



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

April 6, 1994

Docket No. 50-416

Mr. C. Randy Hutchinson
Vice President, Operations GGNS
Entergy Operations, Inc.
Post Office Box 756
Port Gibson, Mississippi 39150

Dear Mr. Hutchinson:

SUBJECT: GENERIC LETTER (GL) 92-01, REVISION 1, "REACTOR VESSEL STRUCTURAL INTEGRITY," ENTERGY OPERATIONS, INC., GRAND GULF NUCLEAR STATION, (TAC NO. M83466)

By letter dated July 6, 1992, Entergy Operations, Inc., provided its response to GL 92-01, Revision 1. The NRC staff has completed its review of your response. Based on its review, the staff has determined that Entergy Operations, Inc. has provided the information requested in GL 92-01.

The GL is part of the staff's program to evaluate reactor vessel integrity for Pressurized Water Reactors (PWRs) and Boiling Water Reactors (BWRs). The information provided in response to GL 92-01, including previously docketed information, is being used to confirm that licensees satisfy the requirements and commitments necessary to ensure reactor vessel integrity for their facilities.

A substantial amount of information was provided in response to GL 92-01, Revision, 1. This data has been entered into a computerized data base designated Reactor Vessel Integrity Database (RVID). The RVID contains the following tables: a pressurized thermal shock (PTS) table for PWRs, a pressure-temperature limit table for BWRs and an upper-shelf energy (USE) table for PWRs and BWRs. Enclosure 1 provides the PTS and/or pressure temperature table(s); Enclosure 2 provides the USE table(s) for your facility, and Enclosure 3 provides a key for the nomenclature used in the tables. The tables include the data necessary to perform USE, pressure-temperature limit, and RT_{pts} and evaluations. This data was taken from your response to GL 92-01 and previously docketed information. The information in the RVID for your facility will be considered accurate at this point in time and will be used in the staff's assessments related to vessel structural integrity. References to the specific source of the data are provided in the tables.

We request that you verify that the information you have provided for your facility has been accurately entered in the data base. No response is necessary unless an inconsistency is identified. If no comments are received within 30 days from the date of this letter, the staff will consider your actions related to GL 93-01, Revision 1, to be complete.

9404180061 940406
PDR ADOCK 05000416
P PDR

130096

DF01

Mr. C. Randy Hutchinson

- 2 -

The information requested by this letter is within the scope of the overall burden estimated in GL 92-01, Revision 1, "Reactor Vessel Structural Integrity, 10 CFR 50.54(f)." The estimated average number of burden hours is 200 person hours for each addressee's response. This estimate pertains only to the identified response-related matters and does not include the time required to implement actions required by the regulations. This action is covered by the Office of Management and Budget Clearance Number 3150-0011, which expires June 30, 1994.

Sincerely,

ORIGINAL SIGNED BY:

Paul W. O'Connor, Senior Project Manager
Project Directorate IV-1
Division of Reactor Projects - III/IV
Office of Nuclear Reactor Regulation

Enclosures:

1. Pressurized Thermal Shock or Pressure-Temperature Limit Table
2. Upper-Shelf Energy Table
3. Nomenclature Key

cc w/enclosures:
See next page

DISTRIBUTION

Docket File
NRC & Local PDRs
PD4-1 Reading
JRoe
EAdensam
WBeckner
PNoonan
PO'Connor
OGC
ACRS (10)
EMerschhoff, RII
DMcDonald
SSheng

OFC	LA:PD4-1 <i>[Signature]</i>	PM:PD4-1 <i>[Signature]</i>	D:DP4-1 <i>[Signature]</i>
NAME	PNoonan	PO'Connor/bc	WBeckner
DATE	4/6/94	4/6/94	4/6/94
COPY	YES/NO	YES/NO	YES/NO

OFFICIAL RECORD COPY Document Name: GG83466.LTR

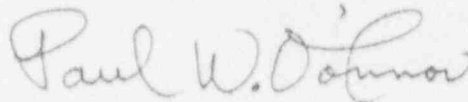
NRC FILE CENTER COPY

Mr. C. Randy Hutchinson

- 2 -

The information requested by this letter is within the scope of the overall burden estimated in GL 92-01, Revision 1, "Reactor Vessel Structural Integrity, 10 CFR 50.54(f)." The estimated average number of burden hours is 200 person hours for each addressee's response. This estimate pertains only to the identified response-related matters and does not include the time required to implement actions required by the regulations. This action is covered by the Office of Management and Budget Clearance Number 3150-0011, which expires June 30, 1994.

Sincerely,



Paul W. O'Connor, Senior Project Manager
Project Directorate IV-1
Division of Reactor Projects - III/IV
Office of Nuclear Reactor Regulation

Enclosures:

1. Pressurized Thermal Shock or
Pressure-Temperature Limit
Table
2. Upper-Shelf Energy Table
3. Nomenclature Key

cc w/enclosures:

See next page

Mr. C. Randy Hutchinson
Entergy Operations, Inc.

Grand Gulf Nuclear Station

cc:

Mr. H. W. Keiser, Exec. Vice President
and Chief Operating Officer
Entergy Operations, Inc.
P. O. Box 31995
Jackson, Mississippi 39286-1995

Mr. D. L. Pace
GGNS General Manager
Entergy Operations, Inc.
P. O. Box 756
Port Gibson, Mississippi 39150

Robert B. McGehee, Esquire
Wise, Carter, Child & Caraway
P. O. Box 651
Jackson, Mississippi 39205

The Honorable William J. Guste, Jr.
Attorney General
Department of Justice
State of Louisiana
P. O. Box 94005
Baton Rouge, Louisiana 70804-9005

Nicholas S. Reynolds, Esquire
Winston & Strawn
1400 L Street, N.W. - 12th Floor
Washington, D.C. 20005-3502

Dr. F. E. Thompson, Jr.
State Health Officer
State Board of Health
P. O. Box 1700
Jackson, Mississippi 39205

Mr. Sam Mabry, Director
Division of Solid Waste Management
Mississippi Department of Natural
Resources
P. O. Box 10385
Jackson, Mississippi 39209

Office of the Governor
State of Mississippi
Jackson, Mississippi 39201

President,
Claiborne County Board of Supervisors
Port Gibson, Mississippi 39150

Mike Moore, Attorney General
Frank Spencer, Asst. Attorney General
State of Mississippi
Post Office Box 22947
Jackson, Mississippi 39225

Regional Administrator, Region II
U.S. Nuclear Regulatory Commission
101 Marietta St., Suite 2900
Atlanta, Georgia 30323

Mr. Jerrold G. Dewease
Vice President, Operations Support
Entergy Operations, Inc.
P.O. Box 31995
Jackson, Mississippi 39286-1995

Mr. W. W. Watson
Project Manager
Bechtel Power Corporation
P.O. Box 808, 4600 W. Main
Russellville, Arkansas 72801

Mr. Michael J. Meisner
Director, Nuclear Safety
and Regulatory Affairs
Entergy Operations, Inc.
P.O. Box 756
Port Gibson, Mississippi 39150

Mr. K. G. Hess
Bechtel Power Corporation
P. O. Box 2166
Houston, Texas 77252-2166

Mr. Rudolph H. Bernhard
Senior Resident Inspector
U.S. Nuclear Regulatory Commission
Route 2, Box 399
Port Gibson, Mississippi 39150

Summary File for Pressure-Temperature Limits

Plant Name	Beltline Ident.	Heat No. Ident.	ID Neut. Fluence at EOL/EFPY	IRT _{min}	Method of Determin. IRT _{min}	Chemistry Factor	Method of Determin. CF	%Cu	%Ni
Grand Gulf 1 EOL: 6/16/2022	#2 Shell Plates	C2593-2	3.14E18	-30°F	Plant specific	26	Table	0.04	0.59
	#2 Shell Plates	C2594-1	3.14E18	-10°F	Plant specific	26	Table	0.04	0.63
	#2 Shell Plates	C2594-2	3.14E18	0°F	Plant specific	26	Table	0.04	0.63
	#2 Shell Plates	A1224-1	3.14E18	0°F	Plant specific	26	Table	0.04	0.65
	#2 Shell Axial Welds	627260	3.14E18	-30°F	Plant specific	82	Table	0.06	1.08
	#2 Shell Axial Welds	5P62148	3.14E18	-50°F	Plant specific	27	Table	0.02	0.82
	#2 Shell Axial Welds	626677	3.14E18	-20°F	Plant specific	20	Table	0.03	1.04

References for Grand Gulf 1

Fluence datum is from July 6, 1992, letter from W. T. Cottle (EO) to USNRC Document Control Desk, subject: Response to Generic Letter 92-01, Revision 1. The staff assumed that the fluence of 2.11E18 was the value at T/4 because the same fluence was reported in FSAR for T/4 location.

Chemical composition and IRT data are from the Grand Gulf FSAR. (Only #2 shell plates are in the neutron active zone)

Ni contents for welds 5P62148 and 627260 are found in attachment to February 28, 1989, letter from T. W. Cloninger (SER) to USNRC Document Control Desk, subject: Generic Letter 88-11, "NRC Position on Radiation Embrittlement of Reactor Vessel Materials and Its Impact on Plant Operations," Updated Information, AECN-89/0047

Ni content of weld 626677 is estimated at 1.00% per RG 1.99, Rev. 2

104

Summary File for Upper Shelf Energy

Plant Name	Beltline Ident.	Heat No.	Material Type	1/4T USE at EOL	1/4T Neutron Fluence at EOL	Unirrad. USE	Method of Determin. Unirrad. USE
Grand Gulf 1 EOL: 6/16/2022	#2 Shell Plates	C2593-2	A 5338-1	90	2.11E18	102	Direct
	#2 Shell Plates	C2594-1	A 5338-1	88	2.11E18	100	Direct
	#2 Shell Plates	C2594-2	A 5338-1	90	2.11E18	102	Direct
	#2 Shell Plates	A1224-1	A 5338-1	143	2.11E18	162	Direct
	#2 Shell Axial Welds	627260	EB018, SMAW	106	2.11E18	121	Direct
	#2 Shell Axial Welds	5P62148	Linde 124, SAW	80	2.11E18	91	Direct
	#2 Shell Axial Welds	626677	EB018, SMAW	84	2.11E18	95	Direct

References for Grand Gulf 1

Chemical composition and USE data are from the Grand Gulf FSAR (Only #2 shell plate are in the neutron active zone).

Fluence datum is from July 6, 1992, letter from W. T. Cottle (EO) to USMRC Document Control Desk, subject: Response to Generic Letter 92-01, Revision 1. The location of the fluence of 2.11E18 was not identified there. The staff assumes the location to be T/4 because this same fluence was reported in FSAR for the T/4 location.

PRESSURE-TEMPERATURE LIMIT TABLES AND USE TABLES FOR ALL BWR PLANTSNOMENCLATURE

Pressure-Temperature Limits Table

- Column 1: Plant name and date of expiration of license.
 Column 2: Beltline material location identification.
 Column 3: Beltline material heat number; for some welds that a single-wire or tandem-wire process has been reported, (S) indicates single wire was used in the SAW process; (T) indicates tandem wire was used in the SAW process.
 Column 4: End-of-life (EOL) neutron fluence at vessel inner wall; cited directly from inner diameter (ID) value or calculated by using Regulatory Guide (RG) 1.99, Revision 2 neutron fluence attenuation methodology from the quarter thickness (T/4) value reported in the latest submittal (GL 92-01, PTS, or P/T limits submittals).
 Column 5: Unirradiated reference temperature.
 Column 6: Method of determining unirradiated reference temperature (IRT).

Plant-Specific

This indicates that the IRT was determined from tests on material removed from the same heat of the beltline material.

MTEB 5-2

This indicates that the unirradiated reference temperature was determined from following MTEB 5-2 guidelines for cases where the IRT was not determined using American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section III, NB-2331, methodology.

Generic

This indicates that the unirradiated reference temperature was determined from the mean value of tests on material of similar types.

- Column 7: Chemistry factor for irradiated reference temperature evaluation.
 Column 8: Method of determining chemistry factor

Table

This indicates that the chemistry factor was determined from the chemistry factor tables in RG 1.99, Revision 2.

Calculated

This indicates that the chemistry factor was determined from surveillance data via procedures described in RG 1.99, Revision 2.

Column 9: Copper content; cited directly from licensee value except when more than one value was reported. (Staff used the average value in the latter case.)

No Data

This indicates that no copper data has been reported and the default value in RG 1.99, Revision 2, will be used by the staff.

Column 10: Nickel content; cited directly from licensee value except when more than one value was reported. (Staff used the average value in the latter case.)

No Data

This indicates that no nickel data has been reported and the default value in RG 1.99, Revision 2, will be used by the staff.

Upper Shelf Energy Table

Column 1: Plant name and date of expiration of license.

Column 2: Beltline material location identification.

Column 3: Beltline material heat number; for some welds that a single-wire or tandem-wire process has been reported, (S) indicates single wire was used in the SAW process. (T) indicates tandem wire was used in the SAW process.

Column 4: Material type; plate types include A 553B-1, A 302B, A 302B Mod., and forging A 508-2; weld types include SAW welds using Linde 80, 0091, 124, 1092, ARCOS-B5 flux, Rotterdam welds using Graw Lo, SMIT 89, LW 320, and SAF 89 flux, and SMAW welds using no flux.

Column 5: EOL upper-shelf energy (USE) at T/4; calculated by using the EOL fluence and either the copper value or the surveillance data. (Both methods are described in RG 1.99, Revision 2.)

EMA

This indicates that the USE issue may be covered by the approved equivalent margins analysis in the BWR Owners Group Topical Report: NEDO-32205, Revision 1.

Column 6: EOL neutron fluence at T/4 from vessel inner wall; cited directly from T/4 value or calculated by using RG 1.99, Revision 2 neutron fluence attenuation methodology from the ID value reported in the latest submittal (GL 92-01, PTS, or P/T limits submittals).

Column 7: Unirradiated USE.

EMA

This indicates that the USE issue may be covered by the approved equivalent margins analysis in the BWR Owners Group Topical Report: NEDO-32205, Revision 1.

Column 8: Method of determining unirradiated USE

Direct

For plates, this indicates that the unirradiated USE was from a transverse specimen. For welds, this indicates that the unirradiated USE was from test date.

65%

This indicates that the unirradiated USE was 65% of the USE from the longitudinal specimen.

Generic

This indicates that the unirradiated USE was reported by the licensee from other plants with similar materials to the beltline material.

NRC generic

This indicates that the unirradiated USE was derived by the staff from other plants with similar materials to the beltline material.

10, 30, 40, or 50 °F

This indicates that the unirradiated USE was derived from Charpy test conducted at 10, 30, 40, or 50 °F.

Surv. Weld

This indicates that the unirradiated USE was from the surveillance weld having the same weld wire heat number.

Equiv. to Surv. Weld

This indicates that the unirradiated USE was from the surveillance weld having different weld wire heat number.

Sister Plant

This indicates that the unirradiated USE was derived by using the reported value from other plants with the same weld wire heat number.

Blank

Indicates that there is insufficient data to determine the unirradiated USE. These licensees will utilize Topical Report NEDO-32205, Revision 1 to demonstrate USE compliance to Appendix G, 10 CFR Part 50.