



Department of the Interior
US Geological Survey
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August 12, 2010

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

Reference: U.S. Geological Survey TRIGA Reactor (GSTR), Docket 50-274, License R-113
Request for Additional Information (RAI) dated May 19, 2010

Subject: Response to the RAI Concerning Financial Qualifications

Mr. Wertz:

The RAI questions are answered in the following pages, in order, as stated in the original request.

Please contact me or Tamara Dickinson if you need further information.

Sincerely,

Tim DeBey
USGS Reactor Supervisor

Attachment:
FY2010 USGS Budget

Copy to:
Tamara Dickinson

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MRR

1. The USGS is not owned, controlled, or dominated by an alien, foreign corporation, or foreign government. The Geological Survey was established by U.S. Congress through the Organic Act of March 3, 1879 (20 Stat. 394; 43 U.S.C. 31), which provided for "the classification of the public lands and examination of the geological structure, mineral resources, and products of the national domain." The Act of September 5, 1962 (76 Stat. 427; 43 U.S.C. 31(b)), expanded this authorization to include such examinations outside the national domain. Topographic mapping and chemical and physical research were recognized as an essential part of the investigations and studies authorized by the Organic Act, and specific provision was made for them by Congress in the Act of October 2, 1888 (25 Stat. 505, 526).
2. A copy of latest USGS budget report for FY2010 (the current fiscal year) is attached to this document. (Budget reports for a number of USGS fiscal years, by fiscal year, may be found at the web site: http://www.usgs.gov/budget/fiscal_year.asp)
3. Annual operating costs.

a. Projected annual operating costs for the GSTR for FY2011—FY2015.

FY2011	\$421,678
FY2012	\$428,003
FY2013	\$434,423
FY2014	\$440,939
FY2015	\$447,554

b. The sources of funds for the above operating costs are:

Direct funding from USGS programs
 User fees from internal, USGS users
 User fees from external, non-USGS users

4. Decommissioning

- a. Decommissioning costs estimate, in 2006 and 2010 dollars, for the USGS TRIGA reactor facility are summarized in Table 1.

Table 1: SUMMARY OF COSTS

Category	Cost (2006 \$)	Cost (2010 \$)
Planning, calculations and inventories	\$ 102,926	\$ 114,774
Fuel transportation to DOE site	\$ 171,543	\$ 191,289
Dismantling, decontamination and disposal	\$ 2,524,286	\$ 2,814,857
USGS preparation and miscellaneous expenses	\$ 171,543	\$ 191,289
Subtotal	\$ 2,970,298	\$ 3,312,209
Contingency (25%)	\$ 742,574	\$ 828,052
Total	\$ 3,712,872	\$ 4,140,261

- b. Future cost estimates will be performed using the same methodology that was used for the 2010 estimate, as described below.

Adjustment factor

The adjustment factor was designed for updating reference Pressurized Water Reactor (PWR) and Boiling Water Reactor (BWR) decommissioning estimates, but serves as a convenient method to adjust GSTR decommissioning cost estimates over time. Whenever a calculation is specified for a PWR or BWR, an average of the PWR and BWR factors is used.

The decommissioning cost inflation equation of 10 CFR 50.75(c)(2) is divided into three general categories that test to escalate similarly: (1) labor, materials and services; (2) energy and waste transportation; and (3) radioactive waste burial/treatment. A relatively simple equation is used to update the estimate of cost by multiplying the revised original cost estimate (in our case, \$3,712,872 in 2006 \$) by a factor developed using the three categories described above. The equation is:

$$\text{Estimate Cost (Year 2010)} = [\text{2006 \$ Cost}] * (A L_x + B E_x + C B_x)$$

where

A = fraction of the [2006 \$ Cost] attributable to labor, materials, and services (0.65)

B = fraction of the [2006 \$ Cost] attributable to energy and transportation (0.13)

C = fraction of the [2006 \$ Cost] attributable to waste burial (0.22)

L_x = labor, materials and services cost adjustment, January of 2006 to latest month of 2010 for which data is available

E_x = energy and waste transportation cost adjustment, January of 2006 to latest month of 2010 for which data is available

B_x = LLW burial/disposition cost adjustment January of 2006 to January of 2010

$$= (R_{2010} + \sum S_{2010}) / (R_{2006} + \sum S_{2006})$$

where

R_{2010} = radioactive waste burial/disposition costs in 2010 dollars

$\sum S_{2010}$ = summation of surcharges in 2010 dollars

R_{2006} = radioactive waste burial/disposition costs in 2006 dollars

$\sum S_{2010}$ = summation of surcharges in 2006 dollars

Determination of L, E and B

These ratios are determined using the information supplied in the most recently published NUREG-1307, Report on Waste Burial Charges, Revision 13, November 2008 and by using the most recent U.S. Department of Labor-Bureau of Labor Statistics (BLS) data.

Labor adjustment factor

The Employment Cost Index (ECI) is taken from Table 5 of current BLS data entitled "Employment Cost Index for total compensation, for private industry workers, by occupational group and industry" under the sub-occupational heading of "All workers." The base L_x is taken from Table 3.2, Regional Factors for Labor Cost Adjustment in NUREG-1307 referenced above.

$$\begin{aligned} L_{2010} &= [(ECI, \text{March } 2010) * (\text{Base } L_x)] / 100 \\ &= [111.1 * 2.06] / 100 \end{aligned}$$

$$\begin{aligned} L_{2006} &= [(ECI, 2006) * (\text{Base } L_x)] / 100 \\ &= [100.8 * 2.06] / 100 \end{aligned}$$

To take into account only the inflation from 2006 to present, you must divide L_{2010} by L_{2006} , giving simply the labor adjustment factor L_x :

$$\begin{aligned}
 L_x &= L_{2010}/L_{2006} \\
 &= ([111.1*2.06]/100 \div [100.8*2.06]/100) \\
 &= 111.1/100.8 \\
 L_x &= 1.102183...
 \end{aligned}$$

Energy adjustment Factor

The adjustment factor for energy, E_x , is a weighted average of two components, namely, industrial electrical power, P_x , and light fuel oil, F_x .

$$\text{For the reference PWR: } E_x(\text{PWR}) = 0.58 P_x + 0.42 F_x$$

$$\text{For the reference BWR: } E_x(\text{BWR}) = 0.54 P_x + 0.46 F_x$$

P_x and F_x are the ratios of the current Producer Price Indexes (PPI) divided by the corresponding indexes for 2006.

$$\begin{aligned}
 P_x &= 189.1 \text{ (average 2010 value for code 0543)} / 172.9 \text{ (average 2006 value for code 0543)} \\
 &= 1.09
 \end{aligned}$$

$$\begin{aligned}
 F_x &= 226 \text{ (average 2010 value for code 0573)} / 212.0 \text{ (average 2006 value for code 0573)} \\
 &= 1.07
 \end{aligned}$$

Therefore:

$$\begin{aligned}
 E_x(\text{PWR}) &= 0.58*1.09 + 0.42*1.07 \\
 &= 1.0816
 \end{aligned}$$

$$\begin{aligned}
 E_x(\text{BWR}) &= 0.54*1.09 + 0.46*1.07 \\
 &= 1.0808
 \end{aligned}$$

E_x for the GSTR is calculated as an average of $E_x(\text{PWR})$ and $E_x(\text{BWR})$, therefore

$$E_x(\text{average}) = 1.0812$$

Because the factors P_x and F_x are already corrected to include only inflation from 2006 to 2010, call

$E_x(\text{average})$ simply E_x , therefore:

$$E_x = 1.0812$$

Waste Burial Adjustment Factor

The adjustment factor for waste burial/treatment, B_x , is taken directly from Table 2.1 of NUREG-1307, B_x Values for Generic LLW Disposal Sites, Direct Disposal with Vendor. For facilities that have no disposal site available for LLW, the NUREG assumes the cost of disposal is the same as that provided for the Atlantic Compact, for lack of a better alternative at this time. Data for 2008 is the most current at this time and will be assumed to approximate 2010 data.

$$B_{2008}(\text{PWR}) = 9.872$$

$$B_{2008}(\text{BWR}) = 11.198$$

$$B_{2006}(\text{PWR}) = 8.600$$

$$B_{2006}(\text{BWR}) = 9.345$$

B_x for GSTR is calculated as an average of $B_x(\text{PWR})$ and $B_x(\text{BWR})$ and therefore:

$$B_{2008}(\text{average}) = 10.535$$

$$B_{2006}(\text{average}) = 8.973$$

To account for only the inflation from 2006 to present, you must divide $B_{2008}(\text{average})$ by $B_{2006}(\text{average})$, giving simply the waste burial adjustment factor B_x :

$$\begin{aligned}
 B_x &= B_{2008}(\text{average}) / B_{2006}(\text{average}) \\
 &= 1.174
 \end{aligned}$$

Adjusted Decommissioning Cost Estimate

Estimated Cost (in 2010 \$)
= [Cost in 2006 \$]*[A L_x + B E_x + C B_x]
= [\$ 3,712,872]*[0.65*1.102 + 0.13*1.081 + 0.22*1.174]
= \$ 4,140,261 (this includes the 25% contingency)

5. Decommissioning by Federal entity

a. Current 2010 \$ estimate for decommissioning is **\$4,140,261**.

STATEMENT OF INTENT [a statement signed by the Director of the U.S. Geological Survey will be sent in a separate letter]

b. Documentation that the USGS is a Federal institution and a Federal government licensee. The Geological Survey is a U.S. federal agency that was established by U.S. Congress through the Organic Act of March 3, 1879 (20 Stat. 394; 43 U.S.C. 31), which provided for "the classification of the public lands and examination of the geological structure, mineral resources, and products of the national domain." The Act of September 5, 1962 (76 Stat. 427; 43 U.S.C. 31(b)), expanded this authorization to include such examinations outside the national domain. Topographic mapping and chemical and physical research were recognized as an essential part of the investigations and studies authorized by the Organic Act, and specific provision was made for them by Congress in the Act of October 2, 1888 (25 Stat. 505, 526).

License R-113 states the following, which corroborates that the USGS is a Federal government licensee:

"The Atomic Energy Commission ("the Commission") having found with respect to the application for license of the U. S. Geological Survey, Department of the Interior (hereinafter "the USGS" or "the licensee"), that:

- 1. The application for license complies with the requirements of the Atomic Energy Act of 1954, as amended (hereinafter "the Act"), and the Commission's regulations set forth in Title 10, Chapter 1, CFR;*
- 2. The reactor has been constructed in conformity with Construction Permit No. CPRR-102 and will operate in conformity with the application and in conformity with the Act and the rules and regulations of the Commission;*
- 3. There is reasonable assurance that the reactor can be operated at the designated location without endangering the health and safety of the public;*
- 4. The USGS is technically and financially qualified to engage in the proposed activities in accordance with the Commission's regulations;*
The issuance of this license will not be inimical to the common defense and security or to the health and safety of the public; and
The USGS is a federal agency and need not furnish proof of financial protection as would otherwise be required by Subsection 170a of the Act."

c. Decommissioning funding obligations for the GSTR (license R-113) are backed by the Federal government. The citation to support this will be sent in a separate letter from the Director of the USGS.

d. Documentation supporting the Director's authority to execute this document will be sent in a separate letter from the Director of the USGS.

**U.S. Geological Survey
2010 President's Budget**
(Dollars in Thousands)

Activity/Subactivity/Program Element	2009 Enacted	Fixed Cst & Rel Chg Subtotal	2010	
			Program Changes	President's Budget Request
GEOG RES, INVESTIGATIONS, & REMOTE SENSING				
Land Remote Sensing	61,718	339	0	62,057
Geographic Analysis and Monitoring	10,598	237	300	11,135
National Geospatial Program		70,748	0	70,748
TOTAL	72,316	71,324	300	143,940
GEOLOGIC HAZ., RESOURCES, & PROC.				
Geologic Hazard Assessments				
Earthquake Hazards	55,760	761	-500	56,021
Volcano Hazards	23,901	270	0	24,171
Landslide Hazards	3,350	55	0	3,405
Global Seismographic Network	5,482	46	0	5,528
Geomagnetism	2,092	46	0	2,138
Subtotal	90,585	1,178	-500	91,263
Geologic Landscape & Coastal Assessments				
National Cooperative Geologic Mapping	27,724	439	0	28,163
Coastal and Marine Geology	44,657	656	875	46,188
Subtotal	72,381	1,095	875	74,351
Geologic Resource Assessments				
Mineral Resources	52,427	1,253	-550	53,130
Energy Resources	26,749	488	1,000	28,237
Subtotal	79,176	1,741	450	81,367
TOTAL	242,142	4,014	825	246,981
WATER RESOURCES INVESTIGATIONS				
Hydrologic Monitoring, Assessments & Research				
Ground-Water Resources Program	9,008	126	-900	8,234
National Water-Quality Assessment	65,056	1,451	0	66,507
Toxic Substances Hydrology	10,767	317	0	11,084
Hydrologic Research & Development	13,421	266	-1,465	12,222
National Streamflow Information Program	22,406	326	5,000	27,732
Hydrologic Networks and Analysis	30,128	556	-643	30,041
Subtotal	150,786	3,042	1,992	155,820
Cooperative Water Program	64,078	1,483	0	65,561
Water Resources Research Act Program	6,500	0	0	6,500
TOTAL	221,364	4,525	1,992	227,881
BIOLOGICAL RESEARCH				
Biological Research and Monitoring	146,416	2,681	8,668	157,765
Biological Information Management & Delivery	21,965	231	0	22,196
Cooperative Research Units	16,949	364	2,000	19,313
TOTAL	185,330	3,276	10,668	199,274

**U.S. Geological Survey
2010 President's Budget**
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Activity/Subactivity/Program Element	2009 Enacted	2010		President's Budget Request
		Fixed Cost & Rel Chg Subtotal	Program Changes	
ENTERPRISE INFORMATION				
Enterprise Information Security and Technology	25,176	1,087	0	26,263
Enterprise Information Resources	17,478	228	2,000	19,706
National Geospatial Program	69,816	-69,816	0	0
TOTAL	112,470	-68,501	2,000	45,969
GLOBAL CHANGE	40,628	549	17,000	58,177
SCIENCE SUPPORT	67,430	1,795	0	69,225
FACILITIES				
Rental Payments and Operations & Maintenance	94,802	4,274	0	99,076
Deferred Maintenance & Capital Improvement	7,321	0	0	7,321
TOTAL	102,123	4,274	0	106,397
TOTAL, SIR (w/o ARRA)	1,043,803	21,256	32,785	1,097,844
American Recovery and Reinvestment Act of 2009	140,000	-140,000		0
TOTAL, SIR (w ARRA)	1,183,803	-118,744	32,785	1,097,844

a/ The difference between the President's Budget Request and the 2009 Enacted funding is: a fixed cost funding adjustment (\$0.339 million).

b/ The difference between the President's Budget Request and the 2009 Enacted funding is: a fixed cost funding adjustment (\$0.237 million) and a decrease for New Energy Frontier - Biofuels (\$0.3 million).

c/ The difference between the President's Budget Request and the 2009 Enacted funding is: a fixed cost funding adjustment (\$0.932 million) and an adjustment moving the National Geospatial Program to Geographic Research, Investigations, & Remote Sensing from Enterprise Information (\$69.1 million).

d/ The difference between the President's Budget Request and the 2009 Enacted funding is: a fixed cost funding adjustment (\$0.761 million) and a decrease for Arkansas Seismological Observatory (-\$0.5 million).

e/ The difference between the President's Budget Request and the 2009 Enacted funding is: a fixed cost funding adjustment (\$0.270 million).

f/ The difference between the President's Budget Request and the 2009 Enacted funding is: a fixed cost funding adjustment (\$0.055 million).

g/ The difference between the President's Budget Request and the 2009 Enacted funding is: a fixed cost funding adjustment (\$0.046 million).

h/ The difference between the President's Budget Request and the 2009 Enacted funding is: a fixed cost funding adjustment (\$0.046 million).

i/ The difference between the President's Budget Request and the 2009 Enacted funding is: a fixed cost funding adjustment (\$0.439 million).

j/ The difference between the President's Budget Request and the 2009 Enacted funding is: a fixed cost funding adjustment (\$0.656 million); increase for Continental Shelf (\$1.0 million) and A New Energy Frontier - Wind and Solar (\$0.375 million); and a decrease for California Sea Floor Mapping (-\$0.3 million).

k/ The difference between the President's Budget Request and the 2009 Enacted funding is: a fixed cost funding adjustment (\$1.253 million); an increase for New Energy Frontier - Biofuels (\$0.1 million); and a decrease for Mineral Resource Assessment Nye County, NV (-\$0.65 million).

l/ The difference between the President's Budget Request and the 2009 Enacted funding is: a fixed cost funding adjustment (\$0.488 million) and a decrease for New Energy Frontier - Geothermal (\$1.0 million).

m/ The difference between the President's Budget Request and the 2009 Enacted funding is: a fixed cost funding adjustment (\$0.126 million) and a decrease for Diego CA Aquifer Mapping (-\$0.9 million).

n/ The difference between the President's Budget Request and the 2009 Enacted funding is: a fixed cost funding adjustment (\$1.451 million).

o/ The difference between the President's Budget Request and the 2009 Enacted funding is: a fixed cost funding adjustment (\$0.317 million).

**U.S. Geological Survey
2010 President's Budget**
(Dollars in Thousands)

<u>Activity/Subactivity/Program Element</u>	<u>2009 Enacted</u>	<u>2010</u>	
		<u>Fixed Cst & Rel Chg Subtotal</u>	<u>President's Budget Request</u>
<u>p/</u> The difference between the President's Budget Request and the 2009 Enacted funding is: a fixed cost funding adjustment (\$0.266 million) and i Canal Dissolved Oxygen Study (-\$0.27 million), San Pedro Partnership Monitoring and Reporting (-\$0.295 million), Long Term Estuary Group (-\$0.4 Mexico Transboundary Aquifer Assessment Act (-\$0.5 million).			
<u>q/</u> The difference between the President's Budget Request and the 2009 Enacted funding is: a fixed cost funding adjustment (\$0.326 million) and i Enhance the National Streamgagage Network (\$5.0 million).			
<u>r/</u> The difference between the President's Budget Request and the 2009 Enacted funding is: a fixed cost funding adjustment (\$0.556 million); an i Energy Frontier - Biofuels (\$0.2 million); and decreases for Lake Champlain Basin Toxic Materials (-\$0.343 million) and Monitoring Water Resource million).			
<u>s/</u> The difference between the President's Budget Request and the 2009 Enacted funding is: a fixed cost funding adjustment (\$1.483 million).			
<u>t/</u> The difference between the President's Budget Request and the 2009 Enacted funding is: a fixed cost funding adjustment (\$2.681 million); incre Sustainable Energy Development (\$0.727 million), A New Energy Frontier - Biofuels (\$0.4 million) and Wind and Solar (\$0.625 million), Climate Ch Support for FWS (\$5.0 million), and Changing Arctic Ecosystems (\$4.2 million); and decreases for Molecular Biology at LCS (-\$0.8 million), San Fr Research Efforts (-\$0.5 million), and NatureServe (-\$0.984 million).			
<u>u/</u> The difference between the President's Budget Request and the 2009 Enacted funding is: a fixed cost funding adjustment (\$0.231 million).			
<u>v/</u> The difference between the President's Budget Request and the 2009 Enacted funding is: a fixed cost funding adjustment (\$0.364 million) and i Vacancies (\$2.0 million).			
<u>w/</u> The difference between the President's Budget Request and the 2009 Enacted funding is: a fixed cost funding adjustment (\$1.087 million).			
<u>x/</u> The difference between the President's Budget Request and the 2009 Enacted funding is: a fixed cost funding adjustment (\$0.228 million) and i 21st Century Youth Conservation Corps (\$2.0 million).			
<u>y/</u> The difference between the President's Budget Request and the 2009 Enacted funding is: a technical funding adjustment moving the National G from Enterprise Information to Geographic Research, Investigations, & Remote Sensing (-\$69.816 million).			
<u>z/</u> The difference between the President's Budget Request and the 2009 Enacted funding is: a fixed cost funding adjustment (\$0.549 million) and i National Climate Change and Wildlife Science Center (\$5.0 million), Carbon Sequestration (\$7.0 million), and Climate Change Science (\$5.0 millior			
<u>aa/</u> The difference between the President's Budget Request and the 2009 Enacted funding is: a fixed cost funding adjustment (\$1.795 million).			
<u>ab/</u> The difference between the President's Budget Request and the 2009 Enacted funding is: a fixed cost funding adjustment (\$4.274 million).			
<u>ac/</u> The difference between the President's Budget Request and the 2009 Enacted funding is: technical adjustment because the American Recove Reinvestment Act of 2009 provided one-time funding (-\$140.0 million).			