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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of

Entergy Corporation

Pilgrim Nuclear Power Station

License Renewal Application

Docket # 50-293

October 1, 2010

**PILGRIM WATCH'S BRIEF: PETITIONER TIMELY RAISED ISSUE OF NRC'S PRACTICE TO USE MEAN CONSEQUENCE VALUES IN SAMA ANALYSES**

## INTRODUCTION

The Board's September 23, 2010 Order asked parties to "address whether Pilgrim Watch, either explicitly or implicitly, raised the averaging practices in its Original Contention 3." The answer to the Board's first question is that Pilgrim Watch did so, and the Board, Entergy, and the NRC Staff explicitly recognized that it had done so.

The Board's September 23 Order went on to say that, "if not, when such concerns first were raised and whether, taking all relevant circumstances into consideration and applying the principles stated at 10 C.F.R. Sec. 2.309(c) and (f)(2), the raising of such concerns was timely."

This question has three answers. The first is that it is irrelevant, because "the concerns [were] first raised" in Original Contention 3. The second is that the supposed "principles" of Sec. 2.309 are irrelevant; Pilgrim Watch did not raise an entirely new contention; at most the



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scope of the contention raised in Original Contention 3 simply became clearer and more focused at this procedure dragged on. Finally, even if the Board, wrongly and contrary to its own prior statements, were to find that Original Contention 3 did not raise what the Board calls "averaging practice concerns," that issue has been timely raised.

## I. Original Contention 3 Raised "Averaging Practice Concerns"

Pilgrim Watch first raised "averaging practice concerns" in its *Request for Hearing and Petition to Intervene*, filed May 25, 2006; and repeated these concerns in its later filings.

NRC's Practice and Procedures Digest repeatedly makes clear the requirement for a contention is not a lot of technicalities; it is that the Applicant knows what it must defend against. It says:

- The test of whether a contention raises an issue is not "that pleadings of contentions be technically perfect. It is neither Congressional no Commission policy to exclude parties because the niceties of pleadings were imperfectly observed. Sounder practice is to decide issues on their merits, not to avoid them on technicalities." (Citations omitted) (US Nuclear Regulatory Commission Staff Practice and Procedure Digest -Commission, Appeal Board, and Licensing Board Decisions, July 1972 – August 2009, Prehearing Matters 100, January 2010)
- The purpose of the contention requirement is "to help assure that that other parties are sufficiently put on notice so that they will know at least generally what they will have to defend against or oppose."(Id., Prehearing Matters 101)

Pilgrim Watch's ***Request for Hearing and Petition to Intervene***, (May 25, 2009) "sufficiently put (parties) on notice."

Pilgrim Watch said (at 29) that, "Entergy has used incorrect input parameters, including meteorology, emergency response, and economic data into a software model of limited scope. In this contention Petitioners will address the input parameters used by Entergy in its SAMA analysis." (Emphasis added)

Further (at 34), "Currently, the complete inputs to the MACCS2 for the license renewal of Pilgrim are not publicly available, and are not included in the Applicant's Environmental Report. Without knowing what parameters were chosen by the Applicant, it is not possible to fully evaluate the correctness of the conclusions about Severe Accident Mitigation Alternatives. However, from what is included in the ER, Petitioners have been able to piece together some possible reasons that Entergy's described consequences of a severe accident at Pilgrim look so small." (Emphasis added)

The definition of "parameter" is well understood to encompass "averaging practice concerns" as the following standard definitions make clear.

- The Free Dictionary: "*Statistics* - a quantity, such as a mean, that is calculated from data and describes a population;" Mathematics & Measurements / Statistics- a characteristic of the distribution of a population, such as its mean, as distinct from that of a sample."
- Answers.com: "*Statistics*. A quantity, such as a mean, that is calculated from data and describes a population."
- Wikipedia: "Parameter- is a computation made from a population (could be a percent, for example) it is a computation from data values recorded- but it is not actually a data value recorded from a subject. Example: for a population of test scores (meteorological data in

this discussion), a parameter would not be an actual score (actual data), but perhaps an average computed from all scores (data), or a percent computed from all scores (data)."

If Entergy says that it did not know what "parameter" meant (an excuse that should not hold since Entergy clearly did know), it is abundantly clear that they were aware that "inputs" were explicitly and implicitly raised in Pilgrim Watch's original Contention 3 and subsequent filings.

In Pilgrim Watch's Motion to Intervene, for example, Section 3.3.3 is titled in bold as, "Entergy used incorrect input data to analyze severe accident consequences."

The Board in its *Memorandum and Order (Ruling on Standing and Contentions of Petitioners Massachusetts Attorney General and Pilgrim Watch)*, October 16, 2006 said explicitly that "The bulk of the contention, PW emphasizes, "input data that were incorrect, incomplete or inadequate." The Board's ruling that a hearing was granted on Contention 3 read,

> Applicant's SAMA analysis for the Pilgrim Plant is deficient in that the input data concerning (1) evacuation times, (2) economic consequences, and (3) meteorological patterns are incorrect resulting in incorrect conclusions about the costs versus benefits of possible mitigation alternatives, such that further analysis is called for.

Input data is commonly understood to mean "that which is put in." (Free dictionary) In this context where we are talking about putting data into a computer code, MACCS2, for analysis, input data refers explicitly to "data to be entered into a computer for processing," or "the process of introducing data into the internal storage of a computer." (Dictionary.com) Input data has many facets or features; what is actually put into the computer is a quantity such as a mean that Entergy used to describe the population. Pilgrim Watch made this clear by repeatedly using both

words and most often together - "input parameters." Averaging practice concerns were an explicit part of this contention from the very beginning.

The record shows that Pilgrim Watch's contention as originally pleaded indeed assured "that other parties (were) sufficiently put on notice so that they will know at least generally what they will have to defend against or oppose" because the Board, NRC Staff and Entergy all explicitly recognized that Contention 3 included the "averaging issue."

For the Board now to say otherwise would completely ignore, and be flatly inconsistent with, what it said on October 16, 2006 – almost four years ago; and what Entergy admitted.

**The Atomic Safety Licensing Board**

The Board's Memorandum and Order (Ruling on Standing and Contentions of Petitioners Massachusetts Attorney General and Pilgrim Watch), LBP-06-23, (October 16, 2006) Section D, *Pilgrim Watch's Contention 3 Regarding SAMA analysis* makes clear that the Board understood that Pilgrim Watch had brought forth concerns about the NRC practice regarding SAMA analyses using mean consequences, resulting in averaging of potential consequences. For example:

- The Order LBP-06-23, (pg., 79) says that, "By using probabilistic modeling and incorrectly inputting certain parameters into the modeling software, Entergy has downplayed the consequences of a severe accident at Pilgrim and this has caused it to draw incorrect conclusions about the costs versus benefits of possible mitigation alternatives. (Emphasis added) (Order, N. 310, citing Petition at 26)
- ...it is asserted that the use of "probabilistic modeling and incorrect parameters in its SAMA analysis" results in a downplaying of the likely consequences of a severe accident

at Pilgrim, which "thus incorrectly discounts possible mitigation alternatives" that might prevent or reduce the impact of an accident. (Emphasis added.) (Order, LBP-06-23, Pg, 80, Fn., 316, Id. Citing Petition at 28).

- The Order (at Fn., 422) says that, "Those sensitivity analyses, however, were performed only with respect to a few parameters..." (Emphasis added)
- ... PW points to, among other things... user's "ability to affect the output from the code by manipulating the inputs and choosing parameters."(Order, LBP-06-23, N. 321, Id. at 33; *see id.* at 31-34 & nn.13, 14 (citing D.E. Chanin and M.L. Young, Code Manual for MACCS2: Vol. 1, User's Guide (Sandia Nat. Lab. 1997); MACCS2 *Computer Code Application Guidance for Documented Safety Analysis* (DOE 2004). Stating that it is impossible for PW to fully evaluate the SAMA conclusions of the Applicant, "[w]ithout knowing what parameters were chosen by the Applicant," (Emphasis added) (Order, LBP-06-23. Pg., 81, Fn., 322, citing PW Petition at 34.)

In the section of the Order entitled, *Licensing Board Ruling on Pilgrim Watch Contention,* The Board says (at 101) that,

> Those sensitivity analyses, however, were performed only with respect to a few parameters...Finally, Applicant's assertion brings into play questions of how and to what extent the input used in various computations drive the results, in the context of a fairly complex analysis. These are factual matters inappropriate for determination in the contention admissibility stage of the proceeding. (Emphasis added)

Further, the Board in the *Memorandum and Order (Ruling on Motion to Dismiss Petitioners Contention 3 regarding Severe Accident Mitigation Alternative*), October 30, 2007 admitted that,

Entergy's motion rests upon the argument that it has "performed a series of sensitivity studies to evaluate the effects of changes in the input parameters challenged by Pilgrim Watch on the results of the SAMA analysis," which demonstrates that the effect of the changes to the input parameters are "negligible and immaterial to the results of the SAMA analysis." (Order, Pg., 3) (Emphasis added)

Pilgrim Watch filed an Answer to the Staff Response in which Pilgrim Watch raises four fundamental issues it sees in the Staff Response: (1) The Staff does not define what are 'the parameters, consequences and duration of a severe accident' (Order, Pg., 4) (Emphasis added)

[t]he computations performed by MACCS2 and the results obtained depend, nearly entirely, upon the input parameters and information provided by the code user." (Order, fn 19, p. 17) (Order, Pg., 41-2) (Emphasis added)

However, they (Pilgrim Watch) did state in their Petition that, '[w]ithout knowing what parameters were chosen by the Applicant, it is not possible to fully evaluate the correctness of the [SAMA analysis] (Order, Pg., 41-2) (Emphasis added)

An affidavit of Bruce Egan (an asserted expert in meteorological modeling) who asserts that the MACCS2 Code has inherent flaws in that it (a) fails to use boundary layer parameterization (Order, Pg., 18) (Emphasis added)

According to Dr. Egan, '[d]ispersion models rely upon the adequacy of the input meteorological data to represent the important air flow regimes,' and 'very significant improvements have been made in the parameterization of the atmospheric boundary layer wind profiles, temperature profiles and variations of turbulent mixing rates with the height above the ground surface,' resulting in 'the development of improved models including those defined as guideline models AERMOD and CALPUFF,' which are now routinely used for regulatory applications and for risk assessments.' (Order, Pg., 30) (Emphasis added)

**NRC Staff**

NRC Staff's filings show that they, too, were sufficiently put on notice by Pilgrim Watch's contention that averaging issues were on the table "to defend against or oppose.'" For example:

The Staff in their *Staff Response to Pilgrim Watch's Petition* (at 27-28) dismissed Pilgrim Watch's concerns regarding Entergy's use of "an outdated version of the MACCS2 code" as "mere speculation" referring to Petitioner's statement that Entergy "minimized consequences by using incorrect input parameters.'" (Emphasis added)

The *NRC Staff Answer to Pilgrim Watch's Petition for Interlocutory Review of LBP-07-13* (November 21, 2007), Pg., 13, acknowledges that, "Pilgrim Watch stated in its Reply to Entergy Answer to Request for Hearing and Petition to Intervene by Pilgrim Watch that Contention 3 'focuses mainly on the input parameters raised in the accident modeling software.'"(Emphasis added)

Further, the Staff's filings in response to Entergy's Motion for Summary Disposition of Pilgrim Watch's Contention 3 are clear that they knew averaging was at issue. For example, in the Affidavit of Joseph A. Jones and Dr. Nathan Bixler Concerning Entergy's Motion for Summary Disposition of Pilgrim Watch Contention 3, June 25, 2007 prepared for NRC Staff response to Entergy's Motion for Summary Disposition of Pilgrim Watch Contention 3 (June 29, 2007), Dr. Bixler, the Staff's expert, says (item 10) that,

> The sea breeze occurrences are typically diurnal events, occurring during daylight hours and during warmer seasons. Thus they occur a small percentage of the total

weather time assessed. The effects are averaged out in the MACCS2 analysis for the small period assessed. (Emphasis added)

**Entergy**

Entergy's filings in response to Pilgrim Watch's Motion to Intervene also clearly show that were sufficiently put on notice by Pilgrim Watch's contention that averaging issues were on the table "to defend against or oppose." Entergy's Motion for Summary Disposition, June 29, 2007, and accompanying expert declarations made this plain. For example:

- Material Fact 2 said that, "The SAMA cost-benefit evaluation looks at whether a SAMA is potentially cost effective by measuring the mean of the total costs avoided versus the cost of implementing the SAMA." O'Kula Decl. at ¶ 45; WSMS Report at 39.
- Declaration of Kevin R. O'Kula, May 16, 2007, at 9, said: "The mean values of the consequence distributions for each postulated release category are used in the analyses and the mean population dose and the mean offsite economic costs are multiplied by the frequency of occurrence for the postulated release condition to determine mean PDR and OECR values for each release condition. The risk estimates for postulated release conditions are summed to determine overall PDR and OECR estimates. WSMWS report at 5 and Table 1 at 9."
- Declaration of Kevin R. O'Kula, May 16, 2007, at 45, said: "The baseline risk is the sum of the mean PDER's and the mean OECR's for the 19 different release categories evaluated in the PNPS SAMA analysis (as well as other costs included in the SAMA analysis referenced in footnote 5 above). The baseline case, or the mean, is used to

determine whether a SAMA is potentially cost effective. The baseline or mean value is used in making this determination in order to ensure that the costs and benefits are appropriately balanced and not biased in one direction or another in determining whether a particular mitigating action is cost-effective."

Further evidence that Entergy understood that "averaging issues" were on the table is found in Entergy's Statement of Material Facts, May 17, 2007. For example:

- 29. MACCS2 models evacuation from the EPZ employing two parameters-evacuation delay time and evacuation speed. (Emphasis added)
- 44. Any uncertainty in the evacuation delay time and the evacuation speed input parameters for EPZ evacuation is therefore inconsequential. Changes to these input parameters will have no impact on the results of the PNPS analysis. (Emphasis added)
- 50. PNPS performed a sensitivity case that modified the input parameters for the value of non-farm property to include data that specifically account for county and metropolitan area gross domestic product, which directly accounts for tourism, business activity and wages. (Emphasis added)

**Pilgrim Watch**

In addition to its Motion to Intervene, *Pilgrim Watch's Answer Opposing Entergy's Motion for Summary Disposition of Pilgrim Watch Contention 3* (June 29, 2007), Pilgrim Watch disputed one material fact after another saying that "The applicant used incorrect input parameters including meteorological, emergency response, and economic data, into a software

model of limited scope." (Examples include responses to Material Facts 30, 39, 40, 41, 42, 43, 44, 52-58)

Declarations provided in Pilgrim Watch's Answer repeatedly referenced the averaging issue. For example:

Dr. Egan's Declaration Commenting on items in the Declaration of Kevin O'Kula (PW's Answer, page 134, Egan number 13)

> Item 7: The claim that MACCS2 is a state-of-the-art computer model is not correct. MACCS2 does not rely upon or utilize the most current understandings of boundary layer meteorological parameterizations such as those adopted by the current US EPA in the models.
>
> Item 9. Similar improvements to the model parameterizations have not been required for models used by the NRC for applications to the permitting of nuclear power plants. AERMOD OR CALPUFF (EPA, 2005)

Declaration of David I. Chanin In Support Of Pilgrim Watch's Response Opposing Entergy's Motion For Summary Disposition Of Pilgrim Watch Contention (PW Answer, Pg., 208):

> The economic cost model in MACCS2 was included (at request of sponsors) only for historical reasons to allow comparison of its cost estimates to those of previous studies. It is my firm belief that the MACCS2 cost model is so seriously flawed that even with reevaluation and modification of all its input parameters, its cost results should not be used unless for replicating prior studies." (Emphasis added)

Declaration of Dr. Jan Beyea:

> Reliance on output from the MACCS2 computer code or the wedge model to estimate consequence from releases of Cesium-137 in this report does not necessarily imply endorsement of the use of these methodologies in other contexts, nor endorsement of the parameter sets that the applicants or others may use with them. All models have strengths and weaknesses that must not be forgotten by modelers. MACCS2 does not appear to have undergone extensive field validation (Young and Chanin 1997)

## II. The Principles of 10 C.F.R § 2. 309 are Irrelevant

Sec. 309 applies only to whether an entirely new contention is required. It is irrelevant here, because the issue was included in the original Contention 3 Motion to Intervene. It is absolutely clear that an original contention can be fleshed out after filing without bringing Sec. 309 into play. US Nuclear Regulatory Commission Staff Practice and Procedure Digest - Commission, Appeal Board, and Licensing Board Decisions, July 1972 – August 2009, Prehearing Matters 96, January 2010) says that,

> Thus if in preparing for an evidentiary hearing on a contention, an intervenor becomes aware of information that it may wish to present as evidence in the hearing, such information would – even if not specifically stated in the original contention and bases- be relevant if it falls within the "envelope," "reach," or "focus" of the contention when read with the original bases offered it. If it falls outside such ambit, then an amended contention would be necessary in order for the new information to be considered relevant and admissible." (Citations omitted) (US Nuclear Regulatory Commission Staff Practice and Procedure Digest -Commission, Appeal Board, and

Licensing Board Decisions, July 1972 – August 2009, Prehearing Matters 96, January 2010)

The averaging issue falls "within the 'envelope,' 'reach,' or 'focus' of the contention when read with the original bases offered it." The Board knew it, the NRC Staff knew it, and Entergy knew it.

In preparing for the evidentiary hearing on the contention, Pilgrim Watch has become aware of information that it wishes to present as evidence in the hearing. "Even if not specifically stated in the original contention" – such information is relevant to demonstrating that Entergy's SAMA analysis significantly minimized consequences so that mitigation to reduce risk did not appear cost effective.

## III. Another Attempt to Narrow Relicensing Challenges and Avoid Answering Hard Questions.

The unfortunate fact is that this proceeding appears to have become yet another example of the NRC's continuing efforts to limit the scope of relicensing hearings so that the real risks to the public will not have to be considered.

Now the Board suggests in its September 23, 2010 Order that the Board was wrong four years ago when it recognized that original Contention 3 included the "averaging concern issues;" and the further reliance on Sec. 309, is yet another attempt by at least a majority of the Board to improperly narrow Contention 3 and insure that the NRC will continue being able to avoid addressing critically important question of whether the NRC's "practice of using mean

consequences in SAMA analysis, resulting in an averaging of potential concerns" (Order, p. 2) effectively insures that essentially no SAMA will ever be required.

Further, even if a majority of the Board were to decide that "averaging practice concerns" are within the scope of the remand and must be addressed, the September 23, 2010 Order ignores that the Commission was clear that these concerns applied to "predicted total population dose and the predicted off-site economic costs"- not simply "meteorological modeling issues." CLI-10-11, 38-39, says that,

> It is NRC practice to utilize ... the mean estimated value for the predicted total population dose and the predicted off-site economic costs. These mean consequence values are multiplied by the estimated frequency of occurrence of specific accident scenarios to determine population dose risk and offsite economic cost risk for each type of accident sequence studied.

They are not, as said in the ASLB September 23 Order, limited to the "reasonableness of this NRC practice as it affected solely conclusions on the meteorological modeling issues."

We remind the Board and parties of what the last sentence of the Commission Order, CLI-10-11 (March 26, 2010) said.

> As a policy matter, license renewal applicants are not required to base their SAMA analysis upon consequence values of the 95$^{th}$ percentile consequence level (the level used for the GEIS severe accident environmental impacts analysis). Unless it looks genuinely plausible that inclusion of an additional factor or use of other assumptions or models may change the cost-benefit conclusions for the SAMA candidates

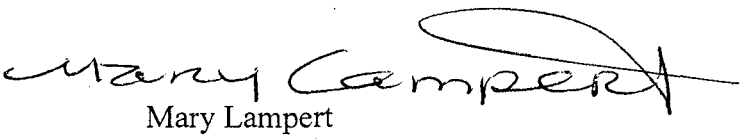
evaluated, no purpose would be served to further refine the SAMA analysis, whose goal is to determine what safety enhancements are cost-effective to implement.

Pilgrim Watch contends that inclusion of "averaging issues" - alternative statistical treatment of the data in Pilgrim's SAMA analysis - would serve a definite purpose as it may significantly change the cost-benefit conclusions and affect what safety enhancements are cost-effective to implement. The Applicant's use of the "mean" only assures that their averaging of the data results in dilution as the solution to saving Entergy monies.

## IV. Conclusion

NRC's Practice and Procedures Digest (Prehearing Matters, pg., 101) made clear that, "Pro se intervenors are not held in NRC proceedings to a high degree of technical compliance with legal requirements and, accordingly, as long as parties are sufficiently put on notice as to what has to be defended against or opposed specificity requirements will generally be considered satisfied." Pilgrim Watch contends that "parties (were) sufficiently put on notice (and demonstrated that they had been put on notice) as to what (had) to be defended against."

Respectfully submitted,



Mary Lampert

Pilgrim Watch, pro se

148 Washington Street

Duxbury, MA 02332

**UNITED STATES OF AMERICA**

**NUCLEAR REGULATORY COMMISSION**

**BEFORE THE ATOMIC SAFETY AND LICENSING BOARD**

In the Matter of — Docket # 50-293-LR

Entergy Corporation

Pilgrim Nuclear Power Station

License Renewal Application — October 1, 2010

## CERTIFICATE OF SERVICE

I hereby certify that Pilgrim Watch's Brief Petitioner Timely Raised Issue NRC's Practice Use Mean Consequence Values in SAMA Analyses was served October 1, 2010 in the above captioned proceeding to the following persons by electronic mail this date, followed by deposit of paper copies in the U.S. mail, first class.

Secretary of the Commission
Attn: Rulemakings and Adjudications Staff
Mail Stop 0-16 C1
United States Nuclear Regulatory Commission [2 copies]

Administrative Judge
Ann Marshall Young, Chair
Atomic Safety and Licensing Board
Mail Stop – T-3 F23
US NRC
Washington, DC 20555-0001

Administrative Judge
Paul B. Abramson
Atomic Safety and Licensing Board
Mail Stop T-3 F23
US NRC
Washington, DC 20555-0001

Administrative Judge
Richard F. Cole
Atomic Safety and Licensing Board
Mail Stop –T-3-F23
US NRC
Washington, DC 20555-0001

Office of Commission Appellate Adjudication
Mail Stop 0-16 C1
United States Nuclear Regulatory Commission
Washington, DC 20555-0001

Atomic Safety and Licensing Board
Mail Stop T-3 F23
United States Nuclear Regulatory Commission
Washington, DC 20555-0001

U.S. Nuclear Regulatory Commission
Office of Commission Appellate Adjudication
Mail Stop: 0-16C1
Washington, DC 20555-0001

U.S. Nuclear Regulatory Commission
Office of General Counsel
Mail Stop: 0-15 D21
Washington DC 20555-0001
Susan L. Uttal, Esq.
Marcia Simon, Esq.
Andrea Jones, Esq.
Brian Harris, Esq.
Michael Dreher, Esq.
Brian Newell, Paralegal

U.S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Mail Stop: 011-F1
Washington, DC 20555-0001

Lisa Regner, Project Mgr. Plant Lic.
Branch 1-1, Operator Reactor Licensing
Washington, DC 20555-0001

Paul A. Gaukler, Esq.
David R. Lewis, Esq.
Jason B. Parker, Esq.
Pillsbury, Winthrop, Shaw,
Pittman, LLP - 2300 N Street, N.W.
Washington, DC 20037-1128

Katherine Tucker
ASLB, Law Clerk
U.S. Nuclear Regulatory Commission
Mail Stop T-3-E2a
Washington, DC 20555-0001

Martha Coakley, Attorney General
Matthew Brock, Assistant Attorney General Commonwealth of Massachusetts
Office of Attorney General
One Ashburton Place
Boston, MA 02108

Mark Stankiewicz
Town Manager, Town of Plymouth
11 Lincoln Street
Plymouth MA 02360

Sheila Slocum Hollis, Esq.
Town of Plymouth MA
Duane Morris, LLP
505 9th Street, N.W. 1000
Washington D.C. 20004-2166

Richard R. MacDonald
Town Manager, Town of Duxbury
878 Tremont Street
Duxbury, MA 02332

Fire Chief & Director DEMA,
Town of Duxbury
688 Tremont Street
P.O. Box 2824
Duxbury, MA 02331

Terence A. Burke, Esq.
Entergy Nuclear
Mail Stop M-ECH-62
Jackson, MS 39213

Mary Lampert
Pilgrim Watch, pro se
148 Washington St.
Duxbury, MA 023332
October 1, 2010