



Entergy Nuclear Operations, Inc.
Pilgrim Nuclear Power Station
600 Rocky Hill Road
Plymouth, MA 02360

Charles M. Dugger
Vice President - Operations

February 4, 2003

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

SUBJECT: Entergy Nuclear Operations, Inc.
Pilgrim Nuclear Power Station
Docket 50-293
License No. DPR-35

Response to NRC Request for Additional Information
Appendix K Measurement Uncertainty Recovery – Power Uprate Request

LETTER NUMBER: 2.03.006

Dear Sir or Madam:

The NRC and Entergy conducted teleconferences on January 3, 2003 and January 13, 2003 to discuss NRC questions related to the Entergy Power Uprate Request. Attachment 1 of this letter provides the responses to the requested information. Attachment 2 is a disk with a zip file of the requested meteorological data for 1978.

This response and the previous responses to requests for additional information do not change the no significant hazard conclusions previously submitted in Entergy Letter 2.02.048, dated July 5, 2002.

Should you have any questions or comments concerning this submittal, please contact Bryan Ford at (508) 830-8403.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 4th day of February 2003.

Sincerely,

A handwritten signature in black ink, appearing to read "C. M. Dugger".

Charles M. Dugger

JRH/dd

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- Attachments: 1. Response to NRC Request for Additional Information (6 pages)
2. Disk Containing Meteorological Data for 1978

cc: Mr. Travis Tate, Project Manager
Office of Nuclear Reactor Regulation
Mail Stop: 0-8B-1
U.S. Nuclear Regulatory Commission
1 White Flint North
11555 Rockville Pike
Rockville, MD 20852

U.S. Nuclear Regulatory Commission
Region 1
475 Allendale Road
King of Prussia, PA 19406

Senior Resident Inspector
Pilgrim Nuclear Power Station

Mr. Robert Walker
Radiation Control Program
Commonwealth of Massachusetts
Exec Offices of Health & Human Services
174 Portland Street
Boston, MA 02114

Mr. Steve McGrail, Director
Mass. Emergency Management Agency
400 Worcester Road
P.O. Box 1496
Framingham, MA 01702

ATTACHMENT 1

LETTER NUMBER 2.03.006

**Response to NRC Request for Additional Information
Appendix K Measurement Uncertainty Recovery-Power Uprate Request**

NRC Request:

Provide the Pilgrim specific accident analysis input values in similar format to the example information provided.

Response:

The attached three tables provide the requested information in the tabular format of the examples provided.

Table 1
Main Steam Line Break Accident Analysis Parameters

Source Term

TS 3.6.B Limit, RCS maximum total iodine concentration $\mu\text{Ci/mL}$ ⁽¹⁾	20
Operational RCS Iodine Concentration, $\mu\text{Ci/mL}$ ⁽²⁾	
I-131	6.1E-2
I-132	3.0E-1
I-133	3.6E-1
I-134	4.3E-1
I-135	4.4E-1
Coolant Release Mass, lbm ⁽³⁾	
Steam	25,000
Liquid	60,000
Coolant Release Duration (MSIV Closure), seconds ⁽³⁾	10.5

Other Parameters

Dose conversion factors	RG 1.109
Offsite breathing rate, offsite, m^3/s	
0-8 hours	3.47E-4
8-24 hours	1.75E-4
Atmospheric dispersion factors, s/m^3 – ground-level ⁽⁴⁾	
EAB, 0-2 hrs:	2.08E-3
LPZ, 0-8 hrs:	1.94E-5

- (1) PNPS Technical Specifications
- (2) PNPS specific value from General Electric source term
- (3) FSAR Section 14.5 value
- (4) PNPS specific calculation value

Table 2
Loss of Coolant Accident Analysis Parameters

Source Term

Reactor power (1998 x 1.02 (Uncertainty in power measurements)), MWt	2038
Release into primary containment	Instantaneous
Noble gas in containment (Percent of activity in core)	100
Iodine in containment (Percent of activity in core)	25
Iodine species distribution	
Elemental	0.91
Organic	0.04
Particulate	0.05

Release Data

Direct release to atmosphere through SGTS – no hold-up in reactor building

SGTS filter efficiency, % (Includes 1% filter bypass) ⁽¹⁾

Elemental	99
Organic	99
Particulate	99

Primary Containment

Primary containment volume, ft ³	147,900
Suppression pool minimum water volume, ft ³	84,000
RCS volume (reactor vessel + piping)	10,000
Primary containment leakage, % volume/day ⁽²⁾	1.25

Secondary Containment

Mixing No mixing

ESF Release

ESF leak data (directly to SGTS), gallons/min ⁽³⁾	
0 – 5 hours	9
5 – 720 hrs	3
ESF flashing fraction, %	10
ESF source term, % of core iodine inventory	50

MSIV Leak Data

MSIV total leak rate (4 MSIV's), scfh ⁽⁴⁾	46
Drywell pressure for MSIV leak rate, psia ⁽⁵⁾	59.7
Containment temperature for MSIV leak rate, deg. F ⁽⁵⁾	292
Standard pressure, psia	14.7
Standard temperature, deg. C	0

Decontamination factors in main steam piping: ⁽⁶⁾

Elemental	100
Organic	1
Particulate	100

MSIV leakage split: ⁽⁷⁾

To condenser/LPT (%)	59
To high pressure turbine (%)	41

Condenser/LPT volume (ft ³) ⁽⁸⁾	88,400
High Pressure turbine volume (ft ³) ⁽⁸⁾	800

Iodine plateout in condenser ⁽⁶⁾	2
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Condenser leak rate to environment (%/day) ⁽⁹⁾	0.5
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Other Parameters

Dose conversion factors	RG 1.109
Offsite breathing rate, offsite, m ³ /s	
0-8 hours	3.47E-4
8-24 hours	1.75E-4
>24 hours	2.32E-4
Atmospheric dispersion factors	Table 4

- (1) Regulatory Guide 1.52 and PNPS TS Bases
- (2) TS Bases reference using AEC value
- (3) PNPS specific calculation
- (4) PNPS TS
- (5) PNPS Specification E-536 (environmental parameters for post-accident conditions)
- (6) BECo letter #81-37/NRC letter of June 24, 1982
- (7) NUREG/CR-1169
- (8) PNPS specific calculation
- (9) AEC SER dated August 25, 1971 and BECo letter #81-37/NRC letter of June 24, 1982

Table 4
Atmospheric Relative Concentration (X/Q) Values

<u>Receptor Location</u>	<u>Ground level X/Q</u>	<u>Stack X/Q</u>
EAB		
0 – 2 hrs	2.08E-3	5.85E-04*
LPZ		
0 – 4 hrs	1.94E-5	1.91E-5**
4 - 8 hrs	1.94E-5	2.94E-6
8 - 24 hrs	1.11E-5	1.77E-6
1 - 4 days	3.72E-6	5.87E-7
4 - 30 days	8.39E-7	1.21E-7

* The LOCA assumes a stack release with fumigation for 0 to 2 hours for EAB (RG 1.145)

** The LOCA assumes a stack release with fumigation for 0 to 4 hours for LPZ (RG 1.145)

NRC Request:

Describe the meaning of analysis basis setpoints in Table 1 of RAI #6 from Entergy to NRC Letter # 2.02.102 and provide references to NRC approved documents supporting this information.

Response:

The analytical inputs for the SRV setpoints are consistent with the NRC approved GE Topical Licensing Report, "Qualification of the One-Dimensional Core Transient Model (ODYN) for Boiling Water Reactors," NEDC-24154P-A, Revision 1.

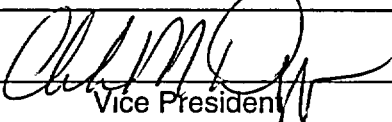
The second to last column of Table 1 of RAI #6 provides the upper limit setpoint for each SRV, which is calculated based on the nominal setpoint conservatively adjusted for the setpoint tolerance of 1% per the Technical Specifications. For the TPO ATWS analysis, one SRV was conservatively assumed to have a lift setpoint of 1136 psig. This assumption provides conservative results for the ATWS pressurization events, i.e., a slightly higher peak pressure. PNPS is not changing the actual SRV setpoints as part of the TPO uprate.

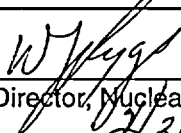
The last column identifies the setpoint inputs used in the ODYN code analysis. These setpoint inputs are the result of a statistical spread around the upper limit of the valves in each valve group. The statistical spread is derived using GE procedures rather than the ODYN code, and maintains the upper limit mean for each valve group. Consequently, the use of the statistical spread has an insignificant impact on the short-term analysis such as the ATWS peak pressure.

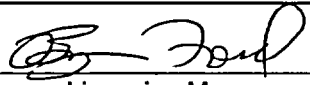
CORRESPONDENCE REVIEW SIGNATURE SHEET #1

EXHIBIT 3
Sheet 1 of 2


TITLE: Letter 2.03.006 Response To NRC Request For Additional Information
Power Uprate Request

 Vice President Date <u>2-4-03</u> C. M. Dugger	Effect on safety and reliability of the plant has been evaluated adequately. Information is accurate, complete, and consistent with NUORG business planning strategy. Preserves PNPS reputation for conservative decision making. Explain:
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 Director, Nuclear Assessment Date <u>2/3/03</u> W. J. Riggs	Effect on safety and reliability of the plant has been evaluated adequately. Information is accurate, complete, and consistent with NUORG business planning strategy. Preserves PNPS reputation for conservative decision making. Explain: <i>Review of letter & appropriate tech reviews.</i>
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 Licensing Manager Date <u>2/2/03</u> B. S. Ford	Consistent with NUORG strategy governing regulatory activities. Information is accurate and complete. Information has received proper review for factual content, commitment ownership, and fiscal oversight. Explain:
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Regulatory Affairs Superintendent. Date _____	Applicable regulatory documents have been considered in content of letter. Information is consistent with other regulatory strategies and commitments. Information is accurate and complete. Information is consistent with design and Licensing Basis. Explain:
--	--

 Regulatory Affairs/ Correspondence Team Leader Date <u>1/31/03</u> J. R. Haley	Information is accurate and complete. Source documents verified. Commitments are identified and owners assigned. Letter is grammatically correct and free of typographical errors. Explain:
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CORRESPONDENCE REVIEW SIGNATURE SHEET #2

EXHIBIT 3
Sheet 2 of 2

TITLE: Letter 2.03.006 Response To NRC Request For Additional Information
Power Uprate Request

<p><u>S. Bethay</u> Director, NESG</p> <p>Date <u>2/3/03</u></p> <p>S. Bethay</p>	<p>Configuration control of plant is maintained. Plant safety, reputation, and costs have been properly considered. Organizational interfaces are properly established to support information/commitment(s).</p> <p>Explain:</p>
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<p>_____ Department Manager</p> <p>Date _____</p>	<p>Technical input provided by Department is properly represented in letter. Scope and schedule of commitment(s) can be met with existing resources. Impact on existing analyses/operations has been appropriately considered.</p> <p>Explain:</p>
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<p><u>See Attached</u> TPO Project Manager</p> <p>Date _____</p> <p>F. J. Mogolesko</p>	<p>Technical input provided by Department is properly represented in letter. Scope and schedule of commitment(s) can be met with existing resources. Impact on existing analyses/operations has been appropriately considered.</p> <p>Explain:</p>
---	--

<p>_____ Date _____</p> <p>S. Wollman</p>	<p>All statements, facts, and conclusions are true and accurately stated.</p> <p>Explain:</p>
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<p><u>P. Compagnone</u></p> <p>Date <u>1/31/03</u></p> <p>P. Compagnone</p>	<p>My basis for recommending approval is: <u>Data are as used in the relevant calculations.</u></p> <p>Explain:</p>
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CORRESPONDENCE REVIEW SIGNATURE SHEET #2

EXHIBIT 3 Sheet 2 of 2

TITLE: Letter 2.03.006 Response To NRC Request For Additional Information
Power Uprate Request

_____ Director, NESG Date _____ S. Bethay	Configuration control of plant is maintained. Plant safety, reputation, and costs have been properly considered. Organizational interfaces are properly established to support information/commitment(s) Explain:
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_____ Department Manager Date _____	Technical input provided by Department is properly represented in letter. Scope and schedule of commitment(s) can be met with existing resources Impact on existing analyses/operations has been appropriately considered. Explain:
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<i>F. J. Mogolesko</i> TPO Project Manager Date <u>1/31/03</u> F. J. Mogolesko	Technical input provided by Department is properly represented in letter. Scope and schedule of commitment(s) can be met with existing resources. Impact on existing analyses/operations has been appropriately considered. Explain: <i>Knowledge of issues within RAI's and discussions with the responders as to completeness of their products.</i>
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<i>S. Wollman</i> Date <u>1/31/03</u> S. Wollman	All statements, facts, and conclusions are true and accurately stated. Explain: <i>per P. Compagnone statement</i>
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_____ Date _____ P. Compagnone	My basis for recommending approval is: Explain:
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