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Date: 05/15/2006 12:50:50 PM
Subject: Supplemental letter w/ Upper Shelf Energy info - RAI 4.2.2-1

Donnie and Veronica,

Attached is letter 2130-06-20332, which provides additional information related to RAI 4.2.2-1, relating to Upper Shelf Energy. In our RAI response letter 2130-06-20298, dated April 26, 2006, we indicated we would provide this additional information by May 15. Please pass on to those interested.

Let me know if you have any questions.

As always, this is being processed through the Document Control Desk as a hard copy submittal.

- John.

<<5-15-06 Supplement providing USE information.pdf>>

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2130-06-20332
May 15, 2006

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

Oyster Creek Generating Station
Facility Operating License No. DPR-16
NRC Docket No. 50-219

Subject: Supplemental Information for Response to NRC Request for Additional Information, dated March 30, 2006, Related to Oyster Creek Generating Station License Renewal Application (TAC No. MC7624)

Reference: (1) "Request for Additional Information for the Review of the Oyster Creek Nuclear Generating Station, License Renewal Application (TAC No. MC7624)," dated March 30, 2006
(2) Response to NRC Request for Additional Information related to Sections 4.2 and 4.7 of the Oyster Creek Generating Station License Renewal Application (TAC No. MC7624), dated April 26, 2006

In the reference (1) letter, the NRC requested additional information related to Sections 4.2 and 4.7 of the Oyster Creek Generating Station License Renewal Application (LRA). Reference (2) provided the information requested by the NRC staff, however, as noted in the response to RAI 4.2.2-1, AmerGen planned to supplement the response with the results of the calculations of the Upper Shelf Energy equivalent margin analysis for non-limiting reactor vessel beltline materials. The results of these additional calculations are provided in the enclosure.

If you have any questions, please contact Fred Polaski, Manager License Renewal, at 610-765-5935.

I declare under penalty of perjury that the foregoing is true and correct.

Respectfully,

Executed on

05-15-06


Michael P. Gallagher
Vice President, License Renewal
AmerGen Energy Company, LLC

U.S. Nuclear Regulatory Commission
May 15, 2006
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Enclosure: Upper Shelf Energy Equivalent Margin Analysis Results For Non-limiting Reactor
Vessel Beltline Materials.

cc: Regional Administrator, USNRC Region I, w/o Enclosure
USNRC Project Manager, NRR - License Renewal, Safety, w/Enclosure
USNRC Project Manager, NRR - License Renewal, Environmental, w/o Enclosure
USNRC Project Manager, NRR - OCGS, w/o Enclosure
USNRC Senior Resident Inspector, OCGS, w/o Enclosure
Bureau of Nuclear Engineering, NJDEP, w/Enclosure
File No. 05040

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Enclosure

Upper Shelf Energy Equivalent Margin Analysis Results

For

Non-limiting Reactor Vessel Beltline Materials

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OCGS RPV Plate Equivalent Margin Analysis

R/2 PLATE
(OCGS Plate Number 564-03A)
(OCGS Code Number G-8-7)

Surveillance Plate USE:

$$\begin{aligned} \%Cu &= \frac{0.17}{0.746 \times 10^{18} \text{ n/cm}^2} \\ \text{Capsule Fluence} &= \frac{0.17}{0.746 \times 10^{18} \text{ n/cm}^2} \end{aligned}$$

$$\begin{aligned} \text{Measured \% Decrease} &= \frac{0.6}{14} \quad (\text{Charpy Curves}) \\ \text{R.G. 1.99 Predicted \% Decrease} &= \frac{0.6}{14} \quad (\text{R.G. 1.99, Figure 2}) \end{aligned}$$

Lower Intermediate Beltline Plate USE:

$$\begin{aligned} \%Cu &= \frac{0.21}{6.97 \times 10^{18} \text{ n/cm}^2} \\ 50 \text{ EPFY Peak ID Fluence} &= \frac{0.21}{6.97 \times 10^{18} \text{ n/cm}^2} \\ 50 \text{ EPFY 1/4T Fluence} &= \frac{0.21}{4.39 \times 10^{18} \text{ n/cm}^2} \end{aligned}$$

$$\text{R.G. 1.99 Predicted \% Decrease} = \frac{0.21}{4.39 \times 10^{18} \text{ n/cm}^2} = 24.8 \quad (\text{R.G. 1.99, Figure 2})$$

$$\text{Adjusted \% Decrease} = \frac{0.21}{4.39 \times 10^{18} \text{ n/cm}^2} = \text{N/A} \quad (\text{R.G. 1.99, Position 2.2})$$

24.8% ≤ 29.5%, so plate is bounded by equivalent margin analysis.

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OCGS RPV Plate Equivalent Margin Analysis

BWR/2 PLATE
(OCGS Plate Number 564-03B)
(OCGS Code Number G-8-8)

Surveillance Plate USE:

$$\begin{aligned} \%Cu &= \frac{0.17}{0.746 \times 10^{18} \text{ n/cm}^2} \\ \text{Capsule Fluence} &= \frac{0.17}{0.746 \times 10^{18} \text{ n/cm}^2} \\ \text{Measured \% Decrease} &= \frac{0.6}{14} \quad (\text{Charpy Curves}) \\ \text{R.G. 1.99 Predicted \% Decrease} &= \frac{0.6}{14} \quad (\text{R.G. 1.99, Figure 2}) \end{aligned}$$

Lower Intermediate Beltline Plate USE:

$$\begin{aligned} \%Cu &= \frac{0.18}{6.97 \times 10^{18} \text{ n/cm}^2} \\ 50 \text{ EPFY Peak ID Fluence} &= \frac{0.18}{6.97 \times 10^{18} \text{ n/cm}^2} \\ 50 \text{ EPFY 1/4T Fluence} &= \frac{0.18}{4.39 \times 10^{18} \text{ n/cm}^2} \\ \text{R.G. 1.99 Predicted \% Decrease} &= \frac{22.3}{29.5} \quad (\text{R.G. 1.99, Figure 2}) \\ \text{Adjusted \% Decrease} &= \frac{22.3}{29.5} \quad (\text{R.G. 1.99, Position 2.2}) \end{aligned}$$

22.3% ≤ 29.5%, so plate is bounded by equivalent margin analysis.

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OCGS RPV Plate Equivalent Margin Analysis

BWR/2 PLATE
(OCGS Plate Number 564-03C)
(OCGS Code Number G-8-6)

Surveillance Plate USE:

$$\begin{aligned} \%Cu &= \frac{0.17}{0.746 \times 10^{18} \text{ n/cm}^2} \\ \text{Capsule Fluence} &= \frac{0.17}{0.746 \times 10^{18} \text{ n/cm}^2} \\ \text{Measured \% Decrease} &= \frac{0.6}{14} \quad (\text{Charpy Curves}) \\ \text{R.G. 1.99 Predicted \% Decrease} &= \frac{0.6}{14} \quad (\text{R.G. 1.99, Figure 2}) \end{aligned}$$

Lower Intermediate Beltline Plate USE:

$$\begin{aligned} \%Cu &= \frac{0.20}{6.97 \times 10^{18} \text{ n/cm}^2} \\ 50 \text{ EFPY Peak ID Fluence} &= \frac{0.20}{6.97 \times 10^{18} \text{ n/cm}^2} \\ 50 \text{ EFPY 1/4T Fluence} &= \frac{0.20}{4.39 \times 10^{18} \text{ n/cm}^2} \\ \text{R.G. 1.99 Predicted \% Decrease} &= \frac{24.0}{29.5} \quad (\text{R.G. 1.99, Figure 2}) \\ \text{Adjusted \% Decrease} &= \frac{24.0}{29.5} \quad (\text{R.G. 1.99, Position 2.2}) \end{aligned}$$

24.0% ≤ 29.5%, so plate is bounded by equivalent margin analysis.

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OCGS RPV Plate Equivalent Margin Analysis

BWR/2 PLATE
(OCGS Plate Number 564-03D)
(OCGS Code Number G-307-1)

Surveillance Plate USE:

$$\begin{aligned} \%Cu &= \frac{0.17}{0.746 \times 10^{18} \text{ n/cm}^2} \\ \text{Capsule Fluence} &= \frac{0.17}{0.746 \times 10^{18} \text{ n/cm}^2} \\ \text{Measured \% Decrease} &= \frac{0.6}{14} \quad (\text{Charpy Curves}) \\ \text{R.G. 1.99 Predicted \% Decrease} &= \frac{0.6}{14} \quad (\text{R.G. 1.99, Figure 2}) \end{aligned}$$

Lower Beltline Plate USE:

$$\begin{aligned} \%Cu &= \frac{0.17}{3.76 \times 10^{18} \text{ n/cm}^2} \\ 50 \text{ EPFY Peak ID Fluence} &= \frac{0.17}{3.76 \times 10^{18} \text{ n/cm}^2} \\ 50 \text{ EPFY 1/4T Fluence} &= \frac{0.17}{2.37 \times 10^{18} \text{ n/cm}^2} \\ \text{R.G. 1.99 Predicted \% Decrease} &= \frac{18.6}{100} \quad (\text{R.G. 1.99, Figure 2}) \\ \text{Adjusted \% Decrease} &= \frac{N/A}{100} \quad (\text{R.G. 1.99, Position 2.2}) \end{aligned}$$

18.6% ≤ 29.5%, so plate is bounded by equivalent margin analysis.

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OCGS RPV Plate Equivalent Margin Analysis

BWR/2 PLATE
(OCGS Plate Number 564-03E)
(OCGS Code Number G-308-1)

Surveillance Plate USE:

$$\begin{aligned} \%Cu &= \frac{0.17}{0.746 \times 10^{18} \text{ n/cm}^2} \\ \text{Capsule Fluence} &= \frac{0.17}{0.746 \times 10^{18} \text{ n/cm}^2} \\ \text{Measured \% Decrease} &= \frac{0.6}{14} \quad (\text{Charpy Curves}) \\ \text{R.G. 1.99 Predicted \% Decrease} &= \frac{0.6}{14} \quad (\text{R.G. 1.99, Figure 2}) \end{aligned}$$

Lower Beltline Plate USE:

$$\begin{aligned} \%Cu &= \frac{0.17}{3.76 \times 10^{18} \text{ n/cm}^2} \\ 50 \text{ EPY Peak ID Fluence} &= \frac{0.17}{3.76 \times 10^{18} \text{ n/cm}^2} \\ 50 \text{ EPY 1/4T Fluence} &= \frac{0.17}{2.37 \times 10^{18} \text{ n/cm}^2} \\ \text{R.G. 1.99 Predicted \% Decrease} &= \frac{18.6}{18.6} \quad (\text{R.G. 1.99, Figure 2}) \\ \text{Adjusted \% Decrease} &= \frac{N/A}{N/A} \quad (\text{R.G. 1.99, Position 2.2}) \end{aligned}$$

18.6% ≤ 29.5%, so plate is bounded by equivalent margin analysis.

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OCGS RPV Plate Equivalent Margin Analysis

BWR/2 PLATE
(OCGS Plate Number 564-03F)
(OCGS Code Number G-307-5)

Surveillance Plate USE:

$$\begin{aligned} \%Cu &= \frac{0.17}{0.746 \times 10^{18} \text{ n/cm}^2} \\ \text{Capsule Fluence} &= \frac{0.17}{0.746 \times 10^{18} \text{ n/cm}^2} \\ \text{Measured \% Decrease} &= \frac{0.6}{14} \quad (\text{Charpy Curves}) \\ \text{R.G. 1.99 Predicted \% Decrease} &= \frac{0.6}{14} \quad (\text{R.G. 1.99, Figure 2}) \end{aligned}$$

Lower Beltline Plate USE:

$$\begin{aligned} \%Cu &= \frac{0.27}{3.76 \times 10^{18} \text{ n/cm}^2} \\ 50 \text{ EFPY Peak ID Fluence} &= \frac{0.27}{3.76 \times 10^{18} \text{ n/cm}^2} \\ 50 \text{ EFPY 1/4T Fluence} &= \frac{0.27}{2.37 \times 10^{18} \text{ n/cm}^2} \\ \text{R.G. 1.99 Predicted \% Decrease} &= \frac{26.0}{26.0} \quad (\text{R.G. 1.99, Figure 2}) \\ \text{Adjusted \% Decrease} &= \frac{N/A}{N/A} \quad (\text{R.G. 1.99, Position 2.2}) \end{aligned}$$

26.0% ≤ 29.5%, so plate is bounded by equivalent margin analysis.

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OCGS RPV Weld Equivalent Margin Analysis

BWR/2 WELD, (OCGS Weld Numbers 2-564A, 2-564B, and 2-564C)
(OCGS Heat Number 86054B)

Surveillance Weld USE:

$$\begin{aligned} \%Cu &= \frac{0.28}{0.746 \times 10^{18} \text{ n/cm}^2} \\ \text{Capsule Fluence} &= \frac{0.28}{0.746 \times 10^{18} \text{ n/cm}^2} \\ \text{Measured \% Decrease} &= \frac{\text{Not reported}}{\text{Not reported}} \quad (\text{Charpy Curves}) \\ \text{R.G. 1.99 Predicted \% Decrease} &= \frac{\text{Not reported}}{\text{Not reported}} \quad (\text{R.G. 1.99, Figure 2}) \end{aligned}$$

Beltline Lower Intermediate Shell Axial Weld USE:

$$\begin{aligned} \%Cu &= \frac{0.206}{6.16 \times 10^{18} \text{ n/cm}^2} \\ 50 \text{ EPY Peak ID Fluence} &= \frac{0.206}{6.16 \times 10^{18} \text{ n/cm}^2} \\ 50 \text{ EPY 1/4T Fluence} &= \frac{0.206}{3.88 \times 10^{18} \text{ n/cm}^2} \\ \text{R.G. 1.99 Predicted \% Decrease} &= \frac{28.6}{28.6} \quad (\text{R.G. 1.99, Figure 2}) \\ \text{Adjusted \% Decrease} &= \frac{\text{N/A}}{\text{N/A}} \quad (\text{R.G. 1.99, Position 2.2}) \end{aligned}$$

28.6% ≤ 39%, so weld is bounded by equivalent margin analysis.

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OCGS Vessel RPV Welds Equivalent Margin Analysis

BWR/2 WELD. (OCGS Weld Numbers 2-564D, 2-564E, and 2-564F) (OCGS Heat Number 86054B)

Surveillance Weld USE:

$$\begin{aligned} \%Cu &= \frac{0.28}{0.746 \times 10^{18} \text{ n/cm}^2} \\ \text{Capsule Fluence} &= \frac{0.28}{0.746 \times 10^{18} \text{ n/cm}^2} \end{aligned}$$

$$\begin{aligned} \text{Measured \% Decrease} &= \frac{\text{Not reported}}{\text{Not reported}} \quad (\text{Charpy Curves}) \\ \text{R.G. 1.99 Predicted \% Decrease} &= \frac{\text{Not reported}}{\text{Not reported}} \quad (\text{R.G. 1.99, Figure 2}) \end{aligned}$$

Beltline Lower Shell Axial Weld USE:

$$\begin{aligned} \%Cu &= \frac{0.214}{3.71 \times 10^{18} \text{ n/cm}^2} \\ 50 \text{ EFPY Peak ID Fluence} &= \frac{0.214}{3.71 \times 10^{18} \text{ n/cm}^2} \\ 50 \text{ EFPY 1/4T Fluence} &= \frac{0.214}{2.34 \times 10^{18} \text{ n/cm}^2} \end{aligned}$$

$$\text{R.G. 1.99 Predicted \% Decrease} = \frac{25.5}{25.5} \quad (\text{R.G. 1.99, Figure 2})$$

$$\text{Adjusted \% Decrease} = \frac{\text{N/A}}{\text{N/A}} \quad (\text{R.G. 1.99, Position 2.2})$$

25.5% ≤ 39%, so weld is bounded by equivalent margin analysis.

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OCGS Vessel RPV Weld Equivalent Margin Analyses

BWR/2 WELD (OCGS Weld Number 3-564)
(OCGS Heat Number 1248)

Surveillance Weld USE:

$$\begin{aligned} \%Cu &= \frac{0.28}{0.746 \times 10^{18} \text{ n/cm}^2} \\ \text{Capsule Fluence} &= \frac{0.28}{0.746 \times 10^{18} \text{ n/cm}^2} \\ \text{Measured \% Decrease} &= \frac{\text{Not reported}}{\text{Not reported}} \quad (\text{Charpy Curves}) \\ \text{R.G. 1.99 Predicted \% Decrease} &= \frac{\text{Not reported}}{\text{Not reported}} \quad (\text{R.G. 1.99, Figure 2}) \end{aligned}$$

Bellline Lower Shell to Lower Intermediate Shell Circumferential Weld USE:

$$\begin{aligned} \%Cu &= \frac{0.214}{3.76 \times 10^{18} \text{ n/cm}^2} \\ 50 \text{ EFPY Peak ID Fluence} &= \frac{0.214}{3.76 \times 10^{18} \text{ n/cm}^2} \\ 50 \text{ EFPY 1/4T Fluence} &= \frac{0.214}{2.37 \times 10^{18} \text{ n/cm}^2} \\ \text{R.G. 1.99 Predicted \% Decrease} &= \frac{25.0}{25.0} \quad (\text{R.G. 1.99, Figure 2}) \\ \text{Adjusted \% Decrease} &= \frac{\text{N/A}}{\text{N/A}} \quad (\text{R.G. 1.99, Position 2.2}) \end{aligned}$$

25.0% ≤ 39%, so weld is bounded by equivalent margin analysis.