

JCN - J5167

**MONTHLY LETTER STATUS REPORT
For September 2002**

Project Title: Spent Fuel Review Assistance
Period of Performance: February 3, 1997 - September 30, 2003
JCN: J5167
PNNL Project Manager: M. A. Khaleel (509-375-2438)
Address: PO Box 999, Mail Stop K2-18
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Facsimile: 509-375-6605
NRC Project Manager: P. Kinney (301-415-7805)
NRC Technical Monitor: C. Bajwa (301-415-1237)

Project Objective: The objective of this project is to conduct safety and environmental reviews and development of regulatory guidance related to Independent Spent Fuel Storage Installations and Dry Cask Storage facilities.

Task Orders 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 & 11 COMPLETED

Task #12

Title: Development and Analysis of Spent Fuel and Radioactive Material Cask Models for Casework Evaluations

JCN: J5167

PNNL Task Manager: T. E. Michener (509-375-2162)
NRC Technical Monitor: C. Bajwa (301-415-1237)

OBJECTIVE

The objective of this task order is to provide package analyses in support of ongoing casework using the ANSYS, ANSYS LS-DYNA FEA, COBRA-SFS, and Star-CD packages.

PROGRESS DURING REPORTING PERIOD

In September PNNL staff performed the following:

- PNNL staff continued to work with the substitute TN-32PT ANSYS model involving a solid rail design provided by the applicant, to determine the appropriateness of the approach and the variation of results when compared to PNNL's original COBRA-SFS modeling effort. Further findings and recommendations were provided in written form and verbally to the NRC technical monitor.
- The initial COBRA-SFS analysis of the TN-24PHB cask was completed in September. The peak clad temperature prediction was provided via email to the NRC technical monitor.

A/B

- PNNL staff involvement in construction and development of the MP 197 transport package, construction of the 52BT NUHOMS evaluation model, and the review of the TN24PHB is ongoing and will continue throughout the life of the task.
- Construction of a 3D transient version of the Baltimore Tunnel Fire (BTF) model has begun and is being constructed. Input and information requests were provided to NIST (via the NRC technical monitor) regarding data/information required to complete the BTF model. Preliminary results are anticipated during the next month.

TRAVEL

Tom Michener and Harold Adkins traveled to Washington DC on two separate occasions in September to participate in discussions with TN and the NRC dealing with discrepancies between the applicants thermal analysis versus the PNNL confirmatory COBRA-SFS results. During these visits project updates on all ongoing efforts were provided to NRC staff.

REPORT, PAPERS, AND PUBLICATIONS

None.

ANTICIPATED AND ENCOUNTERED PROBLEM AREAS

None.

PLANS FOR NEXT REPORTING PERIOD

PNNL staff will continue to support the TN32PT and TN24PHB review efforts via COBRA-SFS confirmatory analyses and investigations into the ANSYS modeling approach used by the applicant. The associated SAR documentation will also continue to be reviewed for consistency, accuracy, and completeness. It is anticipated that additional COBRA-SFS and ANSYS modeling efforts will be necessary as new information is provided by TN West.

PNNL staff will also continue to support the development of the MP-197/DSC 61BT and DSC 52BT that NRC are currently attempting to construct.

PNNL staff were requested to participate in an inspection of the TN West Fremont facility in October. Tom Michener and Harold Adkins will attend.

PNNL staff will continue to develop the MP 197 transport package, construct the 52BT NUHOMS evaluation model, and review of the TN24PHB SAR.

FINANCIAL STATUS AND VARIANCE ANALYSIS

See attached financial status report. The cost and funding information reported on the Cost Status by Element Table includes the necessary adjustments to account for the DOE Adder. All other cost information reflects only the Pacific Northwest National Laboratory costs and does not include the DOE Adder.

PROPERTY AND SOFTWARE

PNNL procured a workstation computer to support current and future tasks performed under the JCN J5167 project. For compatibility, a Dell 2 CPU workstation model PWS 530 configured to match the NRC SFPO machine was selected. The machine was received, installed, and is currently supporting tasks.

Task #13

Title: Dynamic Structural Analyses in Support of Risk-Informing 10 CFR Part 71

JCN: J5167

PNNL Task Manager:	H. E. Adkins	(509-372-6629)
NRC Technical Monitor:	D. T. Huang	(301-415-3381)

OBJECTIVE

The objectives of this task are to: 1) compare the structural analyses results of NUREG-6672 using the ANSYS LS-DYNA FEA packages with selected spent fuel transportation packages currently certified by the NRC; 2) determine the deformed geometry and cladding integrity of three selected pressurized water reactors (PWR) high burn-up (50, 60, and 75 GWD/MTU) spent nuclear fuel assemblies suitable for transport in the systems identified; 3) train selected NRC staff members in the use of ANSYS LS-DYNA in cask analyses; 4) provide continued support on high burn-up material and thermal issues.

PROGRESS DURING REPORTING PERIOD

In September PNNL staff performed the following:

- PNNL staff will continue to review the NRC document NUREG 6672. PNNL staff completed a formal SOW involving a cost estimate change and schedule change of this task to capture the effect of adding the expanded work scope involving the detailed SNF impact evaluations. These proposed changes were provided to the NRC technical representative.
- PNNL staff identified material property requirement for pin assembly analysis and fracture/failure considerations for pin assemblies. PNNL staff also began review of documentation, procedures, and commands for the ANSYS interface with LS-DYNA.
- PNNL staff postponed the beginning of construction of the first of two identified SNF transport systems until obtaining approval on the anticipated approach and expanded work scope from the NRC.

TRAVEL

None.

REPORT, PAPERS, AND PUBLICATIONS

None.

ANTICIPATED AND ENCOUNTERED PROBLEM AREAS

None.

PLANS FOR NEXT REPORTING PERIOD

After discussing the anticipated approach and obtaining approval from the NRC on modification of this task, it is anticipated that PNNL staff will be able to begin construction of the first of two identified SNF transport systems.

FINANCIAL STATUS AND VARIANCE ANALYSIS

See attached financial status report. The cost and funding information reported on the Cost Status by Element Table includes the necessary adjustments to account for the DOE Adder. All other cost information reflects only the Pacific Northwest National Laboratory costs and does not include the DOE Adder.

PROPERTY AND SOFTWARE

An annual LS-DYNA license was obtained for use to perform the remainder of this task.

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SPENT FUEL REVIEW ASSISTANCE

M. A. Khaleel
(509) 375-2438
September 2002

	<u>Current Month</u>	<u>FYTD</u>	<u>Cumulative To Date</u>
I. Direct Staff Labor Hours	299.0	3,404.6	14,734.8
II. Direct Salaries	16,620	199,858	766,518
Materials & Services (Excluding ADP)	8,106	9,624	14,506
ADP Support	0	0	0
Subcontracts	0	0	57,316
Travel Expenses	0	5,994	46,803
Indirect Labor Costs	8,573	91,069	338,931
Other Direct Costs	2,204	17,150	79,366
G&A, Nuclear, and Serv Assmt	12,588	142,145	566,557
Total PNNL Costs	<u>\$48,090</u>	<u>\$465,840</u>	<u>\$1,869,996</u>
Percent Spent		89%	97%
Total Costs to NRC (Includes DOE Adder)	<u>\$49,533</u>	<u>\$479,815</u>	<u>\$1,929,874</u>

III. Overall Funding Status

PNNL Available Funding (Adjusted: Reflects DOE Adder Initiated in FY92)

<u>Total JCN Funding</u>	<u>Prior FY Carryover</u>	<u>FY02 Projected Funding Level</u>	<u>FY02 Funds Received to Date</u>	<u>FY02 Funding Bal. Needed</u>
\$1,926,828	\$134,706	TBD	\$387,967	\$145,631

NRC Funding Provided to DOE

<u>Total JCN Funding</u>	<u>Prior FY Carryover</u>	<u>FY02 Projected Funding Level</u>	<u>FY02 Funds Received to Date</u>	<u>FY02 Funding Bal. Needed</u>
\$1,988,100	\$138,747	TBD	\$399,606	\$150,000

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Task Funding Status (PNNL dollars)

Task No.	NRC \$ Task Funds	PNNL \$ Task Funds	NRC Funds Rec To Date	PNNL Funds Rec. To Date	Monthly Costs	Cumulative Costs	Additional NRC Remaining Funds	Funds Requested
Unobligated \$	0	0	0	0	0	0	0	0
01	18,089	17,343	18,089	17,343	0	17,343	0	0
02	50,729	48,638	50,729	48,638	0	48,638	0	0
Sub-Total	68,818	65,981	68,818	65,981	0	65,981	0	0

NOTE: PNNL received a stop work order on the tasks above.

03 (complete)	191,974	185,743	191,974	185,743	0	184,880	863	0
04 (complete)	50,400	48,322	50,400	48,322	0	48,291	31	0
05 (complete)	298,139	288,169	298,139	288,169	0	288,164	5	0
06 (complete)	113,503	110,197	113,503	110,197	0	110,197	0	0
07 (complete)	155,400	150,874	155,400	150,873	0	150,785	88	0
08 (complete)	165,300	160,485	165,300	160,485	0	159,744	741	0
09 (complete)	352,800	342,524	352,800	342,524	0	342,515	9	0
10 (complete)	228,200	221,553	228,200	221,553	0	221,549	4	0
11 (complete)	154,700	150,194	113,564	110,256	0	110,249	7	41,136
12	200,000	194,175	200,000	194,175	42,246	176,142	18,033	0
13	200,000	194,175	50,000	48,544	5,843	11,500	37,044	150,000
Total	2,179,234	2,112,393	1,988,100	1,926,828	48,090	1,869,996	56,826	191,136

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Task 09

CSFM Methodology for Calculating Cladding Temperature Limits for High Burnup

1. Financial Summary

PNNL Available Funding (Adjusted: Reflects DOE Adder Initiated in FY92)

<u>Authorized</u> <u>Cost Ceiling</u>	<u>Funding</u> <u>Obligation</u>	<u>Period Costs</u>	<u>Total</u> <u>Costs to Date</u>	<u>Cumulative</u> <u>Percent Spent</u>
\$342,524	\$342,524	\$0	\$342,515	100.0%

NRC Funding Provided to DOE

<u>Authorized</u> <u>Cost Ceiling</u>	<u>Funding</u> <u>Obligation</u>	<u>Period Costs</u>	<u>Total</u> <u>Costs to Date</u>	<u>Cumulative</u> <u>Percent Spent</u>
\$352,800	352,800	\$0	\$352,790	100.0%

2. Task Cost Status:

	<u>Current</u> <u>Month</u>	<u>Fiscal</u> <u>Year to Date</u>	<u>Cumulative</u> <u>To Date</u>
Direct Staff Labor Hours	0	39	2,625
Labor	\$0	6,071	\$313,388
Travel Expenses	0	0	9370
Service Equipment Centers	0	0	\$530
Other Intermediate Costs	0	0	\$0
Value Added Overheads	0	0	\$0
Services - Other RL Contractors	0	0	\$0
Procurements	0	0	\$439
Subcontracts	0	0	\$18,786
Total PNNL Costs	\$0	\$6,071	\$342,515
Total Costs to NRC	\$0	\$6,253	\$352,790
(Includes DOE Adder)			

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Task 10

Advanced NUHOMS Thermal Analysis

1. Financial Summary

PNNL Available Funding (Adjusted: Reflects DOE Adder Initiated in FY92)

<u>Authorized</u>	<u>Funding</u>	<u>Period Costs</u>	<u>Total</u>	<u>Cumulative</u>
<u>Cost Ceiling</u>	<u>Obligation</u>		<u>Costs to Date</u>	<u>Percent Spent</u>
\$221,553	\$221,553	\$0	\$221,549	100.0%

NRC Funding Provided to DOE

<u>Authorized</u>	<u>Funding</u>	<u>Period Costs</u>	<u>Total</u>	<u>Cumulative</u>
<u>Cost Ceiling</u>	<u>Obligation</u>		<u>Costs to Date</u>	<u>Percent Spent</u>
228,200	228,200	\$0	\$228,197	100.0%

2. Task Cost Status:

	<u>Current</u>	<u>Fiscal</u>	<u>Cumulative</u>
	<u>Month</u>	<u>Year to Date</u>	<u>To Date</u>
Direct Staff Labor Hours	0.0	1,185.2	1,541.2
Labor	\$0	\$173,324	\$219,381
Travel Expenses	0	229	\$229
Service Equipment Centers	0	76	\$76
Other Prime Costs	0	0	\$0
Value Added Overheads	0	0	\$0
Services - Other RL Contractors	0	0	\$0
Procurements	0	1,154	\$1,862
Subcontracts	0	0	\$0
Total PNNL Costs	\$0	\$174,784	\$221,549
Total Costs to NRC	\$0	\$180,028	\$228,197
(Includes DOE Adder)			

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Task 11

Thermal Hydraulic Analysis Code Verification Technical Support

1. Financial Summary

PNNL Available Funding (Adjusted: Reflects DOE Adder Initiated in FY92)

<u>Authorized</u> <u>Cost Ceiling</u>	<u>Funding</u> <u>Obligation</u>	<u>Period Costs</u>	<u>Total</u> <u>Costs to Date</u>	<u>Cumulative</u> <u>Percent Spent</u>
\$150,194	\$110,256	\$0	\$110,249	100.0%

NRC Funding Provided to DOE

<u>Authorized</u> <u>Cost Ceiling</u>	<u>Funding</u> <u>Obligation</u>	<u>Period Costs</u>	<u>Total</u> <u>Costs to Date</u>	<u>Cumulative</u> <u>Percent Spent</u>
\$154,700	113,564	\$0	\$113,555	100.0%

2. Task Cost Status:

	<u>Current</u> <u>Month</u>	<u>Fiscal</u> <u>Year to Date</u>	<u>Cumulative</u> <u>To Date</u>
Direct Staff Labor Hours	0.0	788.3	891.8
Labor	\$0	\$92,017	\$104,922
Travel Expenses	0	4,772	\$4,772
Service Equipment Centers	0	0	\$0
Other Prime Costs	0	0	\$0
Value Added Overheads	0	0	\$0
Services - Other RL Contractors	0	0	\$0
Procurements	0	554	\$554
Subcontracts	0	0	\$0
Total PNNL Costs	\$0	\$97,343	\$110,249
Total Costs to NRC	\$0	\$100,263	\$113,555

(Includes DOE Adder)

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**Task 12 - Development of Analysis of Spent Fuel & Radioactive Material Cask
Cask Models for Casework Evaluations**

1. Financial Summary

PNNL Available Funding (Adjusted: Reflects DOE Adder Initiated in FY92)

<u>Authorized</u>	<u>Funding</u>	<u>Period Costs</u>	<u>Total</u>	<u>Cumulative</u>
<u>Cost Ceiling</u>	<u>Obligation</u>		<u>Costs to Date</u>	<u>Percent Spent</u>
\$194,175	\$194,175	\$42,246	\$176,142	90.7%

NRC Funding Provided to DOE

<u>Authorized</u>	<u>Funding</u>	<u>Period Costs</u>	<u>Total</u>	<u>Cumulative</u>
<u>Cost Ceiling</u>	<u>Obligation</u>		<u>Costs to Date</u>	<u>Percent Spent</u>
\$200,000	200,000	\$43,513	\$181,426	90.7%

2. Task Cost Status:

	<u>Current</u>	<u>Fiscal</u>	<u>Cumulative</u>
	<u>Month</u>	<u>Year to Date</u>	<u>To Date</u>
Direct Staff Labor Hours	248.5	1,292.6	1,292.6
Labor	\$32,897	\$162,627	\$162,627
Travel Expenses	0	4,154	\$4,154
Service Equipment Centers	173	173	\$173
Other Intermediate Costs	0	0	\$0
Value Added Overheads	0	0	\$0
Services - Other RL Contractors	0	0	\$0
Procurements	9,176	9,187	\$9,187
Subcontracts	0	0	\$0
Total PNNL Costs	\$42,246	\$176,142	\$176,142
Total Costs to NRC	\$43,513	\$181,426	\$181,426

(Includes DOE Adder)

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**Task 13 - Dynamic Structural Analyses in Support of Risk-Informing
10 CFR Part 71**

1. Financial Summary

PNNL Available Funding (Adjusted: Reflects DOE Adder Initiated in FY92)

<u>Authorized</u>	<u>Funding</u>		<u>Total</u>	<u>Cumulative</u>
<u>Cost Ceiling</u>	<u>Obligation</u>	<u>Period Costs</u>	<u>Costs to Date</u>	<u>Percent Spent</u>
\$194,175	\$48,544	\$5,844	\$11,500	23.7%

NRC Funding Provided to DOE

<u>Authorized</u>	<u>Funding</u>		<u>Total</u>	<u>Cumulative</u>
<u>Cost Ceiling</u>	<u>Obligation</u>	<u>Period Costs</u>	<u>Costs to Date</u>	<u>Percent Spent</u>
\$200,000	\$50,000	\$6,019	\$11,845	23.7%

2. Task Cost Status:

	<u>Current</u>	<u>Fiscal</u>	<u>Cumulative</u>
	<u>Month</u>	<u>Year to Date</u>	<u>To Date</u>
Direct Staff Labor Hours	50.5	99.5	99.5
Labor	\$5,671	\$11,326	\$11,326
Travel Expenses	0	0	\$0
Service Equipment Centers	173	173	\$173
Other Intermediate Costs	0	0	\$0
Value Added Overheads	0	0	\$0
Services - Other RL Contractors	0	0	\$0
Procurements	0	0	\$0
Subcontracts	0	0	\$0
Total PNNL Costs	<u>\$5,844</u>	<u>\$11,500</u>	<u>\$11,500</u>
Total Costs to NRC	<u>\$6,019</u>	<u>\$11,845</u>	<u>\$11,845</u>
(Includes DOE Adder)			

DATE

Sept 2002

NRC JOB CODE J5167

MONTHLY FORECAST VS ACTUAL - PNNL EXPENSE BY TASK

TASK #	TASK DESCRIPTION		Prior Years	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	FY03	TOTALS
13	Dynamic Structural Analyses in Support of... PROJECTED	NRC \$'s											15.2	15.2	19.7	150.0	200.0
		PNNL \$'s											14.7	14.7	19.1	145.6	194.2
13	Dynamic Structural Analyses in Support of... ACTUAL	NRC \$'s											0.8	5.0	6.0		11.8
		PNNL \$'s											0.8	4.9	5.8		11.5

TASK #	TASK DESCRIPTION		Prior Years	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	FY03	TOTALS
12	DEV OF ANALYSIS OF SF & RADIOACTIVE... PROJECTED	NRC \$'s								20.1	38.4	20.2	20.2	20.2	20.2	60.6	200.0
		PNNL \$'s								19.5	37.3	19.6	19.6	19.6	19.6	58.9	194.2
12	DEV OF ANALYSIS OF SF & RADIOACTIVE... ACTUAL	NRC \$'s								20.1	20.7	36.4	15.6	45.1	43.5		181.4
		PNNL \$'s								19.5	20.1	35.4	15.2	43.8	42.2		176.1

TASK #	TASK DESCRIPTION		Prior Years	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	FY03	TOTALS
11 Complete	THERMAL HYDRAULIC ANALYSIS PROJECTED	NRC \$'s	13.3	19.3	13.9	20.6	20.6	18.5	20.6	18.5	9.4						154.7
		PNNL \$'s	12.9	18.7	13.5	20.0	20.0	18.0	20.0	18.0	9.1						150.2
11 Complete	THERMAL HYDRAULIC ANALYSIS ACTUAL	NRC \$'s	13.3	19.3	20.1	27.7	9.2	0.8	16.8	6.4	0.0						113.6
		PNNL \$'s	12.9	18.7	19.5	26.9	9.0	0.7	16.3	6.2	0.0						110.2

TASK #	TASK DESCRIPTION		Prior Years	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	FY03	TOTALS
10 Complete	ADV NUHOMS THERMAL ANALYSIS PROJECTED	NRC \$'s	48.2	32.7	21.9	9.1	34.0	27.1	22.7	22.7	9.8	0.0	0.0	0.0	0.0		228.2
		PNNL \$'s	46.8	31.7	21.3	8.8	33.0	26.3	22.0	22.0	9.6	0.0	0.0	0.0	0.0		221.5
10 Complete	ADV NUHOMS THERMAL ANALYSIS ACTUAL	NRC \$'s	48.2	32.7	21.9	9.1	29.7	31.7	45.4	9.6	0.0	0.0	0.0	0.0	0.0		228.2
		PNNL \$'s	46.8	31.7	21.3	8.8	28.8	30.8	44.1	9.3	0.0	0.0	0.0	0.0	0.0		221.6

TASK #	TASK DESCRIPTION		Prior Years	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	FY03	TOTALS
09 Complete	CSFM PROJECTED	NRC \$'s	346.5	6.3	0.0	0.0	0.0	0.0	0.0								352.8
		PNNL \$'s	336.4	6.1	0.0	0.0	0.0	0.0	0.0								342.5
09 Complete	CSFM ACTUAL	NRC \$'s	346.5	7.2	-1.0	0.0	0.0	0.0	0.0								352.8
		PNNL \$'s	336.4	7.0	-0.9	0.0	0.0	0.0	0.0								342.5