

## IPRenewal NPEmails

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**From:** Waters, Roger M. [rwater1@entergy.com]  
**Sent:** Friday, November 21, 2014 8:12 AM  
**To:** Wentzel, Michael; Green, Kimberly; Pickett, Douglas  
**Cc:** Louie, Richard  
**Subject:** IPEC License Renewal - Response to SAMA RAIs  
**Attachments:** NL-14-143 final.pdf

Mike, Kim and Doug,

Attached is a pdf version of the subject response. Hardcopies are in the mail to the Document Control Desk and distribution.

Please note that I am retiring next week and that Rich Louie will be assuming my License Renewal responsibilities starting December 1. Rich can be reached at 914-254-6618.

It has been a pleasure working with you and I wish you all the best.

*Roger Waters*

IPEC Regulatory Assurance  
914-254-7714

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**From:** Waters, Roger M.

**Created By:** rwater1@entergy.com

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Fred Dacimo  
Vice President  
Operations License Renewal

NL-14-143

November 20, 2014

U.S. Nuclear Regulatory Commission  
Document Control Desk  
11545 Rockville Pike, TWFN-2 F1  
Rockville, MD 20852-2738

**SUBJECT:** Reply to Request for Additional Information Regarding the License Renewal Application  
Indian Point Nuclear Generating Unit Nos. 2 and 3  
Docket Nos. 50-247 and 50-286  
License Nos. DPR-26 and DPR-64

**REFERENCE:** NRC letter, "Request for Additional Information for the Review of the Indian Point Nuclear Generating Unit Nos. 2 and 3, License Renewal Application Environmental Review – Refined Cost Estimate (TAC NOS. MD5411 and MD5412)" dated October 6, 2014

Dear Sir or Madam:

Entergy Nuclear Operations, Inc. is providing in the attachment the additional information requested in the referenced letter pertaining to NRC review of the License Renewal Application (LRA) for Indian Point 2 and Indian Point 3.

There are no new regulatory commitments in this submittal.

If you have any questions, or require additional information, please contact Mr. Robert Walpole, IPEC Regulatory Assurance Manager at (914) 254-6710.

I declare under penalty of perjury that the foregoing is true and correct. Executed on 11/20, 2014.

Sincerely,

A handwritten signature in black ink, appearing to read "FRD", written over a horizontal line.

FRD/rw

Attachment: Reply to NRC Request for Additional Information Regarding the License Renewal Application

cc: Mr. David Lew, Acting Regional Administrator, NRC Region I  
Mr. Sherwin E. Turk, NRC Office of General Counsel, Special Counsel  
Mr. Dave Wrona, NRC Branch Chief, Engineering Review Branch I  
Mr. Michael Wentzel, NRC Environmental Project Manager  
Ms. Kimberly Green, NRC Sr. Project Manager, Division of License Renewal  
Mr. Douglas Pickett, NRR Senior Project Manager  
Ms. Bridget Frymire, New York State Department of Public Service  
NRC Resident Inspector's Office  
Mr. John B. Rhoads, President and CEO NYSERDA

**ATTACHMENT TO NL-14-143**

**REPLY TO NRC REQUEST FOR ADDITIONAL INFORMATION**

**REGARDING THE**

**LICENSE RENEWAL APPLICATION**

ENTERGY NUCLEAR OPERATIONS, INC.  
INDIAN POINT NUCLEAR GENERATING UNIT Nos. 2 and 3  
DOCKET NOS. 50-247 and 50-286

INDIAN POINT NUCLEAR GENERATING UNIT NOS. 2 AND 3  
LICENSE RENEWAL APPLICATION (LRA)  
REQUEST FOR ADDITIONAL INFORMATION (RAI)

Environmental Review – Refined Cost Estimate

Entergy provides the following background information prior to responding to the individual RAIs.

**Background**

The SAMA implementation cost estimates for the 22 SAMAs previously identified as potentially cost-beneficial are detailed engineering project cost estimates that Entergy provided to the NRC Staff for the reasons explained in Entergy's May 6, 2013 submittal (NL-13-075). The estimates were prepared by a nuclear engineering services provider that has significant experience in implementing projects at nuclear and other industrial facilities. Indian Point site engineering personnel reviewed the estimates. Professional cost estimators with experience in preparing cost estimates at other nuclear power plants, including other Entergy facilities, prepared the SAMA estimates.

Given Entergy's objective of providing more refined and comprehensive SAMA implementation cost estimates (as stated in NL-13-075), the estimates reflect a level of detail ordinarily reserved for more advanced stages of engineering project implementation. Entergy used established procedures and practices in formulating the estimates to ensure that they are reasonable and appropriate.

The SAMA cost estimates include man-hours and material costs for design, material procurement, and installation, including contractor support for implementation of the proposed modification design. As discussed further in Entergy's responses to the individual RAIs, each SAMA implementation cost estimate included the following elements as applicable.

- Entergy's installer craft labor billing rates for 2010.
- Installation craft labor rates were increased due to inflation for 2011, 2012, 2013 and 2014.
- During the design and implementation phases, engineering contractor labor rates were assumed, as opposed to Entergy in-house engineering staff rates, to allow the flexibility to use outside design organizations for these phases. The 2012 rates were not inflated to 2014 dollars because they were considered to still apply to 2014.
- Encumbrance premium of 20% to account for productivity/time losses associated with substantial constraints on work performed inside the Owner Controlled Area at the Indian Point site. The premium includes working in a security area, etc.
- Location performance factor to account for the additional resource time it takes to perform tasks because of access restrictions in the work area. For activities in the reactor containment building during outages, a multiplier of 1.7 is appropriate.
- Contingency is applied to account for project uncertainties and unknowns. The contingency varies between 20 and 50% based on recommendations contained in the Association of Advancement of Cost Engineering (AACE) International Recommended Practice No. 18R-97, "Cost Estimate Classification System – As Applied in Engineering Procurement, and Construction for the Process Industries, TCM Framework: 7.3 – Cost Estimating and Budgeting" (Feb. 2, 2005). This AACE international standard applies to process industries

in general, and the cost estimating principles and guidelines described therein were judged reasonable and appropriate for estimating nuclear power plant engineering project costs.

- Accounting loaders account for various company overheads. The accounting loaders are updated periodically to reflect economic and business conditions. The finance department determines the appropriate value for capital projects at Indian Point. The value established for the SAMA estimates is 30%.

### **NRC RAIs**

Except where identified below all questions pertain to the information provided in your January 2, 2014, letter.

### **RAI 1**

In the letter dated May 6, 2013, Entergy explained that the refined cost estimates “incorporate a site encumbrance premium to reflect NRC-imposed site access restrictions, including security and personnel access training and controls, some of which were not in effect when the initial conceptual cost estimates were prepared.” In the refined cost estimates, a site encumbrance of 20 percent is added to the subtotal for each severe accident mitigation alternative (SAMAs).

Please provide the basis for the value used as the site encumbrance premium. In addition, explain why the premium is levied against all aspects of the modification, especially materials. Lastly, indicate if the addition of the premium is applied for all cost estimates for all modifications planned at the site (i.e., not just the SAMAs). If not, explain why it is necessary to apply the premium only for SAMAs.

### **Response to RAI 1**

The site encumbrance premium is a best-estimate value that accounts for productivity/time losses associated with general constraints on all work performed inside the Owner Controlled Area at the Indian Point site. Specifically, this premium represents the percentage increase over the normal time required to perform the work associated with a plant modification if the work was performed in a non-nuclear facility (and includes, for example, security-related restrictions, employee training, procurement constraints, independent design verification, and radiological controls). The site encumbrance premium of 20% applied to the SAMA implementation cost estimates is based on site-specific and industry experience.

The 20% premium is applied to all aspects of the SAMA modifications for work performed inside the Owner Controlled Area (engineering, planning, materials, etc.) because the site constraints affect all aspects of a project performed within this area. As an example, for materials, the premium is applied to account for productivity/time losses that are attendant to moving the materials onto and within the Indian Point site; e.g., transporting the materials through security checkpoints, receiving them in the warehouse, moving the materials through security fencing into the protected area and, then, possibly into a vital area within the protected area.

The use of a site encumbrance factor is not unique or specific to the refined SAMA cost estimates. Entergy fleet administrative procedures do not use the term “site encumbrance factor.” However, they indicate that a “productivity/difficulty” factor may need to be applied to improve the accuracy of the cost estimate based on the location of the work being performed (e.g., turbine generator building versus the reactor containment building). The productivity/difficulty factor is generally

equivalent to the site encumbrance factor because it also is applied to reflect general constraints and accessibility to work areas and the physical constraints for safety, security and radiological conditions. Like the site encumbrance factor, it is generally expressed as a percentage increase over the normal time needed to perform the work operation, and is applied to account for productivity/time losses.

## **RAI 2**

For each of the refined cost estimates, “loaders” of 30 percent are applied; however, no explanation is provided for what is included in the “loaders.”

Please explain what is included in the term “loaders,” and provide a basis for the value. Also indicate if “loaders” are applied for all cost estimates for all modifications planned at the site (i.e., not just the SAMAs). If not, explain why it is necessary to apply the “loaders” only for SAMAs.

## **Response to RAI 2**

The term “loaders” refers to overhead costs added to certain costs such as labor and materials.

The 30% loader applied to the refined SAMA cost estimates accounts for the total sum of the estimated overhead costs for material loaders, capital suspense, and applied interest allowance for funds used during construction (AFUDC). Entergy fleet administrative procedures for project cost estimating specify that estimates for capital projects should include applicable loaders. The specific loader value of 30% was estimated by the site finance department. The constituent parts of the 30% loader are as follows.

- Material loaders are applied to all materials that are distributed by Entergy warehousing operations for projects. The purpose of the material loaders is to distribute the overhead costs of procuring materials, maintaining the storerooms, and managing these storerooms.
- A capital suspense loader is applied to the total estimated project cost. This loader is applied to all capital projects to spread the overhead costs of managing the functional specific projects throughout the company, regardless of the functional area where the project is conducted. This loader is applied only to capital projects.
- The AFUDC or capital interest loader is added to all estimated costs, including material loaders and capital suspense loaders. This loader is applied only to capital projects.

These loaders are applied to all IPEC cost estimates for which they are applicable, not just for the SAMA cost estimates.

## **RAI 3**

For work that is conducted during outages, a factor of 1.7 is applied to the labor.

Please provide a brief explanation for the use of this factor, the basis for the value used as the factor, and indicate if the application of this factor is a standard practice for Entergy for all cost estimates associated with modifications at the site. If not, explain why it is necessary to apply this factor only for SAMAs.

**Response to RAI 3**

The 1.7 factor is a location performance factor applied to craft labor hours associated with the installation phase of the modification for the SAMAs requiring outage work in the reactor containment building, to account for time and productivity losses associated with the difficulty of working in the highly-restricted containment area.

The location performance factor is the multiplier that accounts for the restrictions placed on the workers based on the location within the plant where the activity is to be performed. For work in the radiologically controlled area (RCA), this factor includes impact on work performance efficiency caused by restrictions placed on workers – full protective clothing (PCs), foreign material exclusion (FME) controls, hot particle zones, etc. This factor also accounts for the job conditions, *i.e.*, activity performed on a scaffold, confined space or tight locations, stay time limits (which limits the amount of wrench time to perform the activity), etc.

The use of such adjustment factors is not unique or specific to the refined SAMA cost estimates. Entergy procedures for project cost estimating recognize that an appropriate factor should be applied for work performed areas with access restrictions. For example, those procedures recommend the application of appropriate factors to account for productivity and time losses associated with working in constrained or restricted areas such as the reactor containment building. In addition, Entergy’s cost estimating template provides a table for the unit rate adjustments/difficulty factors for use during the estimating phase of the modification. The table provides a factor of 1.7 as a multiplier to use when performing work in the reactor containment building.

**RAI 4**

For several of the labor categories, various values are used for the same labor category. However, an explanation for the labor categories is not given. Therefore, the staff cannot readily determine why different labor rates are used for the same labor category. A list of the labor categories of interest and values used is given below. Please explain the difference for the labor rates used for the same labor category.

<b>Labor Categories</b>	<b>Rate in Refined Cost Estimates (Inflated to 2014)</b>
<b>Craft Labor Categories</b>	
LB	78.15, 78.65, 78.50, or 76.46
OP	115.00 or 100.00
PF	120.71 or 106.40
EL	123.32 or 111.84
FW	53.60 or 50.53
PL	100.00, or (60.00 or 80.00 for EL but listed as plant to develop electrical procedures for IP2-028)
<b>Non Manual Labor Categories -- Implementation/Installation Support</b>	
sys engineering -- civil structural	100.00 (except for SAMA IP2-009 uses 150.00)
Project Management	120.00 (or 100.00)
HP/RP/ALARA	100.00, 80.00, or 79.56

<b>Contractor Support</b>	
Mods planning & sch - SWEC (Incl Per Diem)	100.00 or 80.00
QA/QC verification	80.00 or 75.00
Safety (2%)	68.00 or 72.14

If, from your review of the labor rates, you determine that your refined cost estimates should be adjusted, please indicate which cost estimates are affected, and if such an adjustment would alter your conclusion about the economic feasibility of the SAMA.

**Response to RAI 4**

Following review of the labor rates, Entergy has determined that the refined SAMA cost estimates require minor adjustments. The adjusted labor rates are provided in the table below in the right column entitled "Corrected 2014 Inflated Labor Rates." These adjustments were necessary because inflation increases were not consistently applied to the labor categories used in each SAMA implementation cost estimate.

The SAMA cost estimates have been revised to reflect the corrected labor rates inflated for 2014. The summary table provided below contains the revised cost estimates for the SAMAs affected by the changes, as well as the percentage increase or decrease (as applicable) in each cost estimate. The percentage changes in the cost estimates were small, ranging from a maximum decrease of -1.44% (IP3-019) to a maximum increase of 3.90% (IP2-065). Thus, the revised cost estimates did not change Entergy's conclusions, as set forth in NL-13-075, regarding which of the 22 SAMAs identified therein are potentially cost-beneficial to implement, particularly in light of the post-Fukushima actions and other relevant considerations discussed in NL-13-075.

<b>Labor Categories</b>	<b>Rate in Refined Cost Estimates (Inflated to 2014)</b>	<b>Corrected 2014 Inflated Labor Rates</b>
<b>Craft Labor Categories</b>		
LB – Laborer	78.15, 78.65, 78.50, or 76.46	81.12
OP – Equipment Operator	115.00 or 100.00	126.57
PF – Pipefitter	120.71 or 106.40	117.84
EL – Electrician	123.32 or 111.84	123.87
FW – Fire Watch	53.60 or 50.53	55.96
PL – Maintenance Worker	100.00, or (60.00 or 80.00 for EL but listed as plant to develop electrical procedures for IP2-028)	61.53
<b>Non Manual Labor Categories -- Implementation/Installation Support</b>		
Sys Engineering -- Civil Structural	100.00 (except for SAMA IP2-009 uses 150.00)	100.00
Project Management	120.00 (or 100.00)	120.00
HP/RP/ALARA	100.00, 80.00, or 79.56	100.00
<b>Contractor Support</b>		
Mods planning & sch - SWEC (Incl Per Diem)	100.00 or 80.00	100.00
QA/QC verification	80.00 or 75.00	100.00
Safety (2%)	68.00 or 72.14	72.14

The SAMA cost estimates have been revised to reflect the current labor rates for 2014. As discussed in the response to RAI 7, the rates used for the Non Manual Labor Categories (Implementation/Installation Support) shown in the table above are contract engineering firm rates that did not require adjustments for inflation. The table below provides the revised cost estimates for the SAMAs affected by the labor rate adjustments.

**Summary Table of New SAMA Estimates**

<b>SAMA</b>	<b>2012 Estimate</b>	<b>Revised 2014 Estimate</b>	<b>Increase / (Decrease) \$</b>	<b>Increase / (Decrease) %</b>
IP2-GAG	\$458,617	\$453,745	(\$4,872)	-1.06%
IP2-009	\$1,738,982	\$1,741,724	\$2,742	0.16%
IP2-021	\$4,607,051	\$4,632,227	\$25,176	0.55%
IP2-022	\$7,685,460	\$7,692,784	\$7,324	0.10%
IP2-028	\$2,137,804	\$2,154,767	\$16,963	0.79%
IP2-044	\$3,046,418	\$3,073,130	\$26,712	0.88%
IP2-053	\$1,467,848	\$1,471,234	\$3,386	0.23%
IP2-054	\$456,985	\$458,843	\$1,858	0.41%
IP2-056	\$1,705,367	\$1,704,938	(\$429)	-0.03%
IP2-060	\$715,145	\$721,303	\$6,158	0.86%
IP2-061	\$933,981	\$943,792	\$9,811	1.05%
IP2-062	\$1,624,840	\$1,662,692	\$37,852	2.33%
IP2-065	\$1,789,771	\$1,859,587	\$69,816	3.90%
IP3-GAG	\$458,651	\$453,745	(\$4,906)	-1.07%
IP3-007	\$1,869,811	\$1,874,933	\$5,122	0.27%
IP3-018	\$35,676,701	\$35,691,159	\$14,458	0.04%
IP3-019	\$6,462,470	\$6,369,223	(\$93,247)	-1.44%
IP3-052	\$138,378	\$138,378	\$0	0.00%
IP3-053	\$340,790	\$344,599	\$3,809	1.12%
IP3-055	\$1,589,189	\$1,601,888	\$12,699	0.80%
IP3-061	\$2,258,137	\$2,282,668	\$24,531	1.09%
IP3-062	\$494,175	\$496,071	\$1,896	0.38%
<b>Total</b>	<b>\$77,656,571</b>	<b>\$77,823,430</b>	<b>\$166,859</b>	<b>0.21%</b>

**RAI 5**

For several of the SAMAs (e.g., IP2-021, IP2-022, IP2-028, IP2-044), on the Impact Screening Summary (Attachment 9.3 to EN-DC-115), the Nuclear Analysis item is checked "YES," indicating that the proposed modification involves changes to plant evaluations, Technical Specifications, Technical Requirements Manual, or a full 50.59 evaluation. However, it does not appear that a cost for this activity has been included. In contrast, for SAMA IP2-009, the Nuclear Analysis item is checked "YES," and a cost of \$81,000 (675 hours) was included for "Tech Specs/FSAR, Analysis Calcs." For other SAMAs (e.g., IP-054, IP2-061), an assumption on the Implementation Estimate states that the estimate does not include funding for unreviewed safety questions or NRC

submittals, but if required, the additional cost will be added. Please indicate if a cost for such an evaluation should have been included. Also explain why this activity/task was treated differently for different SAMAs.

If from your review of the cost information you determine that your refined cost estimates should be adjusted to account for a “nuclear analysis,” please indicate which cost estimates are affected, and if such an adjustment would alter your conclusion about the economic feasibility of the SAMA.

### **Response to RAI 5**

Although the Impact Screening Summary “Nuclear Analysis” box was checked YES for SAMAs IP2-021, IP2-022, IP2-028, IP2-044, completion of any necessary plant analyses is not expected to result in significant expense given the lower degree of engineering and regulatory involvement associated with those proposed engineering changes. That is, to the extent those SAMAs require plant evaluations, those evaluations are not expected to require significant Entergy resources or regulatory agency review and, therefore, do not have an associated cost for this activity. In contrast, IP2-009 is a very significant plant modification, because it would allow for the use of water from the fire water system to flood the reactor cavity. It also would require the availability of an alternate water supply from the Hudson River. Significant technical evaluations and regulatory agency review would be anticipated to complete this modification (hence the \$81,000 cost addition). Lastly, IP-054 and IP2-061 SAMAs are not expected to require significant plant evaluations or regulatory agency review.

The treatment of nuclear analysis costs in the estimates is appropriate for each specific SAMA. No changes to the estimates are warranted to address this issue.

### **RAI 6**

For several of the SAMAs (e.g., IP2-028, IP2-053, IP2-062), on the Impact Screening Summary (Attachment 9.3 to EN-DC-115), the Simulator Impact item is checked “YES,” indicating that the proposed modification impacts or involves changes to the simulator. However, it does not appear that a cost for this activity has been included. In contrast, for SAMAs IP2-054, IP2-056, IP2-060, IP2-061, and IP3-062, the Simulator Impact item is checked “YES,” and a cost was included for “Simulator Changes.” For those SAMAs where the item is checked “YES” but a cost was not included, please indicate if a cost for simulator changes should have been included. Also explain why this activity/task was treated differently for different SAMAs.

If from your review of the cost information you determine that your refined cost estimates should be adjusted to account for a “simulator impact,” please indicate which cost estimates are affected, and if such an adjustment would alter your conclusion about the economic feasibility of the SAMA.

### **Response to RAI 6**

SAMAs that affect the simulator in any way are checked YES on the Impact Screening Summary. However, in cases where only an operating procedure is affected, such as IP2-028, IP2-053, IP2-062, no additional costs for simulator work are included. Simulator procedure changes, however, are included in the OPS/OPS Support (*i.e.*, procedure development) line item of the applicable Indian Point Implementation Estimate Work Sheet. SAMAs IP2-054, IP2-056, IP2-060, IP2-061, and IP3-062 require physical modifications to the simulator. Therefore, the implementation cost estimates for those SAMAs include costs for simulator changes.

### **RAI 7**

In the Implementation Estimate Worksheets for the 22 refined cost estimates, you include the following hourly rates for various activities conducted by Entergy plant personnel:

\$100 for systems engineering  
\$120 for project management  
\$120 for training operations staff  
\$75 or \$80 for quality assurance/quality control verification  
\$100 for design engineering  
\$80 or \$100 for health physics, radiation protection, ALARA

However, the basis for these rates was not provided. Explain the basis for these hourly rates and state whether these are standard rates used for all Entergy engineering project estimations. Also state whether these are 2014 rates or older rates inflated to 2014 (such as was done with billed craft labor rates). If these rates were inflated, please indicate what inflation rate was used to arrive at the values. Lastly, explain what these hourly rates reflect (e.g., hourly rate + employer costs + overhead).

### **Response to RAI 7**

Entergy site management could subcontract the tasks to an engineering firm or perform them using in-house engineering resources. That decision would be based on a number of factors, including the availability/workload of plant engineering personnel. For purposes of the refined SAMA cost estimates, Entergy used contract engineering rates because those rates bound in-house engineering personnel rates and thus allow Entergy the flexibility to use either approach for task completion. The rates are representative of 2014 competitive consultant rates and are consistent with those used by Project Management for other site modifications. The rates used are all-inclusive man-hour billing rates for services provided by an engineering contractor.

The 2012 rates were not inflated to 2014 dollars because they were considered to still apply to 2014.

The rates do not include contingencies and Entergy loaders, which are applied above these values.

The QA and health physics personnel rates should be \$100 per hour, not \$80 per hour, to reflect the assumption that Entergy would subcontract the necessary QA and health physics tasks to a qualified outside firm. The revised estimates include the correction for QA and health physics personnel rates.