3/24/09

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

Penny - Reword/delete the O?

1.0 Background

Contract J5546 was originally placed in May 2005 to produce a Transportation Safety Visualizations tool and to look into what change in risk would result from shipping spent fuel in multi-purpose canisters. This contract was awarded for $286K. Revision 1 to the contract was placed in June of 2006. This revision replaced the multi-purpose canister task with the Spent Fuel Transportation Risk Assessment and changed the contract value to $1230K. Revision 2 to the contract was placed in July of 2008. This revision added the rail-cask sized calorimeter test and improved evaluation of impacts onto non-rigid targets. These changes increased the ceiling price of the contract to $1475K. The reason for these two additions was to improve the defensibility of the report. Since real fires do not provide a uniform thermal boundary condition as is specified in 10CFR71.73 and has been used in previous transportation risk assessments. Modeling the actual fire environment is now possible using the CAFE code, and the rail-cask sized calorimeter task will provide data to verify the accuracy of this code. 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. This change added the use of the finite element method to validate the energy balance method.

The reasons for the currently requested change are:
1) To change the visualization tool from a web-based one to an electronic brochure;

2) This risk assessment differs from all prior transportation risk assessments in that it utilizes 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 space are the closure and the impact limiter. Unfortunately, at least for the HI-STAR 100 cask, these are the two areas of the design that are the most complex. In the initial planning for this risk study it was recognized that the complexity of these two regions must be included in the cask models. This was combined with a change in the structural finite element analysis tool that treated the interaction between different components (such as the impact limiter shell and energy absorbing material) in a more physically correct manner. The interplay between this added precision and the complexity of the structure was not clearly understood by either the analysts or the code developers, and required

Penny

This is a draft update of the J5546 SOW, that will accompany the Chairman paper. I believe the $ estimates should not be included - agree? Thx.

Chuck

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substantial unplanned effort to adjust both the code and the model to achieve analysis success; and

3) To provide increased support for the public comment and peer review phase of the project.

Penny Reword/delete

This Statement of Work (SOW) is being revised to reflect the addition of new subtasks (f) and (g) under Task 1, and to revise the estimated level of effort and schedule to complete this project. Sections 6. Schedules and Deliverables, 7. Period of Performance, and 8 Level of Effort have been revised accordingly. Specifically, the level of effort in Section 8 is being increased from the current ceiling of $1,475K to $1,735K, an increase of $260K. The increase reflects the addition of the new subtasks (within the scope of the original SOW), and reflects that fact that the 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 the NRC's the organizational conflict of interest clause.

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Spent Fuel Transport Risk Assessment

The U.S. Nuclear Regulatory Commission (NRC) provided spent fuel transport impact study results in the reports entitled: (1) "Final Environmental Statement on the Transportation of Radioactive Material by Air and Other Modes," NUREG-0170, December 1977; (2) "Shipping Container Response to Severe Highway and Railway Accident Conditions," NUREG/CR-4829, February 1987; and (3) "Reexamination of Spent Fuel Shipment Risks," NUREG/CR-6672, March 2000. Even though the studies demonstrated that spent fuel shipment risks are low, NRC staff has identified a number of technical factors since the last effort was completed that require evaluation in order to refine spent fuel shipment risk estimates. Further, the staff has recently completed spent fuel security assessments, and those results can be leveraged to improve the assessment of spent fuel transport risks. Staff believes that anticipated spent fuel shipment campaigns to storage and/or disposal facilities provide a timely opportunity to perform an updated analysis of spent fuel transport risk estimates. Therefore assistance is needed with a new transport risk assessment that can be conducted by computer analysis. No package testing is envisioned in this effort, although some component testing may be performed to validate input values. All findings shall be documented in a new NUREG report.

Only the first of the reports cited above (NUREG-0170) was provided to the public for review and comment before publication. Staff intends to announce the availability of the draft SFTRA NUREG report in the Federal Register for public review and comment. Staff also intends to arrange a technical peer review of the draft SFTRA NUREG by an external group under separate contract with NRC. After considering public and peer comments, NRC would publish the results as a NUREG document.

SFTRA will 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 comment process, help to alleviate public concerns in this area. These periodic reviews of transportation risk estimates will continue to support Commission direction that "[...] regulatory policy concerning transportation of radioactive material be subject to close and continuing review" (46 FR 21620). Potentially, the Commission could use the outcome of this assessment, including the public comments, to review its conclusion, with respect to spent fuel transport, that "[...]present regulations (i.e., 10 CFR Part 71, "Packaging and Transportation of Radioactive Material") are adequate to protect the public

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against unreasonable risk from the transport of radioactive materials" (46 FR 21620, published April 13, 1981).

Transportation Safety Visualizations

The Division of Spent Fuel Storage and Transportation (SFST) in the Office of Nuclear Material Safety and Safeguards (NMSS) frequently engages in outreach activities in meetings with state, local and Tribal officials in order to explain NRC's safety role in the transport of radioactive material, especially with regard to spent fuel transport. Often, these meetings include presentations by individuals that focus on highlighting transport routine and accident consequences, without providing the balancing perspective of the probabilities of those consequences. It then falls to NRC representatives to reassure the public regarding the adequacy of NRC's transportation safety regulations to provide protection of public health and safety. NRC has produced many technical studies that establish the adequacy of its regulations. However, these studies are based on engineering and probabilistic risk evaluations that can be difficult to convey to the public. The visualizations are intended to facilitate safety communication without overly complicated discussions.

2.0 Objectives

The objectives of this agreement are delineated below.

A. Perform an updated spent fuel transportation risk assessment 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 on 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 in 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.

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Task 1. Spent Fuel Transport Risk Assessment

SNL will conduct a spent fuel transport risk assessment 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 the 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 the NRC by the 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 spent fuel transport risk assessment 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 the NRC, the revised spent fuel transportation risk assessment, 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 its efforts from the outset on the utility and quality aspects of the NUREG report.

Comment [JMG2]: only one set of ", where does the other go?

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SNL will prepare responses to comments and reviews, and revise the draft NUREG in consultation with the 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.

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). Packages are certified as satisfying the regulatory requirements, regardless of the presence of canisters. Thus the canister has no bearing on safety determinations.

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 fuel volatile 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 that 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 spent fuel transport risk assessments 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.

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 spent fuel transportation risk assessments have used the uniform thermal boundary condition specified in 10 CFR 71.73 and only adjusted the duration of the fire, the 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.

New

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 select yielding targets will be performed to validate the energy balance method.

A key component of the spent fuel transportation risk assessment is the response that spent fuel casks will have to impact accidents. Previous work (from NUREG/CR-6672, and PPS) indicated that the cask closure is the region of the cask, that if significantly damamged, 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.

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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 the 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 for the public what the 10 CFR Part 71 hypothetical accident conditions mean to safety in terms with which 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 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, 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 the NRC?
- Why do we believe that, on balance, likely actual risks are less than the (small) estimated risks?
- When does the 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.

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.

Task 2 has been completed.

Schedule of remaining milestones for Task 1:

7/~~28~~/09 20	SNL submits draft "Spent Fuel Transport Risk Assessment" NUREG to the NRC.
9/~~17~~/2009 14	SFST completes review of draft report and provides comments to SNL.
10/12/09 ~~11/13/09~~	SNL provides revised draft SFTRA NUREG based on SFST comments
12/~~18~~/09 07	NRC publishes draft NUREG (in FRN).
2/~~11~~/10 08	Public comment period closes
3/~~11~~/10 08	SFST provides public comments to peer review group.
4/~~8~~/10 07	Peer review group requests clarifications from SNL, including SNL proposed responses to public comments.
6/~~7~~/10 02	Peer review group provides final findings to SFST and SNL.
7/~~18~~/10 14	SNL provides responses to public and peer comments to SFST.
? ~~9/15/10~~ ~~08~~	SFST provides final comments to SNL.

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Comment [JG3]: The timeline below was modified. I need to discuss with John Cook if we want to keep the details of events that took place already. Double check dates against latest version of the Gant chart for this project.

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¶
5/8/06 SNL provided the TPM with a preliminary markup of its Task 2 ideas as how best to clearly and simply depict and convey regulatory safety and risk assessment information. SNL also described its planned method for Task 1 analyses for evaluating the spent fuel shipment risks.¶
¶
This action has been completed.¶
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¶
5/8/06 Review meeting 1¶
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SNL presented and discussed its options for Task 2 visualizations, identified issues, and described its plans for obtaining external review and input on the effectiveness of its proposed visualizations. SNL also described its Task 1 progress on the risk assessment task, and any preliminary issues regarding that work. This included its thorough and complete review of sources for identifying issues and topics to ... [1]

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dates from SNL Gantt chart

9/8/10?

3/30/11 SNL submits final report to NRC.

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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 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.

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7.0 Period of Performance

The period of performance for this project started in June 2005, and will continue until ~~March~~ November 30, 2011.

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8.0 Estimated level of Effort

Comment [JG4]: This section underwent major revisions to include the justification for increase for tasks 1 and 2. Also note that the level of effort for Task 2 was changed from 15 to 21 staff-week, consequently Task 1 was changed to 159 staff-weeks. The sum of staff-weeks for both tasks should be 180.

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

Task 1. 174 staff-weeks

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Justification for increase:

This risk assessment differs from all prior transportation risk assessments in that it utilizes 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 space are the closure and the impact limiter. Unfortunately, at least for the HI-STAR 100 cask, these are the two areas of the design that are the most complex. In the initial planning for this risk study it was recognized that the complexity of these two regions must be included in the cask models. This was combined with a change in the structural finite element analysis tool that treated the interaction between different components (such as the impact limiter shell and energy absorbing material) in a more physically correct manner. The interplay between this added precision and the complexity of the structure was not clearly understood by either the analysts or the code developers, and required substantial unplanned effort to adjust both the code and the model to achieve analysis success. Further, 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. The increase in cost associated with this task is $242,390.

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Task 2. 21 staff-weeks, this is a correction to the previous estimation of 15 staff-weeks.

Justification for increase:

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The output of this task changed from being an NRC web site to an electronic brochure. This resulted in an increase in cost for the task. The original estimated cost was $123,000 and the final actual cost was $165,610, resulting in a cost increase of $42,610.

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The total increase in cost for the project is $166,000.

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 FY09, and FY10. (only in FY11?)

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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 of the required information as shown 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 1and 2

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

* Camera-ready and electronic media

An electronic copy of the monthly letter status reports 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

Technical Assistance Project Manager: Penny Kinney
Technical Project Manager: 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 (SOEW) (NRC Form 173) from NMSS. If the performing organization receives guidance which 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 five days, the performing organization shall notify the DOE Operations Office.

13.0 Quality Assurance

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 which 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. On the occasion of dissent in 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 a written request 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 Management Directive 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 conflicts 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.

Tasks 1 and 2 are to proceed concurrently, although work may initially focus on Task 2. Task 2 will require interactions to develop alternative visualizations, provide for revisions, and obtain approvals to produce the final deliverables. The schedule that follows provides details for the first year of effort, and major milestones thereafter. Note that this schedule, and the distribution of the level of effort, may be revised, based on discussions with SNL.

5/8/06	SNL provided the TPM with a preliminary markup of its Task 2 ideas as how best to clearly and simply depict and convey regulatory safety and risk assessment information. SNL also described its planned method for Task 1 analyses for evaluating the spent fuel shipment risks. This action has been completed.
5/8/06	Review meeting 1 SNL presented and discussed its options for Task 2 visualizations, identified issues, and described its plans for obtaining external review and input on the effectiveness of its proposed visualizations. SNL also described its Task 1 progress on the risk assessment task, and any preliminary issues regarding that work. This included its thorough and complete review of sources for identifying issues and topics to address in the risk assessment and proposed final identification of the risk assessment scope and topics.
5/8/06	SNL provided the TPM with a revised markup of its Task 2 ideas that clearly and simply depicted and conveyed regulatory safety and risk assessment information. SNL also provided Task 1 preliminary results from its analyses and any proposed revisions for the spent fuel shipment risk assessment.
5/8/06	Review meeting 2 SNL presented and discussed its Task 2 progress, identified any issues, and described its plans for preparing the first draft of its proposed visualizations. SNL also described its Task 1 progress on the risk assessment task and any issues regarding that work.
5/8/06	SNL provided the TPM with a first draft of Task 2 visualizations that clearly and simply depicted and conveyed regulatory safety and risk assessment information. SNL also provided a draft of Task 1 results as available from its computer code runs and analyses for the spent fuel shipment risk assessment.
5/8/06	Review meeting 3

SNL presented and discussed its Task 2 draft visualizations and Task 1 draft canister risk assessment impacts in detail. SNL also described its plan for identifying and resolving comments on the drafts, and any difficulties in obtaining the necessary approvals to prepare final deliverables. At the meeting SNL provided a written detailed schedule leading to on-time production of all visualizations.

8/30/06 SNL provided the TPM with a second draft of Task 2 visualizations that clearly and simply depicted and conveyed regulatory safety and risk assessment information. SNL also provided a second draft of Task 1 results from its computer code runs, any testing, and analyses, as available, for evaluating the impact of the use of inner spent fuel canisters on spent fuel shipment risk assessments.

9/06 Review meeting 4

SNL provided Task 2 final visualization deliverables to SFST.

SNL provided status of ongoing Task 1 risk assessment testing and analyses.