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

September 20, 2001

MEMORANDUM TO: Jesse L. Cloud, Chief
Administrative Support Team
Program Management, Policy Development
and Analysis Staff, NMSS

FROM: M. Wayne Hodges, Deputy Director
Technical Review Directorate
Spent Fuel Project Office, NMSS

SUBJECT: REQUEST FOR ACQUISITION OF ADDITIONAL HARDWARE AND SOFTWARE RESOURCES TO MEET SFPO STAFF ANALYSIS NEEDS

The Spent Fuel Project Office (SFPO) staff currently utilizes ANSYS, SolidWorks, SCALE, MCNP, and MONK/MCBEND software for confirmatory and investigatory analysis of spent fuel transportation and storage cask designs, as well as safeguards analyses, responses to Congressional inquires, and responses to ongoing litigation issues for ISFSI licensing activities. The staff has the capability to perform finite element analysis (FEA), solid modeling, shielding, and criticality analyses using the above programs.

The staff plans to utilize the above software in the following areas:

1. Safeguards consequence analyses (truck bombs, sabotage of dry cask storage and transportation). Sabotage issues have been raised by the States of Utah and Nevada. Given the recent turn of events, Congressional inquires are expected to require complex analyses for response. We also anticipate significant public concerns/interest related to the licensing of Diablo Canyon, Rancho Seco, Private Fuel Storage (PFS), and Owl Creek.

2. Earthquake analyses for dry cask storage installations. This is in support of PFS, Owl Creek, San Onfre, and Diablo Canyon. All are highly contested licensing activities.

3. Probabilistic risk assessments that include tunnel fire events and the development of a transportation and storage risk assessment studies. There may be Congressional hearings on transportation safety in the coming year. We anticipate significant computational needs in preparation for those hearings.

4. Analysis to support ongoing spent fuel storage and transportation casework

The staff currently does not have the computer hardware or software resources to carry out the tasks mentioned above on the assigned schedules. For example, many of the above analyses will be carried out using the ANSYS FEA program. SFPO currently has three regular ANSYS/LS-DYNA users and two ANSYS Mechanical licenses. SFPO will be training five additional reviewers to run the ANSYS/LS-DYNA program by the end of this calendar year. This will create a shortage of licenses for staff use and will directly impact productivity and our ability to respond to public, litigation, and Congressional inquires. The effects of this have already been seen with just three users.

SFPO has a long term goal of acquiring significant high performance computer capabilities over the next five years in order to conduct analysis of large finite element models to support storage and transportation reviews. Recently, the ANSYS e-CAE service has been introduced which allows ANSYS users to purchase processing time on secured remote servers via the internet.

The e-CAE service will provide a significant cost savings to NMSS in two ways. First, additional solver licenses, for the ANSYS/LS-DYNA program as well as for the ANSYS/FLOTRAN CFD program will not need to be purchased, as these solvers will be available through the ANSYS e-CAE service. Second, there are significant cost savings over purchasing and maintaining high performance computer resources, as multiple processor computational servers are provided through the ANSYS e-CAE service. The typical five year cost savings are outlined in the table below.

5-year Cost comparison of Traditional ANSYS Licenses vs. Ansys e-CAE Service[1]			
Traditional ANSYS Licences		**e-CAE Service**	
ANSYS Mechanical Licenses (5)	$75,570.00	ANSYS Mechanical Licenses (5)	$75,570.00
Mechanical License fee (per year)	$23,865.00	Mechanical License fee (per year)	$23,865.00
ANSYS LS-Dyna Licenses (2)	$55,560.00	ANSYS LS-DYNA Prep/Post Licenses (2)	$11,560.00
LS-DYNA License fee (per year)	$11,000.00	Prep/Post License fee (per year)	$2,300.00
ANSYS FLOTRAN Licenses (2)	$18,520.00	Fee for e-CAE Service[2]	$16,250.00
FLOTRAN License fee (per year)	$3,700.00		
Proposed Hardware (per year)	$25,000.00	Proposed Hardware (1st year)[3]	$16,500.00
ModelChecker Software	$12,300.00	ModelChecker Software	$12,300.00
ModelChecker License Fee (per year)	$2,460.00	ModelChecker License Fee (per year)	$2,460.00
Total License Fees[4] (per year)	$41,025.00	Total License Fees[4] (per year)	$28,625.00
Total (1st year cost)	$225,515.00	Total (1st year cost)	$142,095.00
Total (5 Year cost)	$492,075.00	Total (5 Year cost)	$340,305.00

Notes:
1. Assumes a base of five (5) ANSYS Mechanical licenses
2. Includes 250 CPU hours of LS-DYNA process time @ 15$ per CPU-hour premium
3. One Additional high-performance workstation is still required
4. Does not include fees for current ANSYS licenses

To support current and future analysis efforts, the staff requests the purchase of five additional ANSYS Mechanical licenses along with two PrepPost licenses for LS-Dyna. The staff also requests the ModelChecker add-on for ANSYS. Quotes for these programs are attached.

The staff also requests a subscription to the ANSYS e-CAE service. A free 30 CPU-hour trial of the ANSYS e-CAE service has been offered to the staff. After evaluating this service, the staff will be able to determine the number of CPU hours to purchase in order to receive the best value for the money spent. It is possible that the staff will elect to purchase less than 500 CPU-hours which would cost less than the amount quoted above.

Due to the depth and breadth of computer codes used by SFPO, the staff also has need for stand-alone high performance computer analysis hardware. Currently the staff has one windows-based high performance work station. Because this is a shared workstation, the workstation is not always available for individual staff to complete time or processor intensive calculations. Current detailed analysis work is being delayed because of the lack of availability of high performance workstations. Given the recent events related to safeguards and ongoing litigation activities, SFPO's computing needs are anticipated to dramatically increase. An additional high performance work station will ensure greater availability of high performance computing to staff, and will enable the staff to complete time intensive analyses in support of their assigned missions. In addition, a stand-alone workstation with a removable hard drive is required to conduct classified safeguards analyses. The Hewlett Packard x-4000 analysis workstation is the system recommended to meet the needs of the staff. A quote for this high performance workstation is attached.

The cost for the workstation, including on-site implementation and set-up is $16,500. The cost of the ANSYS software is $113,295. The ModelChecker add on is $14,760. The total cost of this package is $144,555. The ANSYS e-CAE service will cost $16,250 per year. The staff will determine the appropriate number of CPU-hours to be purchased and submit a separate quote at a later time. These acquisitions will meet the staff's hardware and software needs for the foreseeable future.

This request conforms with the NRC Strategic Plan in the Nuclear Waste Safety arena. Specifically, this proposal will meet the performance goal to make NRC activities and decisions more effective, efficient, and realistic by enabling the staff to conduct analyses of detailed finite element models of storage and transportation casks in less time, and the performance goal to increase public confidence by enabling the staff to conduct confirmatory analyses which will support the staff's findings in the public arena.

Your cooperation in obtaining the analysis resources necessary for the SFPO staff to operate more efficiently and effectively is greatly appreciated.

Attachment: Sales Quotations

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