflicts of interest (OCIs) for this project, including Sandia's role and activities for DOE's Office of Civilian Radioactive Waste Management, in accordance with the NRC requirements stated in Management Directive 11.7, "NRC Procedures for Placement and Monitoring of Work with the U.S. Department of Energy," and the Nuclear Regulatory Commission Acquisition Regulation, Subpart 2009.5, and will ensure compliance with OCI requirements, with regard to placement of the resulting agreement.

It is requested that all budget information concerning this project be guarded as official use, only until after the agreement is awarded.

The Office of the General Counsel has reviewed this paper and has no legal objection.

Once the Chairman has reviewed this procurement, the Chairman will be notified of any subsequent significant changes, whether the changes occur before or after the award, or throughout the period of the contract.

This proposed procurement has been evaluated by the Procurement Oversight Committee, to ensure that it supports the Commission's programmatic direction and is consistent with Commission-approved budget resources, and to ensure that appropriate and sufficient programmatic and contractual content is included to facilitate a streamlined Chairman review.

The NMSS Director requests your notification to proceed with this action. If you, or your staff, wish, a briefing on the project can be provided.

Enclosure:  
"Revised Statement of Work"

Cc: Commissioner Jaczko  
Commissioner Lyons  
Commissioner Svinicki  
OGC  
SECY  
OPA  
OCA

DISTRIBUTION:  
SFST r/f                      NMSS r/f                      RidsNmssOd

OFC:	SFST	SFST	NMSS	SFST	SFST	SFST
NAME:	JGlenny	JCook	EKrauss	DPstrak	EHuemann	RLorson
DATE:	3/31/2009	3/31/2009	4/6/2009	3/31/2009	3/31/2009	4/2/2009
OFC:	SFST	SFST	PMDA	ADM	OGC	NMSS
NAME:	NMamish	WBrach	PEasson	MFlynn	MMaxim	MWeber
DATE:	4/3/2009	/ /09	/ /09	/ /09	/ /09	/ /09
OFC:	EDO	CFO				
NAME:	RBorchardt	JDyer				
DATE:	/ /09	/ /09	/ /09			

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Commissioner Lyons  
Commissioner Svinicki  
OGC  
SECY  
OPA  
OCA

why a paper? 7  
\$ 1.475 to  
\$ 1.810

MEMORANDUM TO: Chairman Klein  
FROM: R. William Borchardt  
Executive Director for Operations  
James Dyer  
Chief Financial Officer  
SUBJECT: CHAIRMAN REVIEW OF AN ACQUISITION FOR SPENT FUEL TRANSPORT RISK ASSESSMENT

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INJECT  
LAST  
PARAGRAPH AND  
PG 4 PURPOSE  
JEFF HAS  
DETERMINED  
THAT

Sandia National Laboratories (SNL or Sandia) can best carry out efforts for the Spent Fuel Transport Risk Assessment (SFTRA) project described in the attached revised SOW, ~~because~~ SNL developed NUREG/CR-6672, "Reexamination of Spent Fuel Shipment Risk Estimates," published in March 2000. Additionally, SNL ~~has~~ developed the key transport campaign risk assessment code, RADTRAN, which has been used in reviews of environmental impact statements, environmental reports, and other transportation-related environmental reviews for licensing actions that involve spent fuel shipments. SNL is also recognized in the industry for its world-renowned expertise, familiarity, and credibility in transport package design, analysis, and evaluation, under normal and accident conditions.

RELATIONSHIP TO THIS MOD

MOVE  
TO  
NEXT  
PG.

This project is ~~primarily intended~~ <sup>will</sup> to support NMSS/Division of Spent Fuel Storage and Transportation (SFST) reviews of environmental impact statements; environmental reports, and other transportation-related environmental reviews for future nuclear power plants--or other facility licensing actions that involve spent fuel shipments. This project ~~would~~ <sup>will</sup> also further risk-inform the Commission's technical basis for conclusions regarding spent fuel shipment safety, increase public understanding of spent fuel shipment risks and may, through public participation in the NUREG comment process, help to alleviate public concerns in this area. In this regard, "...[s]takeholders are informed and involved in NRC processes as appropriate." Additionally, this project supports Commission direction that "...regulatory policy concerning transportation of radioactive material be subject to close and continuing review, (46 FR 21620, published April 13, 1981)." The Commission ~~could~~ <sup>can</sup> use the updated SFTRA to review its conclusion that "...present regulations [i.e., 10 CFR Part 71] adequately protect the public against unreasonable risk from the transport of radioactive materials, (ibid.)." The

HOW?  
IS THIS  
BEING DONE?

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Penelope Kinney, POC Lead, NMSS/PBPA, 301-492-3248

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results of the project <sup>will</sup> ~~would~~ also assist NMSS/SFST staff in the review of environmental assessments and impact statements related to interim spent fuel storage facilities.

How?

INSERT FROM SF 1

Consideration was given to having the work done by in-house staff, other U.S. Department of Energy (DOE) laboratories, or a small business. However, none of these alternative organizations possesses all the requisite technical skills or the wealth and breadth of experience and technical competency to perform the work. Furthermore, SNL has completed 80 percent of the SFTRA project under job code J5546, as of March 2009. Using a source other than SNL would be inefficient, in that any new contractor would require time to become familiar with efforts already performed, as well as future tasks, delaying completion unnecessarily, and increasing the total costs. In addition, as noted above, there is no single entity, other than SNL, sufficiently familiar with the SFTRA cask modeling efforts already performed, and that possesses the technical skills and experience to perform the SFTRA. Using multiple contractors would similarly be inefficient, in that it would require additional NRC staff effort to integrate work from several contractors, thereby incurring schedule delays and cost increases.

PROJECT

Therefore, SNL is the only source with the necessary experience and knowledge to successfully complete all aspects of this project. The NMSS/SFST staff: (1) managed the original NUREG-6672 effort, and is managing the existing risk assessment agreement, with SNL, that the revised SOW would modify; (2) has an established working relationship with SNL in the requisite spent nuclear fuel cask technical disciplines; and, (3) will be the principal user of the results. Accordingly, NMSS/SFST will manage the modified agreement.

MODS to SF 1 2ND PARAGRAPH

*Add purpose of MOD - from Point A to Point B*  
The desired outcome for SFTRA is an NRC NUREG document that summarizes spent fuel transportation safety (as detailed in the "Description/Scope" section below), and that has undergone public and peer review and comment. This modification is required to complete the SFTRA currently being performed under the existing agreement. This modification provides for: (1) an increase in the level of effort required to complete the analyses, which are more complex than originally estimated and stated in the initial SOW; (2) an increase in the level of effort required to resolve peer and public comments, because of the complexity of the analyses; (3) an increase in the Principal Investigator's level of effort in drafting the NUREG, because of the complexity of the analysis; and (4) the development of an electronic brochure.

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Procurement Method: The project is an agreement with DOE's SNL.

Title: "Spent Fuel Transport Risk Assessment"

Type of Action: This is a modification to an existing interagency agreement.

Program/Contract Background:

~~There is no Staff Requirements Memorandum, policy guidance, or other authority directing the work. The original agreement required SNL to: (1) perform an updated analysis of the spent fuel transport risk estimates contained in NUREG/CR-6672, based on the collection of new data and estimates of the impact of inner spent fuel canisters on previous spent fuel shipment risk estimates; (2) document the findings in a draft NUREG report; (3) develop graphics and other presentation material to explain NRC's safety role in the transport of radioactive material, especially with regard to spent fuel transport; (4) issue the report for public comment; (5) support a technical peer review (under separate acquisition); (6) consider public and peer comments; and (7) prepare a Final Draft NUREG document to be employed in SFST transportation reviews and other licensing actions. Efforts began in June 2005 and have continued to date.~~

*contract background needs to be clear here - originated in 2005 for \$1,475,000? 5 mods since 2005 (pg 5)? pop 6/23/05 - 6/10/10?*

~~Staff is not aware of any related contracts within NMSS or throughout the Agency for this type of work. There were no conflicts of interest identified with SNL's current or past work for NRC. Since the agreement was initiated in the summer of 2005, and to date, SNL has not contracted to perform work in the same or similar technical areas as the efforts described, in the attached SOW, with any other entities.~~

*ARE - IS THIS TRUE? OR FOR THIS WORK?*

~~Work to date has focused on updating the analysis of spent fuel transport risk estimates, including modeling of spent fuel canisters and package impact limiters, and preparing a draft NUREG that will be issued for public comment in early calendar year 2010. SNL has also prepared an interactive web-based document entitled "Understanding Cask Basics" (SAND 2008-2901W). This document is anticipated to be released December 2009, as an electronic brochure (NUREG/BR) by NRC.~~

Description/Scope:

~~The desired outcome for SFTRA remains unchanged: an NRC NUREG document that summarizes spent fuel transportation safety (including estimated spent fuel transportation impacts using best available technology), and that has undergone both public and peer review and comment. However, the estimated funds necessary to fully complete SFTRA are greater than previously estimated, necessitating the current modification, as described below.~~

*WILL THIS WORK COMPLETE THIS PROJECT? (OR A CONTINUING NEED?)*

*MOVE TO 1st PG - PART of PURPOSES - AND WHY*

*to complete the project. WHY?*

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Task 1 modification. SFTRA differs from all prior transportation risk assessments in that it uses NRC certified casks instead of generic casks. For this reason, it is imperative that the analytical models very closely match the actual cask design. It is not possible to make simplifying assumptions about geometry or to leave out complex details. Results of NUREG/CR-6672 and subsequent analyses have indicated the two aspects of cask design that have the greatest influence on package behavior in extra-regulatory accident scenarios are the closure region and the impact limiter. For the HI-STAR 100 cask used in SFTRA, these are the two areas of the design that are the most complex. In the initial planning for SFTRA, it was recognized that the complexity of these two regions must be included in the cask models. The planning also included a change in the structural finite element analysis code that treats the interaction between different components (such as the impact limiter shell and energy-absorbing material) in a more physically correct manner. The interplay between the complexity of the structure and the added analysis code precision was not clearly understood by either the analysts or the code developers at SNL, and required substantial unplanned effort to adjust the cask model code to achieve analysis success.

NOT CRISP OF CSAR

JNL selected for expertise - mixed message

WHY? too much detail covered by ORIGINAL ESTIMATE.

WHY?

In addition, the level of effort is being increased to provide a greater role, for the Principal Investigator, in drafting the NUREG document, and to provide increased support for the public comment and peer review phase of the project.

Task 2 modification. To format the visualization tool. The original SOW focused on developing visual content to help explain transport safety. The SOW did not specify the format of this visual content. Sandia designed a website as a possible mechanism for providing access to this information; however, the website did not meet NRC web protocols. SNL developed an electronic brochure, to be issued by NRC, which will maintain the content and format of the information in the website. This modification will allow for completion of the electronic brochure.

MOVE TO PURPOSE 100 PG.

This proposed modification, <sup>ISSUE IN FY 2005</sup> which requires a \$335,300 increase to the agreement ceiling from \$1,475,000 to \$1,810,300, will enable the SFTRA project to be brought to conclusion with additional benefits beyond those captured in the original SOW. No further increases are anticipated.

WHAT

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Key Milestones/Outputs:

The agreement is nearing completion on the structural, thermal, source-term estimation, and consequence modeling of the NRC-certified casks. A complete write-up of the results of the series of analyses will be submitted in a draft NUREG report, to NRC, by January 2010. The period of performance will be extended from June 2010 to April 2011, to allow completion of these efforts, including incorporation of comments from stakeholders. Previous modifications were made in the summer of 2006 and 2008. ~~There is no change in the expected outcome of this agreement.~~ This will be a generic-risk assessment; however, specific package designs will be employed in the analysis. The assessment will be informed by results of relevant security assessments, but will not evaluate security-related scenarios nor impacts. This assessment will be performed primarily by computer analysis, will be useful in outreach efforts on communicating transport risks, and will complement the work done on the Baltimore and Caldecott tunnel fires (ADAMS Accession Nos. ML 090570742 and ML 070460351, respectively).

CONTRACT BACKGROUND

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CONTRACT BACKGROUND

The following are <sup>the</sup> ~~remaining~~ milestones for deliverables and their completion dates.

- Prepare and submit draft NUREG to NRC. 1/05/2010
- Support public meeting. 7/05/2010
- SNL presentation to peer review group. 9/23/2010
- Public and peer review responses. 1/27/2011
- Submit final report to NRC. 4/21/2011

Relationship of the Work To the Agency's Goals and Objectives:

The staff ~~can use~~ <sup>will</sup> the results of SFTRA as a benchmark in its reviews of transportation sections of environmental impact assessments associated with reactor applications, or other future facilities involving spent fuel transport.

A secondary purpose is to support openness and outreach efforts associated with spent fuel transportation. NMSS/SFST staff previously studied spent fuel transport impacts and found that spent fuel shipment risks are low. However, the public remains concerned about spent fuel

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shipments in anticipation of shipment campaigns to storage and/or disposal facilities. Since publication of NUREG/CR-6672 in March 2000, staff has recently completed spent fuel cask security assessments, and believes those results can be leveraged to improve the assessment of spent fuel transport risk estimates. Staff also has a new capability to better model spent fuel cask components and their effects on transport risk estimates, and believes the results could be used to represent more realistic transportation risk assessments that would also further address public concerns. Staff believes that an updated assessment of spent fuel transport risk estimates should be completed soon, before future spent fuel shipments.

?

Period of Performance: The performance period of this agreement began on June 23, 2005, and currently ends on June 10, 2010. The proposed modification ~~includes~~ <sup>REQUESTS</sup> an extension until April 2011.

Chairman Action Needed by: July 14, 2009

Total Estimated Cost: ~~\$335,300 (includes fiscal year (FY) 2009 funding of \$235,300)~~

Estimated Cost by FY: FY 2009: \$235,300  
FY 2010: \$25,000  
FY 2011: \$75,000

Budget Availability: NMSS has budgeted \$350,000 for this effort in FY 2009, of which \$114,700 will fully fund the current agreement up to the cost ceiling. Contract support of \$25,000 is included in the FY 2010 budget, and \$75,000 is included in the base budget request for FY 2011, as part of the Planning, Budgeting, and Performance management process. FY 2010 resource requirements decrease to reflect the completion of the SFTRA, and issuance of the draft NUREG for public comment. Efforts under this agreement during FY 2010 will principally be to support a separate peer review of the SFTRA. FY 2011 resource requirements increase to reflect incorporation of the peer review comments and issuance of the final NUREG report.

*why funding an existing agreement?*

All prior-year funds were expended by January 2009. FY 2009 budgeted funds are needed for completion of the original effort, and the expansion discussed in this paper. The FY 2009 budgeted funds are planned for obligation in August, but most of these funds will be carried over into FY 2010, for the reasons outlined below. These funds will provide for contractor support from September (estimated to be \$38,000) through the issuance of the draft NUREG in



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early January 2010 (estimated to be an additional \$127,000). Also, approximately \$65,000 will be carried over from FY 2009 into FY 2010, to allow continuation of contractor efforts from January through July 2010, to support the separate peer review. These efforts were originally anticipated and budgeted to occur during FY 2009, but are now deferred to FY 2010, to complete the Chairman Review process.

Job Code/Program  
Planned Activity:

J5546/Spent Fuel Storage and Transportation/ Licensing

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NMSS will consider all pertinent requirements associated with the organizational conflicts of interest (OCIs) for this project, including Sandia's role and activities for DOE's Office of Civilian Radioactive Waste Management, in accordance with the NRC requirements stated in Management Directive 11.7, "NRC Procedures for Placement and Monitoring of Work with the U.S. Department of Energy," and the Nuclear Regulatory Commission Acquisition Regulation, Subpart 2009.5, and will ensure compliance with OCOI requirements, with regard to placement of the resulting agreement.

It is requested that all budget information concerning this project be guarded as official use, only until after the agreement is awarded.

The Office of the General Counsel has reviewed this paper and has no legal objection.

Once the Chairman has reviewed this procurement, the Chairman will be notified of any subsequent significant changes, whether the changes occur before or after the award, or throughout the period of the contract.

This proposed procurement has been evaluated by the Procurement Oversight Committee, to ensure that it supports the Commission's programmatic direction and is consistent with Commission-approved budget resources, and to ensure that appropriate and sufficient programmatic and contractual content is included to facilitate a streamlined Chairman review.

The NMSS Director requests your notification to proceed with this action. If you, or your staff, wish, a briefing on the project can be provided.

Enclosure:  
"Revised Statement of Work"

Cc: Commissioner Jaczko  
Commissioner Lyons  
Commissioner Svinicki  
OGC  
SECY  
OPA  
OCA

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<b>OFC:</b>	SFST	SFST	NMSS	SFST	SFST	SFST
<b>NAME:</b>	JGlenny	JCook	EKrauss	DPstrak	EHuemann	RLorson
<b>DATE:</b>	3/31/2009	3/31/2009	4/6/2009	3/31/2009	3/31/2009	4/2/2009
<b>OFC:</b>	SFST	SFST	PMDA	ADM	OGC	NMSS
<b>NAME:</b>	NMamish	WBrach	PEasson	MFlynn	MMaxim	MWeber
<b>DATE:</b>	4/3/2009	/ /09	/ /09	/ /09	/ /09	/ /09
<b>OFC:</b>	EDO	CFO				
<b>NAME:</b>	RBorhardt	JDyer				
<b>DATE:</b>	/ /09	/ /09	/ /09			

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Enclosure:  
"Revised Statement of Work"

Cc: Commissioner Jaczko  
Commissioner Lyons  
Commissioner Svinicki  
OGC  
SECY  
OPA  
OCA

**Rickie Seltzer**

---

**From:** Rickie Seltzer  
**Sent:** Saturday, April 18, 2009 3:14 PM  
**To:** Penelope Kinney  
**Subject:** RE: Chairman Memo for J5546 SFTRA.doc

Penny - both Ron and I reviewed the document. I am sorry, it is very confusing and needs substantive re-work. The major question is why is it a Chairman paper? it is for \$335,300, so it doesn't hit any thresholds for review. It is a change of performance period and % increase, which would require notification. Maybe we've overlooked something. The purpose is not clear - it doesn't walk you clearly from the existing agreement, through the changes that support the modification. The contract background is also very fuzzy and the work is described differently in multiple places.

I will leave both my and Ron's comments on my work chair if you want to pick them up. (b)(6)  
(b)(6) Once you  
take a look, send me an e-mail if you would like to discuss and I can give you a call. (b)(6)  
(b)(6) Rickie

---

**From:** Penelope Kinney  
**Sent:** Wednesday, April 08, 2009 10:13 AM  
**To:** Rickie Seltzer  
**Subject:** Chairman Memo for J5546 SFTRA.doc

Good Morning Rickie,  
Attached is a memo that's currently being reviewed within the office and NMSS would like R. Thompson to review. NMSS plans to provide it to DC by 4/24. Please let me know if you need any additional info.

Thanks,  
Penny  
(301) 492-3248

**Rickie Seltzer**

---

**From:** Penelope Kinney  
**Sent:** Wednesday, April 08, 2009 10:13 AM  
**To:** Rickie Seltzer  
**Subject:** Chairman Memo for J5546 SFTRA.doc  
**Attachments:** Chairman Memo for J5546 SFTRA.doc

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Thanks,  
Penny  
(301) 492-3248

*poorly written  
- very confusing  
see COMMENTS  
- P.K.*



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

MEMORANDUM TO: Chairman Klein

FROM: R. W. Borchardt  
Executive Director for Operations

James Dyer  
Chief Financial Officer

SUBJECT: CHAIRMAN REVIEW OF AN ACQUISITION FOR SPENT FUEL  
TRANSPORT RISK ASSESSMENT

In accordance with the January 24, 2005, "Delegation of Contractual Authority" memorandum, you are requested to review the project described in the draft Statement of Work (SOW) (Enclosure 1) and to provide to the Director, Office of Nuclear Material Safety and Safeguards (NMSS), notification to proceed with the subject agreement. This project is an appropriate Agency action conforming to Commission budget and program management decisions, and does not duplicate any other U.S. Nuclear Regulatory Commission (NRC) work.

Sandia National Laboratories (SNL or Sandia) can best carry out efforts for the Spent Fuel Transport Risk Assessment (SFTRA) project described in the attached revised SOW, because SNL developed NUREG/CR-6672, "Reexamination of Spent Fuel Shipment Risk Estimates," published in March 2000. Additionally, SNL has developed the key transport campaign risk assessment code, RADTRAN, which has been used in reviews of environmental impact statements, environmental reports, and other transportation-related environmental reviews for licensing actions that involve spent fuel shipments. SNL is also recognized in the industry for its world-renowned expertise, familiarity, and credibility in transport package design, analysis, and evaluation, under normal and accident conditions.

This project is primarily intended to support NMSS/Division of Spent Fuel Storage and Transportation (SFST) reviews of environmental impact statements; environmental reports, and other transportation-related environmental reviews for future nuclear power plants--or other facility licensing actions that involve spent fuel shipments. This project would also further risk-inform the Commission's technical basis for conclusions regarding spent fuel shipment safety, increase public understanding of spent fuel shipment risks and may, through public participation

CONTACTS: John Cook, NMSS/SFST  
301-492-3318

Penelope Kinney, POC Lead, NMSS/PBPA  
301-492-3248

in the NUREG comment process, help to alleviate public concerns in this area. In this regard, "...[s]takeholders are informed and involved in NRC processes as appropriate." Additionally, this project supports Commission direction that "...regulatory policy concerning transportation of radioactive material be subject to close and continuing review, (46 FR 21620, published April 13, 1981)." The Commission could use the updated SFTRA to review its conclusion that "...present regulations [i.e., 10 CFR Part 71] adequately protect the public against unreasonable risk from the transport of radioactive materials, (*ibid.*)" The results of the project would also assist NMSS/SFST staff in the review of environmental assessments and impact statements related to interim spent fuel storage facilities.

Consideration was given to having the work done by in-house staff, other U.S. Department of Energy (DOE) laboratories, or a small business. However, none of these alternative organizations possesses all the requisite technical skills or the wealth and breadth of experience and technical competency to perform the work. Furthermore, SNL has completed 80 percent of the SFTRA project under job code J5546, as of March 2009. Using a source other than SNL would be inefficient, in that any new contractor would require time to become familiar with efforts already performed, as well as future tasks, delaying completion unnecessarily, and increasing the total costs. In addition, as noted above, there is no single entity, other than SNL, sufficiently familiar with the SFTRA cask modeling efforts already performed, and that possesses the technical skills and experience to perform the SFTRA. Using multiple contractors would similarly be inefficient, in that it would require additional NRC staff effort to integrate work from several contractors, thereby incurring schedule delays and cost increases.

Therefore, SNL is the only source with the necessary experience and knowledge to successfully complete all aspects of this project. The NMSS/SFST staff: (1) managed the original NUREG-6672 effort, and is managing the existing risk assessment agreement, with SNL, that the revised SOW would modify; (2) has an established working relationship with SNL in the requisite spent nuclear fuel cask technical disciplines; and, (3) will be the principal user of the results. Accordingly, NMSS/SFST will manage the modified agreement.

The desired outcome for SFTRA is an NRC NUREG document that summarizes spent fuel transportation safety (as detailed in the "Description/Scope" section below), and that has undergone public and peer review and comment. This modification is required to complete the SFTRA currently being performed under the existing agreement. This modification provides for: (1) an increase in the level of effort required to complete the analyses, which are more complex than originally estimated and stated in the initial SOW; (2) an increase in the level of effort required to resolve peer and public comments, because of the complexity of the analyses; (3) an increase in the Principal Investigator's level of effort in drafting the NUREG, because of the complexity of the analysis; and (4) the development of an electronic brochure.

Procurement Method: The project is an agreement with DOE's SNL.

Title: "Spent Fuel Transport Risk Assessment"

Type of Action: This is a modification to an existing interagency agreement.

Program/Contract Background: There is no Staff Requirements Memorandum, policy guidance, or other authority directing the work. The original agreement required SNL to: (1) perform an updated analysis of the spent fuel transport risk estimates contained in NUREG/CR-6672, based on

the collection of new data and estimates of the impact of inner spent fuel canisters on previous spent fuel shipment risk estimates; (2) document the findings in a draft NUREG report; (3) develop graphics and other presentation material to explain NRC's safety role in the transport of radioactive material, especially with regard to spent fuel transport; (4) issue the report for public comment; (5) support a technical peer review (under separate acquisition); (6) consider public and peer comments; and (7) prepare a Final Draft NUREG document to be employed in SFST transportation reviews and other licensing actions. Efforts began in June 2005 and have continued to date.

Staff is not aware of any related contracts within NMSS or throughout the Agency for this type of work. There were no conflicts of interest identified with SNL's current or past work for NRC. Since the agreement was initiated in the summer of 2005, and to date, SNL has not contracted to perform work in the same or similar technical areas as the efforts described, in the attached SOW, with any other entities. Work to date has focused on updating the analysis of spent fuel transport risk estimates, including modeling of spent fuel canisters and package impact limiters, and preparing a draft NUREG that will be issued for public comment in early calendar year 2010. SNL has also prepared an interactive web-based document entitled "Understanding Cask Basics" (SAND 2008-2901W). This document is anticipated to be released December 2009, as an electronic brochure (NUREG/BR) by NRC.

Description/Scope:

The desired outcome for SFTRA remains unchanged: an NRC NUREG document that summarizes spent fuel transportation safety (including estimated spent fuel transportation impacts using best available technology), and that has undergone both public and peer review and comment. However, the estimated funds necessary to fully complete SFTRA are greater than previously estimated, necessitating the current modification, as described below.

Task 1 modification. SFTRA differs from all prior transportation risk assessments in that it uses NRC-certified casks instead of generic casks. For this reason, it is imperative that the analytical models very closely match the actual cask design. It is not possible to make simplifying assumptions about geometry or to leave out complex details. Results of NUREG/CR-6672 and subsequent analyses have indicated the two aspects of cask design that have the greatest influence on package behavior in extra-regulatory accident scenarios are the closure region and the impact limiter. For the HI-STAR 100 cask used in SFTRA, these are the two areas of the design that are the most complex. In the initial planning for SFTRA, it was recognized that the complexity of these two regions must be included in the cask models. The planning also included a change in the structural finite element analysis code that treats the interaction between different



components (such as the impact limiter shell and energy-absorbing material) in a more physically correct manner. The interaction between the complexity of the structure and the added analysis code precision was not clearly understood by either the analysts or the code developers at SNL, and required substantial unplanned effort to adjust the cask model code to achieve analysis success.

In addition, the level of effort is being increased to provide a greater role, for the Principal Investigator, in drafting the NUREG document, and to provide increased support for the public comment and peer review phase of the project.

Task 2 modification. SNL developed a web-based visualization tool which will be changed to an electronic brochure. The web-based interactive electronic document entitled, "Understanding Cask Basics," and will better demonstrate the robustness of the casks used for transportation of spent nuclear fuel. Since the document was not developed for posting on the NRC website, and it did not meet NRC web protocols. An electronic brochure, that NRC will issue, will maintain the basic content and format of the information and make it readily available and accessible to members of the public. Development of the brochure, which was reviewed and commented on internally at NRC, will include content and format revision that SNL will complete.

This proposed modification, which requires a \$335,300 increase to the agreement ceiling from \$1,475,000 to \$1,810,300, will enable the SFTRA project to be brought to conclusion with additional benefits beyond those captured in the original SOW. No further increases are anticipated.

Key Milestones/Outputs:

The agreement is nearing completion on the structural, thermal, source-term estimation, and consequence modeling of the NRC-certified casks. A complete write-up of the results of the series of analyses will be submitted in a draft NUREG report, to NRC, by January 2010. The period of performance will be extended from June 2010 to April 2011, to allow completion of these efforts, including incorporation of comments from stakeholders. Previous modifications were made in the summer of 2006 and 2008. There is no change in the expected outcome of this agreement. This will be a generic-risk assessment; however, specific package designs will be employed in the analysis. The assessment will be informed by results of relevant security assessments, but will not evaluate security-related scenarios nor impacts. This assessment will be performed primarily by computer analysis, will be useful in outreach efforts on communicating transport risks, and will complement the work done on the Baltimore and Caldecott tunnel fires (ADAMS Accession Nos. ML 090570742 and ML 070460351, respectively).

Chairman's approval, to modify the agreement, was requested in 2006, and authorization to increase the ceiling above \$1 million was received on May 5, 2006, to obtain: (1) SNL's assistance on an updated analysis of transportation risk estimates; (2) documentation of the findings in a draft NUREG report; (3) support of the public comment period, peer review, and publication processes; and (4) technical support on public outreach, regarding the level of safety provided in NRC's transportation regulations.

The following are remaining milestones for deliverables and their completion dates.

Prepare and submit draft NUREG to NRC.	1/05/2010
Support public meeting.	7/05/2010
SNL presentation to peer review group.	9/23/2010
Public and peer review responses.	1/27/2011
Submit final report to NRC.	4/21/2011

Relationship of the Work  
To the Agency's Goals and  
Objectives:

The staff can use the results of SFTRA as a benchmark in its reviews of transportation sections of environmental impact assessments associated with reactor applications, or other future facilities involving spent fuel transport.

A secondary purpose is to support openness and outreach efforts associated with spent fuel transportation. NMSS/SFST staff previously studied spent fuel transport impacts and found that spent fuel shipment risks are low. However, the public remains concerned about spent fuel shipments in anticipation of shipment campaigns to storage and/or disposal facilities. Since publication of NUREG/CR-6672 in March 2000, staff has recently completed spent fuel cask security assessments, and believes those results can be leveraged to improve the assessment of spent fuel transport risk estimates. Staff also has a new capability to better model spent fuel cask components and their effects on transport risk estimates, and believes the results could be used to represent more realistic transportation risk assessments that would also further address public concerns. Staff believes that an updated assessment of spent fuel transport risk estimates should be completed soon, before future spent fuel shipments.

Period of Performance: The performance period of this agreement began on June 23, 2005, and currently ends on June 10, 2010. The proposed modification includes an extension until April 2011.

Chairman Action  
Needed by:

July 14, 2009

*change in accordance with  
New Schedule*

Chairman Klein

- 6 -

Total Estimated Cost: \$335,300 [includes fiscal year (FY) 2009 funding of \$235,300]

Estimated Cost by FY: FY 2009: \$235,300  
FY 2010: \$25,000  
FY 2011: \$75,000

Budget Availability: NMSS has budgeted \$350,000 for this effort in FY 2009, of which \$114,700 will fully fund the current agreement up to the cost ceiling. Contract support of \$25,000 is included in the FY 2010 budget, and \$75,000 is included in the base budget request for FY 2011, as part of the Planning, Budgeting, and Performance management process. FY 2010 resource requirements decrease to reflect the completion of the SFTRA, and issuance of the draft NUREG for public comment. Efforts under this agreement during FY 2010 will principally be to support a separate peer review of the SFTRA. FY 2011 resource requirements increase to reflect incorporation of the peer review comments and issuance of the final NUREG report.

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September

Job Code/Program

Planned Activity: J5546/Spent Fuel Storage and Transportation/ Licensing

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It is requested that all budget information concerning this project be guarded as official use, only until after the agreement is awarded.

The Office of the General Counsel has reviewed this paper and has no legal objection.

Chairman Klein

- 7 -

Once the Chairman has reviewed this procurement, the Chairman will be notified of any subsequent significant changes, whether the changes occur before or after the award, or throughout the period of the contract.

This proposed procurement has been evaluated by the Procurement Oversight Committee, to ensure that it supports the Commission's programmatic direction and is consistent with Commission-approved budget resources, and to ensure that appropriate and sufficient programmatic and contractual content is included to facilitate a streamlined Chairman review.

The NMSS Director requests your notification to proceed with this action. If you, or your staff, wish, a briefing on the project can be provided.

Enclosure:

"Revised Statement of Work"

cc: Commissioner Jaczko  
Commissioner Lyons  
Commissioner Svinicki  
SECY  
OGC  
OCA  
OPA  
CFO

Chairman Klein

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"Revised Statement of Work"

- cc: Commissioner Jaczko
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- OCA
- OPA
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OFC:	SFST	SFST	NMSS	SFST	SFST	SFST
NAME:	JGlenny	JCook	EKrauss	DPstrak	EHuemann	RLorson
DATE:	3/31/2009	3/31/2009	4/6/2009	3/31/2009	3/31/2009	4/2/2009
OFC:	SFST	SFST	PMDA	NMSS	NMSS	ADM
NAME:	NMamish	WBrach <i>NMA</i>	PEasson	MFlynn	MWeber	EJernell
DATE:	4/3/2009	4/17/09	/ /09	/ /09	/ /09	/ /09
OFC:	OGC	EDO	CFO			
NAME:	MMaxim	RBorchardt	JDyer			
DATE:	/ /09	/ /09	/ /09			

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~~March 31, 2009~~  
REVISED STATEMENT OF WORK

Project Title:	Spent Fuel Transport Risk Assessment (SFTRA)
Job Code Number:	J5546
B&R No.:	85015366270
Technical Project Manager (TPM):	John Cook, SFST (301) 492-3318
Technical Assistance Project Manager (TAPM):	Penny Kinney, PMDA (301) 492-3248
Performing Organization:	Sandia National Laboratories (SNL)
Fee Recoverable:	No

### 1.0 Background

#### Current Modification

The desired outcome for SFTRA remains unchanged: a U.S. Nuclear Regulatory Commission (NRC) NUREG document that summarizes spent fuel transportation safety (including estimated spent fuel transportation impacts using best available technology), and that has undergone both public and peer review and comment. However, the estimated funds necessary to fully complete SFTRA are greater than previously estimated, requiring the current modification, as described below.

Task 1 modification. SFTRA differs from all prior transportation risk assessments in that it uses NRC-certified casks instead of generic casks. For this reason, it is imperative that the analytical models very closely match the actual cask design. It is not possible to make simplifying assumptions about geometry or to leave out complex details. Results of NUREG/CR-6672 and subsequent analyses have indicated the two aspects of cask design that have the greatest influence on package behavior in extra-regulatory accident scenarios are the closure region and the impact limiter. For the HI-STAR 100 cask used in SFTRA, these are the two areas of the design that are the most complex. In the initial planning for SFTRA, it was recognized that the complexity of these two regions must be included in the cask models. The planning also included a change in the structural finite element analysis code that treats the interaction between different components (such as the impact limiter shell and energy-absorbing material) in a more physically correct manner. The interaction between the complexity of the structure and the added analysis code precision was not clearly understood by either the analysts or the code developers at SNL, and required substantial unplanned efforts both to adjust the cask model code and to achieve analytical success.

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members of the public. Development of the brochure, which was reviewed and commented on internally at NRC, will include content and format revision that SNL will complete.

This revised "Statement of Work" (SOW) reflects the current estimated level of effort and schedule to complete this project. Section 6, "Schedule and Deliverables"; 7, "Period of Performance"; and 8, "Level of Effort," have been revised accordingly. The increase reflects that actual expenditures required to complete Tasks 1 and 2 are greater than originally estimated. Section 17 has also been revised to comply with changes to NRC's organization conflict of interest clause.

## 2.0 Objectives

The objectives of this agreement are delineated below.

A. Perform an updated SFTRA, including modeling of spent fuel canisters and package impact limiters, prepare a draft final NUREG, and support the related public comment, peer review, and publication processes.

B. Provide technical support in the preparation of materials, including animations and graphics, to better inform the public about the level of safety provided by NRC's transportation safety regulations.

C. Enhance public acceptance of spent fuel transportation risk estimates. Enhance staff understanding of code parameters. Perform analysis of fuel and material behavior and properties. Provide other technical support as assigned.

## 3.0 Purpose

The purpose of this agreement is to obtain an updated spent fuel shipment risk assessment and explanatory materials that will enhance NRC's outreach efforts (see "Background").

## 4.0 Expertise and Disciplines Required

SNL will ensure that the Principal Investigator is a nationally and internationally recognized radioactive material packaging expert. The Principal Investigator must be a scientist or engineer with in-depth experience in package design and testing, who has recently assessed package performance under impact and/or thermal accident conditions. In particular, the Principal Investigator will have experience in conducting physical package testing, in the pre- and post-test evaluation of containment systems, and in the application of package structural integrity evaluations to spent fuel shipment risk estimates.

The Principal Investigator will either perform or provide technical oversight and continuity during all work performed on this project. Therefore the Principal Investigator must possess outstanding oral and written communication skills.

## 5.0 Work to be Performed

Work requirements are delineated under the tasks below. Since specific needs in terms of these subject areas cannot be completely forecast in advance, this agreement will be modified to include additional tasks and to revise work requirements whenever other work is required under the tasks identified below. A proposal will be requested for any revisions to the updated work.

### Task 1. SFTRA

SNL will conduct an SFTRA that updates the spent fuel transportation risk estimates in NUREG/CR-6672. This will be a generic-risk assessment, not a facility-specific assessment, although specific package designs and routes may be employed in the analysis. To the maximum extent practicable, SNL will use cask design models already developed by NRC for structural and thermal analyses. These models will be specified by the TPM, and include, for example, the truck and rail cask models developed for NRC by the U.S. Department of Energy's (DOE's) Pacific Northwest National Laboratory. The assessment will be informed by results of relevant security assessments, but will not evaluate security-related scenarios or impacts. This assessment will be performed primarily by using computer analysis (although small-scale or bench testing might be included at the direction of the SFST TPM). This will be a useful tool in outreach efforts on communicating transport risks, and will complement the work done on the Baltimore and Caldecott tunnel fires.

The SFTRA task will include the following subtasks:

Subtask 1a. SNL will provide support, as needed, for publication of the revised transportation risk assessment as a NUREG document. SNL will prepare, and provide to NRC, the revised SFTRA, as a draft NUREG, in the appropriate format for (sequential) public comment and peer review.

Considering the end use of the document by the public, the clarity of explanation of the method used and results obtained, accessibility to the underlying assumptions and data, and overall readability of the NUREG, are paramount objectives of this effort. SNL will carefully plan and structure the document to meet the challenge of achieving these objectives. The NUREG report will be the primary focus of the entire task, and SNL management and staff will focus their efforts, from the outset, on the utility and quality aspects of the NUREG report.

SNL will prepare responses to comments and reviews, and revise the draft NUREG in consultation with the Division of Spent Fuel Storage and Transportation (SFST) TPM. With respect to explaining the relationships between the various components of the risk assessment to the public, SNL will consider and advise the SFST TPM on the utility of a hyperlinked version of the document, to be web-published at the draft NUREG/public comment stage. SNL will subsequently provide the SFST TPM with a draft final NUREG document to NRC, in the appropriate format.

The revision includes an increase in the estimated level of effort for the Principal Investigator role in authoring the draft NUREG report, and for SNL response to peer review and group and public comments. The change in the estimated level of effort for this subtask is 10 staff-weeks.



Subtask 1b. SNL will analyze high-fidelity models of two rail cask designs (one with, and one without, an inner spent fuel canister) and one truck cask design (without an inner spent fuel canister), and their respective (fuel) contents, and their respective impact limiters.

Several current and proposed spent fuel transportation package designs include inner thin-walled canisters, to facilitate spent fuel handling and loading. These structures are not considered in the safety evaluation of the package design (i.e., no credit is given to the canister with respect to containment of package contents under either routine or accident conditions).

However, when performing risk assessments, the presence of canisters could affect risk-informed assessment of impacts from transporting spent fuel under accident conditions. The basic consideration is that a thin-walled canister is likely to readily deform during severe accidents. In some severe accidents, a leak path, for volatile fuel or particulates, that might otherwise be generated, could be blocked if the inner canister does not fail. If the canister does fail, the additional time required for materials to escape from the canister to the cask interior and then from the cask interior to the environment is likely to increase the amount of deposition on interior cask and canister surfaces, thus reducing the quantity of material released from the cask to the environment. This effect could lower risk estimates for impact accidents.

Under fire conditions, an inner canister would have to be heated to the point of failure before any fuel material could be released to the interior of the cask, whose seals would also have to fail before material could be released outside the cask. Heating the canister to this point could require more severe thermal conditions than those needed to fail the cask seals alone. The more severe the thermal conditions for release are, the less likely it is that an accident will generate those conditions. Thus the use of canisters may lower the already low risks for release from casks involved in accidents with fires.

However, canisters might also produce effects that would not be favorable to lower-risk estimates. SNL will evaluate the overall impact of the use of spent fuel canisters on spent fuel shipment risk estimates.

Additionally, previous SFTRA did not model impact limiters, or modeled them as pre-crushed (i.e., no credit was taken for the impact limiters). Impact limiters are known to provide protection during the majority of impact accidents, but were omitted from previous analyses because of the complexity in modeling the structure and deformation of the impact limiters. Impact limiters will be included in the finite-element modeling and evaluation of spent fuel cask behavior under accident conditions, in this subtask.

Finally, under this subtask, SNL will evaluate available information and update assumptions and parametric values used to estimate the behavior of fuels under impact-and/or fire-accident conditions.

The level of effort required for this subtask was underestimated in previous versions of the SOW. The degree of modeling complexity associated with the HI-STAR 100 impact limiter and the accurate depiction of the closure response were greater than anticipated. The change in level of effort to complete this subtask is 20 staff weeks.

Subtask 1c. SNL will perform 3-D thermal analysis, including 3-D modeling of fuel assemblies, to improve predictions of spent fuel cask behavior during accidents involving fire.

Subtask 1d. SNL will perform other analyses to reduce uncertainty in the risk estimates and/or to corroborate previously used values, based on SNL review of previous and related work, SNL recommendation and consultation with SFST staff, and as directed by the TPM. This work may include scale testing of packaging components (e.g., bolt/closure system, calorimeter test on ground, etc.).

Subtask 1e. SNL will calculate spent fuel shipment risk estimates, under routine and accident conditions, using RADTRAN 6. SNL will address both population and (maximum) individual risks (the latter may involve the use of RISKIND). SNL will use available and appropriate event trees and shipment route models, including event trees with new wayside surface frequencies, and Transportation Routing Analysis Geographic Information System (TRAGIS)-based routes, with the most recently available Census population data.

Subtask 1f. Since past SFTRAs have used the uniform thermal boundary condition specified in 10 CFR 71.73 and only adjusted the duration of the fire, NRC now requires a full-scale rail-cask sized-calorimeter test to measure the heat flux that is applied to a cask in a real fire. Real fires have non-uniform heating of the package both spatially and temporally, and the CAFE fire code of SNL is capable of modeling this behavior. To provide higher defensibility of the results calculated by the CAFE code, SNL shall compare the calculated heat flux to that measured in the calorimeter tests.

This subtask was added in the previous revision of the SOW, but was minimally funded. The additional level of effort required to complete this subtask is 4 staff-weeks.

Subtask 1g. SNL shall determine a package's response to impacts onto yielding targets. The primary analyses will be for impacts onto rigid targets. Since all real-world accidents involve impacts onto (or into) a target that has some degree of deformation, a way to correlate the damage of the package, determined from the analyses of package impacts onto rigid targets, to higher-speed impacts onto yielding targets, will be developed. In NUREG/CR-6672, this correlation was carried out using an energy-balance method. In this task, finite-element analyses of cask impacts onto selected yielding targets will be performed, to validate the energy-balance method.

A key component of the SFTRA is the response that spent fuel casks will have to impact accidents. Previous work (from NUREG/CR-6672, and the "Package Performance Study") indicated that the cask closure is the region of the cask, which, if significantly damaged, could lead to release of radioactive contents. Therefore for a highly defensible risk assessment, it is imperative to determine the response of this region of the package in the most accurate manner possible. The use of bolt sub-models with several hundred elements in a cross-section would be required for this type of assessment, but bolt models with this level of refinement cannot be used in the entire package model, because the analysis requires too many computer resources (even the fastest computers in the world working solely on this problem would take many days for each simulation). Therefore, the results from a detailed bolt model should be incorporated into the entire package model with a spot-weld, which is a single connection that represents the load-deflection behavior of the detailed bolt model.

Since no transportation risk assessment in the past has included this accuracy of closure response, and the technique is new, this subtask has been incorporated into this agreement.

## Task 2. Transport Safety Visualizations

SFST staff has identified a need for visualizations, including graphics and animations, that could be used in public meetings, websites, and other venues, to facilitate the explanation of the public health and safety protection afforded by the current transportation safety system. The visualizations needed by NRC are in the areas of regulatory provisions and risk assessment.

The regulatory provision and risk assessment visualizations must be effective (i.e., they must convey the safety information in a fashion that is easy for the intended audience to grasp). The visualizations must be factual, rigorously accurate, and without promotional aspect. The visualizations will be subject to close scrutiny and critique by governmental and non-governmental organizations, alike.

### Subtask 2a. Regulatory Provision Visualizations

With regard to regulatory provisions, the visualizations must translate, to the public, what 10 CFR Part 71 hypothetical accident conditions mean to safety, in terms that the public can readily identify and understand. Animations may be particularly well-suited for these visualization needs.

The point of these visualizations is to convey how rigorous and challenging the hypothetical accident test conditions are when compared to real-world (historical) transport accident conditions. In other words, why do we believe the regulations provide adequate safety when some real-world accident conditions (e.g., accident speed or fire duration) exceed those specified in the regulations?

A large part of the answer involves explaining those aspects of the test conditions and acceptance criteria that are not obvious (e.g., unyielding surfaces, engulfing fires, activity-release rates). Another part of the answer includes the assumptions used, in assessing package performance, that impart additional forces to the package, but that are unlikely to occur in real-world accidents (e.g., worst-case orientations, orthogonal impacts, etc.), and also includes ignoring factors that provide additional protection, for the package, that are likely to occur in real-world accidents (e.g., collapse of vehicle structures before package impact, contact with the ground, and other heat sinks, etc.). The performing organization will consider and recommend the extent to which these considerations should be addressed in the visualizations.

Specific example topics for visualizations include:

- Free drop through a distance of 9 m (30 ft) onto an essentially unyielding surface: The public may often focus only on the impact speed condition. Visualize protection afforded by certified packages during real-world, higher-speed, impacts, but onto yielding surfaces, to determine accident impacts.
- Fully engulfing fire test: The public may often focus only on the fire-temperature, or the fire-duration, condition. Visualize protection afforded by certified packages during real world, higher-temperature, longer-duration, but non-engulfing accident fires.
- Test acceptance criteria: The public often overlooks the stringent post-hypothetical accident-test-activity release and radiation-level limits that must be satisfied for package certification. Visualize minimum post-test releases/radiation levels that would result in rejection of package design.

In addition to considering the examples above, the performing organization will review all the hypothetical accident test conditions and acceptance criteria, and will provide and discuss alternatives as how best to clearly and simply depict and convey the real-world safety, afforded by the regulatory provisions, to the public. This review will include discussions with the SFST TPM and NRC staff, on difficulties that have been encountered in public meetings related to this and related topics.

#### Subtask 2b. Risk Assessment Visualizations

With regard to risk assessment, the visualizations must define what risk means in the context of spent fuel shipments, with equal weighting to the consequence and probability components. We believe that risk comparisons should be avoided in the visualizations. For example, perhaps some form of progressive consideration of risk could be illustrated:

- What portion of expected shipments will be involved in an accident?
- What portion of accidents will be severe?
- What portion of severe accidents will be mitigated by the package?
- What portion of severe accidents will be severe enough to cause any release?
- How long between such accidents at expected shipping rates?
- What is the chance of still more severe accidents, and how frequently might they occur?
- How does the magnitude of these latter transport risks compare with the risks of operating facilities also regulated by NRC?

- Why do we believe that, on balance, likely actual risks are less than the (small) estimated risks?
- When does NRC conclude that risks are acceptably small?

The performing organization will consider these and other examples, and provide alternatives for visualizations for spent fuel shipment risk assessments, such as those presented in previous risk assessment studies and in environmental impact statements.

Actual topics for the regulatory provision and risk assessment visualizations will be selected by the SFST TPM, and may include topics other than the examples provided above. The performing organization will obtain approval from the SFST TPM, of visualization content, before production of final visualizations begins.

The added level of effort to change the visualization tool from web-based to an electronic brochure and to incorporate the results of the Task 1 analyses is 6 staff-weeks.

#### 6.0 Deliverables and Schedule (Including Meetings)

The deliverables required under each subtask with the anticipated time for delivery are provided below. All deliverables will be provided to the SFST TPM.

Deliverables:

##### Task 1.

The deliverable for Task 1 will be a comprehensive NUREG report that provides spent fuel shipment risk estimates, including the analytical (and testing, if any) results. The report will also describe the approach, methods, assumptions, input data, and calculations used. A comparative analysis with previous studies of spent fuel package behavior and shipment risks will be included. The report will also contain an overall assessment of the confidence in the results provided, including a discussion of any caveats that may apply, as well as any sensitivities or uncertainties associated with the results. SNL will organize, illustrate, and write the report for the general public.

The deliverable will be provided to the SFST TPM initially as a draft NUREG report; this report should comply with applicable NRC format requirements and be suitable for web posting. After SNL has responded to public and peer review comments and revised the draft NUREG report in consultation with SFST staff, SNL will provide the TPM with a draft final NUREG in the applicable NRC format.

##### Task 2.

Provide support for development of the electronic brochure to be issued in concert with SNL's draft NUREG document.

Schedule of remaining milestones for Task 1:

1/5/10	SNL submits draft "Spent Fuel Transport Risk Assessment" NUREG to NRC.
3/2/10	SFST completes review of draft report and provides comments to SNL.
3/30/10	SNL provides revised draft SFTRA NUREG based on SFST comments.
5/25/10	NRC publishes draft NUREG (in <u>Federal Register Notice</u> ).
7/5/10	SFST provides public comments to peer review group.
7/27/10	Public comment period closes.
9/23/10	Peer review group requests clarifications from SNL, including SNL proposed responses to public comments.
11/18/10	Peer review group provides final findings to SFST and SNL.
12/15/10	SNL provides responses to public and peer comments to SFST.
1/27/11	SFST provides final comments to SNL.
4/21/11	SNL submits final report to NRC.

The SFST TPM will provide comments, to the performing organization, to be considered in the preparation of the draft and final NUREG reports. These comments will identify potential problem areas, discrepancies, and technical insights on the draft materials and reports. SNL will provide draft documents of the NUREG technical report and the responses to public and peer-reviewed comments. All reports will be edited and reviewed by the performing organization and checked in accordance with the quality assurance requirements, addressed later, under Section 13.0. Within the above schedule and after receipt of NRC comments, the performing organization will revise the interim materials, results, and draft reports, incorporating resolution of comments, and submit an NRC-compatible, electronic media copy of the final materials and reports.

#### 7.0 Period of Performance

The period of performance for this project started in June 2005, and will continue until November 2011.

#### 8.0 Estimated level of Effort

The estimated level of effort for this project is identified below.

Task 1.	185 staff-weeks
Task 2.	21 staff-weeks

## 9.0 Meetings and Travel

It is estimated that one trip, each year, to Rockville, MD to consult with, and brief, NRC staff, will be required during fiscal year (FY) 09, FY10 and FY11.

SFST personnel may meet periodically at the performing organization's facilities, as mutually agreed, to review interim progress on tasks throughout the period of performance. SNL will prepare meeting notes, including identification of Action Items. Disposition of Action Items will be tracked in the Monthly Letter Status Reports (MLSRs). Meeting notes will be distributed in accordance with Section 11.0 of this SOW.

## 10.0 Project Status Reports

The performing organization shall submit a MLSR by the 20th day of each month, with distribution as shown below. The MLSR should contain, at a minimum, all the required information, as shown in MD 11.7, Exhibit 4, "Monthly Letter Status Report Requirements."

## 11.0 Distribution of Deliverables

The following summarizes the required report distribution under this SOW. The NMSS TPM shall provide the performing organization with current NRC mailing addresses for this distribution.

### Tasks 1 and 2

	Monthly Letter Status Reports	Meetings, Workshops, & Trip Reports	Draft Formal Tech. Reports	Final Formal Tech. Reports
Distribution NMSS TPM	1	1	1	1
NMSS TAPM	1	1	5	1*
SFST Program Coordinator	1			
Div. of Freedom of Info. and Pub. Services	0	0	0	1

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\* Camera-ready and electronic media

An electronic copy of the MLSRs shall be sent to the Division of Contracts, Office of Administration, to Joyce Fields, at Joyce.Fields@nrc.gov, and to Beverly Anker, at Beverly.Anker@nrc.gov.

## 12.0 Technical/Project Direction

TAPM: Penny Kinney  
TPM: John Cook

The NMSS TAPM 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.

The NMSS TPM is responsible for providing technical guidance, to the performing organization, regarding staff interpretations of the technical aspects of regulatory requirements, along with copies of relevant documents (e.g., Regulatory Guides), when requested by the performing organization. All work products must be reviewed and approved by the NMSS TPM before they are submitted as final documents. All technical direction 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. Directions for changes in cost or the period of performance will be provided by the DOE Operations Office, after receipt of an approved Standard Order for DOE Work (NRC Form 173) from NMSS. If the performing organization receives guidance that is believed to be invalid, under the criteria cited above, the performing organization shall immediately notify the NMSS TAPM. If the NMSS TAPM and the performing organization are unable to resolve the question within 5 days, the performing organization shall notify the DOE Operations Office.

## 13.0 Quality Assurance (QA)

13.1 - For all draft and final reports delivered under this agreement, the performing organization shall assure that an independent review and verification of all numerical computations and mathematical equations and derivations are verified by qualified personnel other than the original author(s) of the reports. If the performing organization proposes to verify/check less than 100 percent of all computations and mathematical equations and derivations in the report(s) (such as might be the case when there are a large number of routine, repetitive calculations), the performing organization must first obtain written approval from the NMSS TPM. Computer-generated calculations will not require verification where the computer program has already been verified. The NMSS TPM has the option of auditing all documentation, including project correspondence, drafts, calculations, and unrefined data.

13.2 - In addition, all reports, including those that do not contain numerical analyses, must be reviewed by the performing organization's management and approved with two signatures, one of which is for the performing organization's management at a level above the program manager.

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

13.4 - NRC has the option of appointing a Peer Group to review the draft report and make changes to the final report. The performing organization may recommend candidates for the Peer Group, for approval by the NMSS TPM. If there is dissent regarding the content of the final report, the dissenting party will have the option of stating its viewpoints and findings in a section of the report. Alternative QA plans should be submitted for NRC review and approval.



#### 14.0 Disposal of Property

Management of property purchased under this Interagency Agreement will follow the procedures as stated in Part VIII of MD 11.7.

#### 15.0 DOE-Acquired Material

Laboratories shall submit written requests to NMSS (Attn: Director, PBPA) and the NMSS TPM, for approval to develop additional NRC-funded software or purchase additional property, with an estimated acquisition cost of \$500 or more, after work initiation. The project manager shall approve, or disapprove, the acquisition or development of any additional items, in writing.

DOE laboratories shall report property, including software, with an acquisition cost of \$500 or more in the MLSR, in the month the property or software was acquired. DOE laboratories shall forward a copy of all MLSRs to the NRC Division of Contracts, Office of Administration, in addition to regular distribution. For each item reported in the MLSR, as appropriate, DOE laboratories shall provide the information listed in Part IX, Section B, paragraph (1), item (f) of MD 11.7, *NRC Procedures for Placement and Monitoring of Work with the U.S. Department of Energy*.

#### 16.0 NRC-Furnished Material

None

#### 17.0 Organizational Conflict of Interest Disclosure

DOE recognizes that Section 170A of the Atomic Energy Act of 1954, as amended, requires that NRC be provided with disclosures on potential conflicts, when NRC obtains technical, consulting, research, and other support services. DOE further recognizes that the assignment of NRC work to DOE laboratories must satisfy NRC's conflict standards. Accordingly, when NRC enters into an agreement with a DOE laboratory to perform work for NRC, and during the life of the agreement, the laboratory shall review and promptly disclose its current work, planned work, and, where appropriate, past work, for DOE and others. This means organizations in the same, or similar, technical area, as the NRC project scope of work, including, but not limited to, NRC licensees, vendors, industry groups, or research institutes, that represent, or are substantially comprised of, nuclear utilities, used for work in the same or similar technical area as the proposed NRC project. Disclosures for current or planned work for DOE or others in the same or similar technical area as the proposed work, are to include: (1) the name of organization; (2) dollar value; (3) period of performance of the work identified; and (4) SOWs for the projects. NRC shall then determine whether a conflict would result and, if one does, determine, after consultation with the laboratory and DOE, the appropriate action NRC or DOE should take to avoid the conflict, or when appropriate under the NRC procedures, waive the conflict. If the laboratory determines there is no applicable work in the same or similar technical area or on the same or similar material, it should be stated in its proposal.

MEMORANDUM TO: Chairman Klein

FROM: R. William Borchardt  
Executive Director for Operations

James Dyer  
Chief Financial Officer

SUBJECT: CHAIRMAN REVIEW OF AN ACQUISITION FOR SPENT FUEL TRANSPORT RISK ASSESSMENT

In accordance with the January 24, 2005, "Delegation of Contractual Authority" memorandum, you are requested to review the project described in the draft Statement of Work (SOW) (Enclosure 1) and to provide to the Director, Office of Nuclear Material Safety and Safeguards (NMSS), notification to proceed with the subject agreement. This project is an appropriate Agency action conforming to Commission budget and program management decisions, and does not duplicate any other U.S. Nuclear Regulatory Commission (NRC) work.

Sandia National Laboratories (SNL or Sandia) can best carry out efforts for the Spent Fuel Transport Risk Assessment (SFTRA) project described in the attached revised SOW, because SNL developed NUREG/CR-6672, "Reexamination of Spent Fuel Shipment Risk Estimates," published in March 2000. Additionally, SNL has developed the key transport campaign risk assessment code, RADTRAN, which has been used in reviews of environmental impact statements, environmental reports, and other transportation-related environmental reviews for licensing actions that involve spent fuel shipments. SNL is also recognized in the industry for its world-renowned expertise, familiarity, and credibility in transport package design, analysis, and evaluation, under normal and accident conditions.

This project is primarily intended to support NMSS/Division of Spent Fuel Storage and Transportation (SFST) reviews of environmental impact statements; environmental reports, and other transportation-related environmental reviews for future nuclear power plants--or other facility licensing actions that involve spent fuel shipments. This project would also further risk-inform the Commission's technical basis for conclusions regarding spent fuel shipment safety, increase public understanding of spent fuel shipment risks and may, through public participation in the NUREG comment process, help to alleviate public concerns in this area. In this regard, "...[s]takeholders are informed and involved in NRC processes as appropriate." Additionally, this project supports Commission direction that "...regulatory policy concerning transportation of radioactive material be subject to close and continuing review, (46 FR 21620, published April 13, 1981)." The Commission could use the updated SFTRA to review its conclusion that "...present regulations [i.e., 10 CFR Part 71] adequately protect the public against unreasonable risk from the transport of radioactive materials, (ibid.)." The

CONTACTS: John Cook, NMSS/SFST, 301-492-3318  
Penelope Kinney, POC Lead, NMSS/PBPA, 301-492-3248

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results of the project would also assist NMSS/SFST staff in the review of environmental assessments and impact statements related to interim spent fuel storage facilities.

- How?

Consideration was given to having the work done by in-house staff, other U.S. Department of Energy (DOE) laboratories, or a small business. However, none of these alternative organizations possesses all the requisite technical skills or the wealth and breadth of experience and technical competency to perform the work. Furthermore, SNL has completed 80 percent of the SFTRA project under job code J5546, as of March 2009. Using a source other than SNL would be inefficient, in that any new contractor would require time to become familiar with efforts already performed, as well as future tasks, delaying completion unnecessarily, and increasing the total costs. In addition, as noted above, there is no single entity, other than SNL, sufficiently familiar with the SFTRA cask modeling efforts already performed, and that possesses the technical skills and experience to perform the SFTRA. Using multiple contractors would similarly be inefficient, in that it would require additional NRC staff effort to integrate work from several contractors, thereby incurring schedule delays and cost increases.

What Tech Skills

that is

Therefore, SNL is the only source with the necessary experience and knowledge to successfully complete all aspects of this project. The NMSS/SFST staff: (1) managed the original NUREG-6672 effort, and is managing the existing risk assessment agreement, with SNL, that the revised SOW would modify; (2) has an established working relationship with SNL in the requisite spent nuclear fuel cask technical disciplines; and, (3) will be the principal user of the results. Accordingly, NMSS/SFST will manage the modified agreement.

EXPLAIN WORK RELATED TO NUREG 6672 EFFORT

EXPLAIN EXISTING RISK ASSESSMENT AGREEMENT

Why needed?

The desired outcome for SFTRA is an NRC NUREG document that summarizes spent fuel transportation safety (as detailed in the "Description/Scope" section below), and that has undergone public and peer review and comment. This modification is required to complete the SFTRA currently being performed under the existing agreement. This modification provides for: (1) an increase in the level of effort required to complete the analyses, which are more complex than originally estimated and stated in the initial SOW; (2) an increase in the level of effort required to resolve peer and public comments, because of the complexity of the analyses; (3) an increase in the Principal Investigator's level of effort in drafting the NUREG, because of the complexity of the analysis; and (4) the development of an electronic brochure.

EXPLAIN WHY MORE

WHAT THE REVISED SOW

Complex. WHAT

What would modify? - WHAT SOW? - is this agreement action going to modify the unidentified SOW?

WHAT ENVISIONED

1ST TIME A MODIFICATION IS MENTIONED!

in ORIGINAL CONTRACT?

- WAS A Peer Review THAT OR COMMENTS

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Procurement Method: The project is an agreement with DOE's SNL.

Title: "Spent Fuel Transport Risk Assessment"

Type of Action: This is a modification to an existing interagency agreement.

Program/Contract Background:

There is no Staff Requirements Memorandum, policy guidance, or other authority directing the work. The original agreement required SNL to: (1) perform an updated analysis of the spent fuel transport risk estimates contained in NUREG/CR-6672, based on the collection of new data and estimates of the impact of inner spent fuel canisters on previous spent fuel shipment risk estimates; (2) document the findings in a draft NUREG report; (3) develop graphics and other presentation material to explain NRC's safety role in the transport of radioactive material, especially with regard to spent fuel transport; (4) issue the report for public comment; (5) support a technical peer review (under separate acquisition); (6) consider public and peer comments; and (7) prepare a Final Draft NUREG document to be employed in SFST transportation reviews and other licensing actions. Efforts began in June 2005 and have continued to date.

*Summarize on previous pages*

Staff is not aware of any related contracts within NMSS or throughout the Agency for this type of work. There were no conflicts of interest identified with SNL's current or past work for NRC. Since the agreement was initiated in the summer of 2005, and to date, SNL has not contracted to perform work in the same or similar technical areas as the efforts described, in the attached SOW, with any other entities.

*NOT A COMPLETE SENTENCE!*

Work to date has focused on updating the analysis of spent fuel transport risk estimates, including modeling of spent fuel canisters and package impact limiters, and preparing a draft NUREG that will be issued for public comment in early calendar year 2010. SNL has also prepared an interactive web-based document entitled "Understanding Cask Basics" (SAND 2008-2901W). This document is anticipated to be released December 2009, as an electronic brochure (NUREG/BR) by NRC.

*So. How does this contract to proposed modification?*

Description/Scope: The desired outcome for SFTRA remains unchanged: an NRC NUREG document that summarizes spent fuel transportation safety (including estimated spent fuel transportation impacts using best available technology), and that has undergone both public and peer review and comment. However, the estimated funds necessary to fully complete SFTRA are greater than previously estimated, necessitating the current modification, as described below.

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WHAT IS  
TASK 1-TITLE?

Task 1 modification. SFTRA differs from all prior transportation risk assessments in that it uses NRC certified casks instead of generic casks. For this reason, it is imperative that the analytical models very closely match the actual cask design. It is not possible to make simplifying assumptions about geometry or to leave out complex details. Results of NUREG/CR-6672 and subsequent analyses have indicated the two aspects of cask design that have the greatest influence on package behavior in extra-regulatory accident scenarios are the closure region and the impact limiter. For the HI-STAR 100 cask used in SFTRA, these are the two areas of the design that are the most complex. In the initial planning for SFTRA, it was recognized that the complexity of these two regions must be included in the cask models. The planning also included a change in the structural finite element analysis code that treats the interaction between different components (such as the impact limiter shell and energy-absorbing material) in a more physically correct manner. The interplay between the complexity of the structure and the added analysis code precision was not clearly understood by either the analysts or the code developers at SNL, and required substantial unplanned effort to adjust the cask model code to achieve analysis success.

~~How~~  
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In addition, the level of effort is being increased to provide a greater role, for the Principal Investigator, in drafting the NUREG document, and to provide increased support for the public comment and peer review phase of the project.

Sentence  
fragment!

Task 2 modification. To format the visualization tool. The original SOW focused on developing visual content to help explain transport safety. The SOW did not specify the format of this visual content. Sandia designed a website as a possible mechanism for providing access to this information; however, the website did not meet NRC web protocols. SNL developed an electronic brochure, to be issued by NRC, which will maintain the content and format of the information in the website. This modification will allow for completion of the electronic brochure.

WHAT  
IS TASK  
2?

This proposed modification, which requires a \$335,300 increase to the agreement ceiling from \$1,475,000 to \$1,810,300, will enable the SFTRA project to be brought to conclusion with additional benefits beyond those captured in the original SOW. No further increases are anticipated.

→ WHY?  
21 million  
FOR  
DUM  
TABLES  
1 & 2?

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Key Milestones/Outputs:

The agreement is nearing completion on the structural, thermal, source-term estimation, and consequence modeling of the NRC-certified casks. A complete write-up of the results of the series of analyses will be submitted in a draft NUREG report, to NRC, by January 2010. The period of performance will be extended from June 2010 to April 2011, to allow completion of these efforts, including incorporation of comments from stakeholders. Previous modifications were made in the summer of 2006 and 2008. There is no change in the expected outcome of this agreement. This will be a generic-risk assessment; however, specific package designs will be employed in the analysis. The assessment will be informed by results of relevant security assessments, but will not evaluate security-related scenarios nor impacts. This assessment will be performed primarily by computer analysis, will be useful in outreach efforts on communicating transport risks, and will complement the work done on the Baltimore and Caldecott tunnel fires (ADAMS Accession Nos. ML 090570742 and ML 070460351, respectively).

*S. Morris*  
*- what were they?*

Chairman's approval, to modify the agreement, was requested in 2006, and authorization to increase the ceiling above \$1 million was received on May 5, 2006, to obtain: (1) SNL's assistance on an updated analysis of transportation risk estimates; (2) documentation of the findings in a draft NUREG report; (3) support of the public comment period, peer review, and publication processes; and (4) technical support on public outreach, regarding the level of safety provided in NRC's transportation regulations.

The following are remaining milestones for deliverables and their completion dates.

Prepare and submit draft NUREG to NRC.	1/05/2010
Support public meeting.	7/05/2010
SNL presentation to peer review group.	9/23/2010
Public and peer review responses.	1/27/2011
Submit final report to NRC.	4/21/2011

Relationship of the Work To the Agency's Goals and Objectives:

The staff can use the results of SFTRA as a benchmark in its reviews of transportation sections of environmental impact assessments associated with reactor applications, or other future facilities involving spent fuel transport.

A secondary purpose is to support openness and outreach efforts associated with spent fuel transportation. NMSS/SFST staff previously studied spent fuel transport impacts and found that spent fuel shipment risks are low. However, the public remains concerned about spent fuel

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shipments in anticipation of shipment campaigns to storage and/or disposal facilities. Since publication of NUREG/CR-6672 in March 2000, staff has recently completed spent fuel cask security assessments, and believes those results can be leveraged to improve the assessment of spent fuel transport risk estimates. Staff also has a new capability to better model spent fuel cask components and their effects on transport risk estimates, and believes the results could be used to represent more realistic transportation risk assessments that would also further address public concerns. Staff believes that an updated assessment of spent fuel transport risk estimates should be completed soon, before future spent fuel shipments.

No change in desired outcome?

Period of Performance: The performance period of this agreement began on June 23, 2005, and currently ends on June 10, 2010. The proposed modification includes an extension until April 2011.

Chairman Action Needed by: July 14, 2009

Total Estimated Cost: \$335,300 [includes fiscal year (FY) 2009 funding of \$235,300]

Estimated Cost by FY: FY 2009: \$235,300  
FY 2010: \$25,000  
FY 2011: \$75,000

< 1 million

Budget Availability: NMSS has budgeted \$350,000 for this effort in FY 2009, of which \$114,700 will fully fund the current agreement up to the cost ceiling. Contract support of \$25,000 is included in the FY 2010 budget, and \$75,000 is included in the base budget request for FY 2011, as part of the Planning, Budgeting, and Performance management process. FY 2010 resource requirements decrease to reflect the completion of the SFTRA, and issuance of the draft NUREG for public comment. Efforts under this agreement during FY 2010 will principally be to support a separate peer review of the SFTRA. FY 2011 resource requirements increase to reflect incorporation of the peer review comments and issuance of the final NUREG report.

\$ Don't add up!

I want MOD = \$ 335,300

All prior-year funds were expended by January 2009. FY 2009 budgeted funds are needed for completion of the original effort, and the expansion discussed in this paper. The FY 2009 budgeted funds are planned for obligation in August, but most of these funds will be carried over into FY 2010, for the reasons outlined below. These funds will provide for contractor support from September (estimated to be \$38,000) through the issuance of the draft NUREG in

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early January 2010 (estimated to be an additional \$127,000). Also, approximately \$65,000 will be carried over from FY 2009 into FY 2010, to allow continuation of contractor efforts from January through July 2010, to support the separate peer review. These efforts were originally anticipated and budgeted to occur during FY 2009, but are now deferred to FY 2010, to complete the Chairman Review process.

*Very  
Compelling*

Job Code/Program  
Planned Activity:

J5546/Spent Fuel Storage and Transportation/ Licensing



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NMSS will consider all pertinent requirements associated with the organizational conflicts of interest (OCOLs) for this project, including Sandia's role and activities for DOE's Office of Civilian Radioactive Waste Management, in accordance with the NRC requirements stated in Management Directive 11.7, "NRC Procedures for Placement and Monitoring of Work with the U.S. Department of Energy," and the Nuclear Regulatory Commission Acquisition Regulation, Subpart 2009.5, and will ensure compliance with OCOL requirements, with regard to placement of the resulting agreement.

It is requested that all budget information concerning this project be guarded as official use, only until after the agreement is awarded.

The Office of the General Counsel has reviewed this paper and has no legal objection.

Once the Chairman has reviewed this procurement, the Chairman will be notified of any subsequent significant changes, whether the changes occur before or after the award, or throughout the period of the contract.

This proposed procurement has been evaluated by the Procurement Oversight Committee, to ensure that it supports the Commission's programmatic direction and is consistent with Commission-approved budget resources, and to ensure that appropriate and sufficient programmatic and contractual content is included to facilitate a streamlined Chairman review.

The NMSS Director requests your notification to proceed with this action. If you, or your staff, wish, a briefing on the project can be provided.

Enclosure:  
"Revised Statement of Work"

Cc: Commissioner Jaczko  
Commissioner Lyons  
Commissioner Svinicki  
OGC  
SECY  
OPA  
OCA

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OFC:	SFST	SFST	NMSS	SFST	SFST	SFST
NAME:	JGlenny	JCook	EKrauss	DPstrak	EHuemann	RLorson
DATE:	3/31/2009	3/31/2009	4/6/2009	3/31/2009	3/31/2009	4/2/2009
OFC:	SFST	SFST	PMDA	ADM	OGC	NMSS
NAME:	NMamish	WBrach	PEasson	MFlynn	MMaxim	MWeber
DATE:	4/3/2009	/ /09	/ /09	/ /09	/ /09	/ /09
OFC:	EDO	CFO				
NAME:	RBorchardt	JDyer				
DATE:	/ /09	/ /09	/ /09			

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