TEXAS ENGINEERING EXPERIMENT STATION

TEXAS A&M UNIVERSITY

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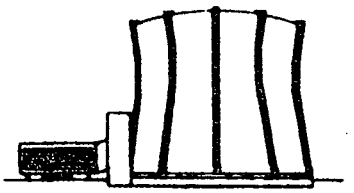

NUCLEAR SCIENCE CENTER
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August 30, 2010

2010-0053

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: Response to NRC Requests for Additional Information RAI 3, Chapter 15- Financial Qualifications, from the Texas A&M University System, Texas Engineering Experiment Station, Nuclear Science Center Reactor (NSCR, License No. R-83, Docket 50-128)

To Whom It May Concern:

The Texas A&M University System, Texas Engineering Experiment Station (TEES), Nuclear Science Center (NSC, License No. R-83) operates a LEU, 1MW, TRIGA reactor under timely renewal. In December, 2003 the NSC submitted a Safety Analysis Report (SAR) as part of the license renewal process. In December, 2005 a conversion SAR (Chapter 18) was submitted resulting in an order to convert from the NRC. In July 2009, the NSC submitted an updated SAR, dated June 2009, to the Nuclear Regulatory Commission (NRC). This updated 2009 version of our SAR incorporated the information from the conversion SAR and the startup of the new LEU reactor core. On November 13, 2009 the NRC submitted a Request for Additional Information as a part of the review process. This request included four questions related to Chapter 15 - Financial Qualifications, of the NSC's SAR submittal. The NSC has already submitted replies to Financial Questions 1 and 2. Attached is our reply to Financial RAI 3.

If you have any questions, please contact Jim Remlinger at 979-845-7551.

I declare under penalty of perjury that the foregoing is true and correct. Executed on August 30, 2010.

James A. Remlinger
NSC, Associate Director

Xc: 211/Central File
Duane Hardesy, NRC Project Manager

A020
NRR

Texas A&M University System
Texas Engineering Experiment Station
Nuclear Science Center
License No. R-83
Docket No. 50-128

Responses to Request for Additional Information
Chapter 15 – Financial Qualifications

Pursuant to Title 10 of the Code of Federal Regulations (10 CFR) Section 50.33(f)(2), "Applicants to renew or extend the term of an operating license for a nonpower reactor shall include the financial information that is required in an application for an initial license." To comply with this requirement, please provide the following updated and supplemental information to the Texas Engineering Experiment Station/Texas A&M University System (the TEES, the applicant) 2003 application (the application) for a renewed facility operating license for the TEES Nuclear Science Center (the NSC).

3. *The application indicates that the cost to decommission the NSC will be between $3 million and $8 million, based on a University of Wisconsin decommissioning cost estimate for decommissioning of a similar facility. Since certain information is needed regarding the eventual decommissioning of the NSC facility, the staff requests that TEES update the 2003 application to include the following information:*

(a) Pursuant to 10 CFR 50.75(d)(2), develop a current cost estimate in 2010 dollars to meet the NRC's radiological release criteria for decommissioning the NSC for unrestricted use; describe the basis on how the cost estimate was developed; show costs in current dollar amounts, specifically broken down into the categories of labor, waste disposal, or other items (such as energy, equipment and supplies): and a contingency factor of at least 25 percent.

The NSC estimates the 2010 Decommission costs for the NSC reactor to be:

Category	Cost
Labor	$1,374,000
Energy	$349,000
Burial	$5,427,000
Sub-total	$7,150,000
25% Contingency	$1,788,000
	$8,938,000

Details on how these numbers where calculated are shown in (d) below.

(b) Provide a statement of the decommissioning method to be used (e.g., DECON, or other method).

The Nuclear Science Center will employ the DECON method.

(c) To comply with 10 CFR 50.75(d)(2)(iii), the applicant must "provide a description of the means of adjusting the cost estimate and associated funding level periodically over the life of the facility." Since the application does not provide this information, please update the application to include a full description of the method to be used as the means of adjusting the cost estimate and associated funding level periodically over the life of the facility.

The NSC will follow the guidance provided in up-to-date revisions of USNRC UNREG/CR-1756 and NUREG-1307, updating values to current BLS information to allow use of the general equation:

$$\text{Estimate Cost (Yr X)} = [1986\ \$\ \text{Cost}] * (ALx + BEx + CBx)$$

The NSC will utilize regional data when available and calculate burial costs from the most recent Atlantic Company value for PWR for direct disposal. Once new information is available for a LLW site those burial numbers will be used to calculate disposal costs.

(d) Provide a numerical example showing how the 2010 decommissioning cost estimate will be updated periodically in the future.

Our numerical example is the attached detailed method used to calculate our 2010 decommissioning cost. The same approach will be used for future decommissioning cost estimations.

2010 Cost for Decommissioning the
Texas A&M University System
Texas Engineering Experiment Station,
Nuclear Science Center Reactor (NSCR)

References:

1. U.S. Nuclear Regulatory Commission, NUREG/CR- 1756
2. U.S. Nuclear Regulatory Commission, NUREG-1307, Rev. 13
3. BLS Inflation Calculator, http://data.bls.gov/cgi-bin/cpicalc.pl

Introduction

The estimated cost of decommissioning the Nuclear Science Center Reactor can be made by following guidance in above referenced US Nuclear Regulatory Commission NUREGs.

1982 Cost of Decommissioning

The USNRC NUREG/CR-1756 estimates the cost to decommission the reference research reactor using the DECON method to be $846,000 in 1982 dollars. This estimate does not including fuel shipping or demolition costs. The NSC works under the assumption that the government will cover the cost of the final fuel shipment and that the facilities will not be demolished.

2008 Cost of Decommissioning

In November 2008, the USNRC updated NUREG-1307, Rev. 13 reporting changes in decommissioning waste disposal cost at low-level waste burial sites. This NUREG reports estimations for the reference PWR and BWR reactors. The NSC will use data for the PWR reactor in developing its decommissioning cost estimates. In this document the USNRC states that "a relatively simple equation can be used to determine the minimum decommissioning fund requirement in year 2008 or previous-year dollars." That equation is:

$$\text{Estimate Cost (Yr X)} = [1986\ \$\ \text{Cost}] * (ALx + BEx + CBx) \quad \text{.....(Eqn.1)}$$

Where the coefficients A, B, and C are the fraction of the total in Year x for labor, energy and burial respectively and whose sums to one. Lx, Ex, and Bx are the cost adjustments (1986 to the latest month of Year X for which data is available) for labor, energy and burial respectively.

According to NUREG-1307 the best estimates for the values of the three coefficients are:

$$A = 0.65 \quad B = 0.13 \quad C = 0.22$$

For the year 2008 NUREG-1307 suggests that the values for the three cost adjustments to be:

$L_{(2008)}$ = 2.15 (Table 3.2, South Region)
$E_{(2008)}$ = 2.746 (Section 3.2)
$B_{(2008)}$ = 24.231 (Table 2.1, Generic Site, Direct Disposal, Worse Cost Scenario)

To determine the 2008 decommission cost for the TAMU NSC reactor the following equation must be solved:

Estimated Cost (2008) = [1986 $ Cost] * (0.65*2.15 + 0.13*2.746 + 0.22*24.231).....(Eqn. 2)

The only unknown is the 1986 cost of decommission for the NRC reactor. However, the CPI inflation calculator found at http://data.bls.gov/cgi-bin/cpicalc.pl can be use to escalate the 1982 decommission cost of $846,000 to 1986 dollars. Using the calculator the 1986 cost of decommission the NSC reactor is $965,400.

Solving equation 2, the cost of decommission the NSC reactor in 2008 dollars is $7,052,500. In defining our decommissioning costs the NSC believes it has taken the most conservative approach to represent the decommission cost (without contingency) as of January 2008.

Jan 2010 Cost of Decommissioning

To determine the decommissioning cost in 2010 dollars the method outlined in NUREG-1307 is used.

Estimated Cost (2010) = [1986 $ Cost]* ($AL_{2010} + BE_{2010} + CB_{2010}$)..... (Eqn. 3)

The values for the three coefficients remain the same as above: A = 0.65, B = 0.13, C = 0.22

Determination of Labor Cost Adjustment, L_{2010}:

Following the directions given in section 3.1 and appendix c of NUREG- 1307, Rev. 13 the following table is constructed:

Table 1 – Regional Labor Cost Adjustment			
Region	Base L_{2010} (Dec 2005)	Qtr 4 2009 ECI (Dec 2005 = 100)	L_{2010} = (198 *110.7)/100
South	1.98	110.7	**2.19**
Notes:	Last re-indexed in 2005	ECI from BLS table, CIU2010000000201	Series ID:

Determination of Energy Cost Adjustment, E_{2010}:

From Section 3.2, for the reference PWR reactor,

$$E_x = 0.58P_x + 0.42F_x \quad \text{(Eqn. 4)}$$

where E is a weighted average of two components, industrial electricity, P, and light fuel oil, F for a year x. To determine the adjustment from January 2008 to January 2010 we need BLS data for both of those months. These values are taken from the tables and entered in Table 2.

Table 2				
	Industrial Electricity		Light Fuel Oils	
Time Period	P	P_{2010} = 186/112.3	F	F_{2010} = 197.5/45.6
Dec 1986	112.3	**1.656**	45.6	**4.331**
Dec 2009	186.0		197.5	
Notes:	P and F values from BLS tables. P from Series Id: WPU0543, F from Series Id: WPU0573			

To solve for E_{2010}, use Eqn. 4 and data from Table 2:

$E_{2010} = 0.58(1.656) + 0.42(4.331) =$ **2.780**

Determination of Burial Cost Adjustment, B_{2010}

The NSC will use the most up-to-date value for direct disposal by a PWR at the Generic LLW Disposal Site (See Table 2, Section 2, page 3, NUREG-1307-Rev 13. For 2008 that value is 25.231. The NSC was unable to secure updated values for the Atlantic Compact so we have conservatively escalated the 2008 value from 25.231 to 25.55 using the BLS Inflation Calculator.

Final Determination of Jan 2010 Decommissioning Costs

Following the guideline of NUREG-1307 rev. 13 the NSC determined the 2008 cost for decommissioning the NSC reactor to be $7,052,500. Applying what was learned the three cost adjustments to go from 1986 to 2010 were determined:

Labor, L_{2010} = 2.19 (South Region)
Energy, E_{2010} = 2.780
Burial, B_{2010} = 25.55

And, by knowing the three coefficients values to be: A = 0.65, B = 0.13, C = 0.22, we can substitute the known values in Eqn. 3 to get the estimated Jan 2010 Decommissioning Costs for the NSC reactor.

Estimated Cost (2010) = [965,400]* (0.65*2.19 + 0.13*2.780 + 0.22*25.55).....Eqn.5

= $7,150,000

With 25% contingency the total estimated decommissioning cost is $8,938,000.

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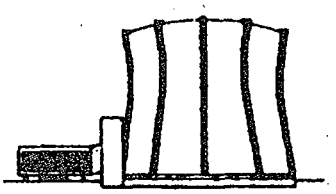

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May 28, 2010

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Washington, DC 20555-0001

2010-0030

Subject: Response to NRC Requests for Additional Information Questions 1 and 2, Chapter 15- Financial Qualifications, from the Texas A&M University System, Texas Engineering Experiment Station, Nuclear Science Center Reactor (NSCR, License No. R-83, Docket 50-128)

To Whom It May Concern:

The Texas A&M University System, Texas Engineering Experiment Station (TEES), Nuclear Science Center (NSC, License No. R-83) operates a LEU, 1MW, TRIGA reactor under timely renewal. In December, 2003 the NSC submitted a Safety Analysis Report (SAR) as part of the license renewal process. In December, 2005 a conversion SAR (Chapter 18) was submitted resulting in an order to convert from the NRC. In July 2009, the NSC submitted an updated SAR, dated June 2009, to the Nuclear Regulatory Commission (NRC). This updated 2009 version of our SAR incorporated the information from the conversion SAR and the startup of the new LEU reactor core. On November 13, 2009 the NRC submitted a Request for Additional Information as a part of the review process. This request included four questions related to Chapter 15 - Financial Qualifications, of the NSC's SAR submittal. Attached to this letter are the NSC's response to Questions 1 and 2 of the NRC's financial RAIs. Please note in the attachment that text from the NRC's November 13th letter has been italicized and the NSC's non-italicized response immediately follows each question.

If you have any questions, please contact Jim Remlinger at 979-845-7551.

I declare under penalty of perjury that the foregoing is true and correct. Executed on May 28, 2010.

James A. Remlinger
NSC, Associate Director

Xc: 2.11/Central File
Jesse Quichocho, NRC Project Manager

Texas A&M University System
Texas Engineering Experiment Station
Nuclear Science Center
License No. R-83
Docket No. 50-128

Responses to Request for Additional Information
Chapter 15 – Financial Qualifications

Pursuant to Title 10 of the Code of Federal Regulations (10 CFR) Section 50.33(f)(2), "Applicants to renew or extend the term of an operating license for a nonpower reactor shall include the financial information that is required in an application for an initial license." To comply with this requirement, please provide the following updated and supplemental information to the Texas Engineering Experiment Station/Texas A&M University System (the TEES, the applicant) 2003 application (the application) for a renewed facility operating license for the TEES Nuclear Science Center (the NSC).

1. *The U. S. Nuclear Regulatory Commission (NRC) staff will analyze the financial statements for the current year, which are required under 10 CFR 50.71(b), to determine if the applicant is financially qualified to operate the NSC. Since TEES's financial statements are not included with the application, please provide a copy of the latest financial statements.*

   NSC Response: The NSC is electronically submitting three pdf files (documents) that we believe satisfies this information request. They are titled: "State of Texas AFR – 2009", "TAMU Combined – FY2009" and "TEES – FY2009".

2. *Pursuant to 10 CFR 50.33(f)(2), "the applicant shall submit estimates for total annual operating costs for each of the first five years of operations of the facility." Since the information included in the application is now out of date, please provide the following additional information:*

   a. *The estimated operating costs for each for each of the fiscal years (FY) 2011 through 2015 (the first five-year period after the projected license renewal date).*

   NSC Response:

Operating Cost	2011	2012	2013	2014	2015
Salaries	$800k	$808k	$817k	$827k	$837k
Wages	$50k	$51k	$51k	$52k	$53k
Fringe/Benefits	$50k	$51k	$51k	$52k	$53k
Routine Expenses	$110k	$110k	$111k	$114k	$117k
Facility Upgrades	$40k	$40k	$40k	$40k	$40k
Total	$1,050k	$1,060k	$1,070k	$1,085k	$1,100k

   b. *The NSC's primary source(s) of funding to cover the operating costs for the above FY.*

   NSC Response:

Funding Sources	2011	2012	2013	2014	2015
TEES Allocation	$300k	$300k	$300k	$300k	$300k
TAMU Allocation	$50k	$50k	$50k	$50k	$50k
Academic Grants	$360k	$365k	$370k	$380k	$385k
Commercial	$340k	$345k	$350k	$355k	$365k
Total	$1,050k	$1,060k	$1,070k	$1,085k	$1,100k