From: <william.maher@exeloncorp.com>
To: <MTM2@nrc.gov>, <lagory@anl.gov>
Date: 3/15/06 3:00PM
Subject: SAMA Clarification Response

Attached you will find the above listed document.

If you should have any questions, please feel free to contact me at any time.

Bill

Attached you will find the above listed document. If you should have any questions, please feel free to contact me at any time. Bill

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Creation Date: 3/15/06 2:59PM
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Created By: william.maher@exeloncorp.com

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U.S. Nuclear Regulatory Commission
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Washington, DC 20555

Oyster Creek Generating Station
Facility Operating License No. DPR-16
NRC Docket No. 50219

Subject: Clarifications to Responses to NRC Request for Additional Information related to Severe Accident Management Alternatives (SAMA) for Oyster Creek Generating Station (TAC No. MC7625)

Reference: Letter, AmerGen Energy Company, LLC, (P. B. Cowan) to U.S. Nuclear Regulatory Commission (M. T. Masnik), dated January 9, 2006, "Response to NRC Request for Additional Information (RAI) Related to Severe Accident Mitigation Alternatives (SAMA) for Oyster Creek Nuclear Generating Station (TAC No. MC7625)"

Enclosed are clarifications to the responses provided to the NRC in the referenced letter associated with the topic of Severe Accident Management Alternatives (SAMAs) as related to the AmerGen Energy Company, LLC, Oyster Creek Generating Station License Renewal Application.

These clarifications were requested by the NRC to aid them in understanding the nature of and details associated with the responses previously provided.

If you have any questions, please contact Bill Maher at 610-765-5939 or 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 03-15-2006

Michael P. Gallagher
Vice President, License Renewal Projects
Exelon Generation

Enclosure: Clarifications Associated with SAMA RAI Responses

cc: Regional Administrator, USNRC Region I, w/o Enclosure
USNRC Project Manager, NRR - License Renewal, Environmental, w/Enclosure
USNRC Project Manager, NRR - License Renewal, Safety, w/o Enclosure
USNRC Project Manager, NRR - Project Manager, OCGS, w/o Enclosure
USNRC Senior Resident Inspector, OCGS, w/o Enclosure
Bureau of Nuclear Engineering, New Jersey Department of Environmental Protection
Karen Tuccillo, NJ BNE (w/Enclosure)
File No. 05040

Enclosure

Clarifications Associated with SAMA RAI Responses

Reference to original RAI Response: RAI 1c

The response to this RAI indicates that the results of the 2004A PRA model were "re-reviewed to establish the number of gaps that remained following the update" and "the self-assessment performed for the 2004A model and documentation also applies to 2004B".

Based on discussions with Staff, the following clarifications are needed:

Was the 2004A analysis subjected to a complete self assessment or was the focus of the re-review limited to those gaps found in the 2001 PRA? Of concern is the completeness/applicability self-assessment of the 2001 PRA relative to the 2004A model considering the extensive changes from the 2001 model to the 2004 model not the least of which is the change from support state (RISKMAN) modeling to linked fault tree (CAFTA) modeling.

Clarification to AmerGen Response

The Oyster Creek 2004A model, documentation, and results were subjected to a complete self assessment to ensure that they reflected the insights from the RISKMAN model and the model changes made during the 2004A model preparation.

Discussion

AmerGen performed the analysis of the "gaps" of the 2001 Level 1 PRA and the 2003 Level 2 / LERF PRA relative to the ASME PRA Standard [1] and the RG 1.200 [2] changes by direct comparison between the Standards and the PRA. The NEI self-assessment process was used as a second check, but was not a primary input. It was used to ensure that no deficiencies that had previously been pointed out continued to persist. The assessment was performed on the model and documentation compared with the two documents, Ref. [1] and [2].

The 2004A model was targeted to comply with the ASME PRA Standard. The areas of compliance in the 2001 PRA model were retained and updated using a consistent methodology to meet Ref. [1] and [2].

Following development of the 2004A model, it was then completely re-assessed using the Ref. [1] and [2].

Figure 1c-1 summarizes this process.

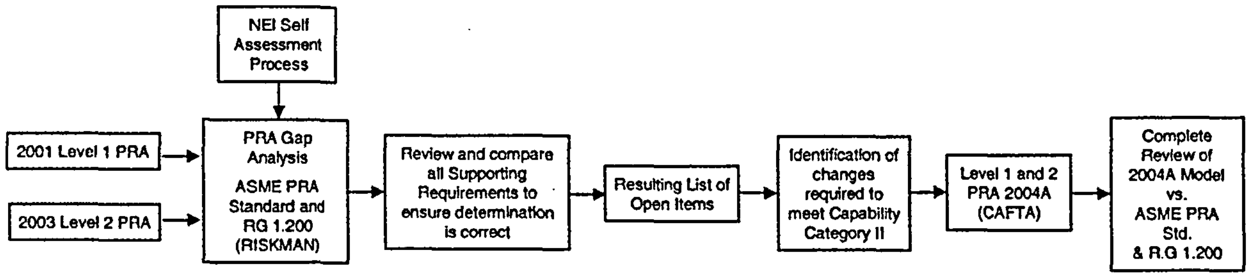

Figure 1c-1 Review Process for Oyster Creek PRA Model

Reference to original RAI Response: RAI 1e

It is implied in the response to this RAI that the self-assessment discussed in the response to RAI 1c included reviewing the Level 2 PRA. The Self-assessment, however, as described, started with the 2001 PRA and this PRA did not include the complete Level 2 model.

Based on discussions with Staff, the following clarifications are needed:

Please describe in more detail the review of the current Level 2 model.

Clarification to AmerGen Response

Response 1e to the RAIs provides information regarding the Level 2 model development and review. The Level 2 was significantly upgraded in 2003 to a model (still in RISKMAN) that is similar to that currently used in the 2004A and B models. As such, the 2003 model that was subjected to the "gap" analysis in 2004 was a close approximation to many of the features adopted for the 2004A and B models.

The review process for the 2004A and B Level 2 models consisted of the following steps:

- The IPE model was assessed to determine its applicability and it was significantly upgraded to a 2003 LERF model that was used as input to the 2004 Self-Assessment.

- The completed 2003 LERF PRA model was reviewed relative to the ASME PRA Standard [1] and RG 1.200 [2].

- The results of the self-assessment were then used to create work packages to upgrade the 2003 model.

- After these work packages were implemented and the scope of the model expanded to treat the spectrum of radionuclide releases, the result was the 2004A PRA model.

- The 2004A model was then completely reassessed relative to the ASME PRA Standard and RG 1.200 to determine if there were any open items that did not meet Capability Category II. The Standard only addresses the LERF portion of the model.

Reference to original RAI Response: RAI 2C

1. *The results of the Fire PRA (FPRA) Reassessment gives a CDF for the two dominant fire areas in the IPEEE of 3.5E-06/yr vs. the IPEEE value of 1.37E-05/yr.*

Based on discussions with Staff, the following clarifications are needed:

The evaluation of SAMA 125 gives a CDF for these two areas of 2.11E-05/yr. Please explain the very large reduction from the SAMA 125 evaluation.

Clarification to AmerGen Response

Preliminary Fire PRA results were available to support the SAMA evaluations for the initial SAMA App. F submittal. The higher CDF reported in App. F for fires was based on the following:

(a) New failure mode in 480VAC switchgear Rooms (p. F-206 of the ER)
(b) Use of the 2004 model with increased CDF[1]
(c) OB-FZ-8C CDF increased by factor of 4.

Currently, the Fire PRA reassessment model available for Oyster Creek provides lower calculated CDF values related to fire risk. The SAMA assessment focused on two dominant fire areas, the cable spreading room (OB-FZ-4) and the "A" 480 VAC Switchgear Room (OB-FZ-6A). The large reduction in fire induced CDF is principally related to the reassessment of fire area OB-FZ-4. As discussed in the previous RAI response, the values for fire area OB-FZ-6A did not change significantly. Therefore, the impact on SAMA 125 is judged to be small. However, as discussed in the previous RAI, values for fire area OB-FZ-4 changed significantly due to "more detailed treatment of the fixed fire ignition sources in the room and incorporation of alternate mitigation measures from the remote shutdown panel."

(1) Input to Fire model changed from the IPE to the current 2004A model:

	CDF (Per Yr)
IPE Model	3.69E-06
2004B Model	1.05E-05

Factor of 2.8 increase in CDF.

Based on discussions with Staff, the following clarifications are needed:

2. *Please provide a summary description of the FPRA Reassessment including: overall methodology, scope, reviews and status.*

Clarification to AmerGen Response

The recently completed FPRA for Oyster Creek was a comprehensive effort that replaced the Fire IPEEE prepared in response to Generic Letter 88-20, Supplement 4. The FPRA applied accepted industry methods as documented in the EPRI Fire PRA Implementation Guide, as modified by NRC Generic RAIs and responses. The analysis incorporated updated generic fire frequency values based on EPRI TR-1013111, and applied fire induced spurious actuation conditional probabilities consistent with those now documented in NUREG/CR 6850 / EPRI TR-1011989. The scope of the FPRA included the entire physical plant and included the complete reassessment of all plant fire areas using current plant design data. While the completed analysis has received extensive internal review by Exelon, AmerGen, and ERIN, an external peer review has not been performed. Documentation of the Fire PRA Reassessment is to be finalized and the model rolled out. It is also noted that the ANS Standard for a Fire PRA is still under development. The principal investigator of the Oyster Creek Fire PRA is a member of the ANS writing group for the Fire PRA Standard.

Based on discussions with Staff, the following clarifications are needed:

3. *The results of the FPRA indicate a significant reduction in fire risk below that utilized in the evaluations for SAMA 125. Please discuss the impact of the revised Fire risk on the SAMA 125 evaluations.*

Clarification to AmerGen Response

See discussion under 2C.1 for further clarification.

SAMA 125 evaluations are not judged significantly impacted by the newest Fire PRA modeling. The input to the decision makers remains that SAMA 125A is cost beneficial, as is SAMA 125B. SAMA 125C is cost beneficial if neither SAMA 125A nor 125B is adopted.

SAMA 125A, the portable DC Battery Charger, is cost-beneficial independent of fire sequences and would still provide notable benefit for fire response.

In addition, SAMA 125B, addition of a circuit breaker related to fire area OB-FZ-6A, is not significantly changed since the risk of that area remained approximately the same. Specifically, the previous RAI response notes: "*The "A" 480VAC Switchgear Room fire induced risk is similar to that identified in the IPEEE RAI response and remains a risk contributor at ~3.07E-06/yr. SAMA 125B reduces this risk contribution.*"

SAMA 125C, cable rerouting for dominant fire areas, was considered an option if other improvements were not viable. Since fire area OB-FZ-6A did not change significantly in the newest Fire PRA model, this option would have similar benefits for this area. The significant reduction in calculated risk for fire area OB-FZ-4 would tend to reduce the benefits of SAMA 125C however, because fire area OB-FZ-6A still has similar risk estimates in the Fire PRA Reassessment compared with the IPEEE values, the conclusions of the sensitivity provided in the previous RAI for SAMA 125C is still judged applicable. The specific conclusion important to decision makers is that if SAMA 125B is not implemented for fire area OB-FZ-6A, then SAMA 125C should be considered in place of SAMA 125B.

Based on discussions with Staff, the following clarifications are needed:

4. *Footnote 2 to Table 2-2 discusses Cable fire scenario U and indicates that review of existing mitigating measures reduces the CDF. Please clarify what these measures are.*

Clarification to AmerGen Response

The specific mitigation measures consist of operator actions credited in the deterministic post fire safe shutdown analysis that are incorporated into the plant procedures. The specific actions involve the following: (1) the first action is cross-tying Unit Substation 1A3 and 1B3 by 'racking-in' and closing an existing circuit breaker; (2) the other mitigation action involves the tripping of the recirculation pump motors locally at the switchgear.

In both cases, the mitigation action does not occur in, or involve passage through, the fire affected area.

Based on discussions with Staff, the following clarifications are needed:

5. *Fire Area OB-FZ-4, which was the dominant contributor in the IPEEE, is now the seventh ranked contributor to fire CDF. Please discuss potential for SAMAs for this zone as is done for the other top ranked fire zones.*

Clarification to AmerGen Response

Fire Area OB-FZ-4 is the Cable Spreading Room. The calculated fire related CDF for this area is the result of a postulated fire that is not adequately suppressed by the installed automatic suppression systems. The sequence results in a need to abandon the Main Control Room due to loss of critical control functionality and mitigation of the event from the Remote Shutdown Panel. The cable spreading room has been examined to determine if additional SAMAs could be cost beneficial. The further reduction of this risk estimate could be realized by implementing measures to address any one or all of the three traditional levels of defense in depth.

Likelihood of Fires – further reduction in the likelihood of fire in this area would require the removal the cables that are in and of themselves the targets whose fire induced failure results in the undesired consequences. Because of the substantial volume involved and the fact that any re-routing would effectively relocate the 'threat' to another plant location, further reductions in risk through this echelon of defense in depth is not deemed to be possible without a corresponding substantial cost.

Suppression of Fires – the area is already provided with smoke detectors and automatic fire suppression. The specific numerical treatment of this area did not credit manual suppression because of the congestion in the area and the limited time that may be available between the onset of fire and damage to adjacent targets. However, the installation of an incipient fire detection system may provide sufficient 'advance' notification of conditions that fire brigade response could be effective. The installation of such a system would require the installation of multiple sampling lines in the room and the installation of the incipient detector itself outside the area. The specific cost of such an installation was not formally developed, but based on the congestion of the area and the number of sample points likely to be desired, an order of magnitude cost estimate of $150,000 provided. The availability of such a system would provide an opportunity for fire brigade response before any actual flames occur. However, the ability of the brigade to locate and prevent the fire from occurring is questionable because of the congestion of the area. For the purposes of the SAMA treatment, a manual suppression failure probability of 0.10 is assigned. The application of this factor would translate to a CDF reduction of about 3.5E-07/yr., which has previously been determined to result in a cost-risk averted on the order of $50,000. Therefore, this SAMA is not cost beneficial.

Safe Shutdown Capability – the fire scenario involves the mitigation of the event from the remote shutdown panel. Further enhancement of this capability would require substantial plant modifications to provide additional functionality at the Remote Shutdown Panel and/or to add additional plant equipment such as a dedicated and protected safe shutdown train of equipment. Either option would involve substantial cost.

Reference to original RAI Response: RAI 4e

Based on the response, the reason for the larger reduction in CDF indicated for SAMA 125A than for SAMA 109 is that the SAMA has a much more significant impact on the fire CDF than on the internal events CDF. If the impact of the SAMA on internal events CDF is a 15.6% reduction, the reduction in the fire CDF must be approximately 72% to give the final SAMA 125A result.

SAMA 125A CDF = Internal events contribution + Fire events contribution

= (1- 0.156) 1.05E-05 + (1 - 0.725) * 2.11E-05*
= 0.886E-05 + 0.580E-5 = 1.47E-05

The latter number is equal to the SAMA frequency given on page F-206. This result is contrary to the general argument that the fire risk is only partially influenced by internal events SAMAs.

Based on discussions with Staff, the following clarifications are needed:

As it turns out, SAMA 109 is cost beneficial based on the assumption that the fire risk is impacted to the same degree as the internal event risk is impacted. If it had not been true then the SAMA 125A result might have changed this conclusion. Are there any other SAMAs where the impact on fire risk could be more significant than on the internal events risk and therefore change the cost benefit result? Please discuss:

Clarification to AmerGen Response

The SAMA 109 was identified as potentially important for both fire and internal events. Hence, an explicit calculation was performed in the SAMA submittal to assess the fire impact. This provided insights into the cost benefit and rebaselined the model for use in assessing SAMA 125B.

Other SAMAs were evaluated qualitatively to assess their potential impact when fire induced risk is considered. The factor of two change in risk measures is considered conservative, and covers all of the other SAMAs for their potential risk impact due to fire scenarios.

The reason SAMA 109 was singled out for consideration in the fire assessment was pointed out in the main report as well as in the previous RAI submittal. After reviewing the fire sequences, it was apparent that the dominant fire sequences were SBO-like in nature. Because the dominant fires resemble SBO scenarios, other internal events related SAMAs are not applicable or are less beneficial than SAMA 109. SAMA 109 was designed specifically to deal with SBO sequences at Oyster Creek. For example, consider SAMA 7, the first unscreened SAMA shown in Table F-16. This addresses alignment of service water for RPV injection. However, in the fire scenarios, if the pumps have no power to operate (as in an SBO scenario), they can provide no measurable benefit. Therefore, it was not further assessed beyond inclusion of the factor of two (2) in the benefit assessment. Because SAMA 109 has a greater influence on the dominant fire scenarios, it was explicitly evaluated. This process suggests that the PRA Team correctly identified the internal SAMA, i.e., SAMA 109, that is the most applicable to fire sequences.

Reference to original RAI Response: RAI 4f

The analysis of Net Value in Table 4F-1 makes use of averted cost calculated on two different bases. For SAMA 109 it is based on the internal events analysis and a factor of 2 to account for external events; for SAMAs 125B and 125C it is based on the preliminary fire risk results. Also, rather than providing the net values for implementing the SAMAs individually, the net value provided for SAMA 125B reflects the combined benefit of SAMAs 125A and 125B, and the net value provided for SAMA 125C reflects the combined benefit of SAMAs 125A, 125B, and 125C.

Based on discussions with Staff, the following clarifications are needed:

The results provided do not appear to be the most appropriate estimates to use. Please discuss.

Clarification to AmerGen Response

The values provided in Table 4F-1 were derived to respond to the NRC RAI using the models and results documented in the original submittal. They are judged to be conservative evaluations of the net value of each SAMA assessed individually as requested. However, because no fully integrated model of the fire PRA and internal events PRA is available, judgement was used to assess their impacts by using conservative estimates based on the available models.

The results of the conservative assessment of each SAMA in the RAI response indicate that individually these SAMAs can be considered cost beneficial. Other variations in the application of different models and model assumptions are not expected to alter this conclusion except to vary the magnitude of the net value.

Because the sensitivity assessment involves considering the benefit of each SAMA implemented alone it is judged conservative to "back-out" the benefit of each SAMA which was assumed previously implemented. In the main report, it was assumed that the lowest cost SAMA related to fire mitigation would be implemented prior to the more costly SAMA. Thus, in the main report, SAMA 125B was evaluated for cost-benefit assuming SAMA 125A was implemented first.

For the sensitivity of SAMA 125B alone, requested by the NRC, and reported in Table 4F-1, SAMA 125A was assumed not implemented. Because these SAMAs address similar fire sequences, it was assumed for a conservative assessment to add the benefit of SAMA 125A to the sensitivity of SAMA 125B. If SAMA 125A does not exist, the sequences it mitigates may be mitigated by SAMA 125B. Thus, adding the benefit of SAMA 125A to the case of SAMA 125B individual implementation provides a conservative estimate of its benefit.

Alternatively, the SAMA 125B net value can be derived using a separate approach in order to assess this degree of conservatism. SAMA 125B involves the installation of an additional circuit breaker in order to reduce a failure mode that applies to fire sequences related to the "A" 480 VAC switchgear room. Because SAMA 125B involves fire risk solely, its net value can be reconsidered using the updated fire results. Table 2-1 from the original RAI response indicates that the CDF impact from this fire area is 3.07E-6 per year based on the Oyster Creek Fire PRA

Reassessment. Noting that the benefit from SAMA 125B is solely for the reduction of fire risk in the 480 VAC "A" switchgear room, the maximum benefit of the SAMA would be a reduction in risk equivalent to 3.07E-6 per year. An averted cost-risk estimate related to this SAMA can be inferred from the main report. Section F.6.28 of the ER (P. F-207) provides the averted cost-risk for SAMA 125B given that SAMA 125A is implemented. This consequence evaluation is considered scaleable to the evaluation of SAMA 125B alone. Section F.6.28 of the ER describes that a reduction in risk from a CDF of 1.47E-5 per year to 1.24E-5 per year (i.e., 2.3E-6/yr) is equivalent to an averted cost-risk of $333,000. Assuming similar release category contributions, the averted cost-risk equivalent to 3.07E-6 per year can be estimated. This results in a less conservative estimate of the averted cost-risk for SAMA 125B of approximately $445,000 (i.e., (3.07E-6/2.3E-6)*$333,000). Therefore, the Net Value for SAMA 125B implemented alone is as follows:

Net Value = Averted cost-risk – Cost of implementation
= $445,000 - $100,000
= $345,000

This shows that the Net Value $907,000 estimate for SAMA 125B is conservative, and a more reasonable, but still conservative, estimate of $345,000 is more appropriate.

The sensitivity case for SAMA 125C is handled similarly. However, the costs, competing risks, and potential benefits associated with the fire wrapping of cables and rerouting of the cables are uncertain and considered to make SAMA 125C undesirable.

The RAI notes, as does the previous RAI response, that the "factor of 2" derived value is used for SAMA 125A. This was done to be consistent with the values used in the main report and is consistent with previous RAI responses 2B and 2C. The use of the internal events results multiplied by a factor of two is judged reasonable for the sensitivity related to this RAI.

The values of each case are shown to be cost-beneficial and use of other boundary conditions will yield results of similar magnitude, i.e., little perceived difference to decision-makers. Also note that this case (i.e., implementation of SAMA 125B alone) applies only when the more desirable and less costly SAMA 109/125A is NOT implemented.

Reference to original RAI Response: RAI 4h

Based on the wind speed probabilities cited in RAI 4h, the probability curve would shift upward by about one to two orders of magnitude at low and high wind speeds. This would increase both the baseline risk contribution from high winds and the risk reduction from each SAMA. Since the slope of the curve is similar to that on which the SAMA evaluation was based, it was expected that this shift would increase the net value of these SAMAs by one to orders of magnitude. While, as described in the RAI response, the probability curve on which the SAMA analysis RAI response is based is higher than used in the IPEEE, it is but still lower than suggested in the staff's review of the IPEEE (by about one decade). Further, the re-analysis described in the RAI response did not change the base line risk to be more consistent with the higher frequency of low wind speeds suggested by the staff's IPEEE comments. Use of the higher frequencies indicates an 85 MPH wind speed frequency of 1 to 2 E-02/yr, implying that there may be some probability of CT or Fire Pump House failure in the severe weather category of LOOP events. The net values based on the "NRC Recommended Revised Evaluation" may therefore be underestimated.

Based on discussions with Staff, the following clarifications are needed:

Discuss the impact on the baseline risk and the risk reduction for each of these SAMAs if the curve were shifted consistent with the staff comments on the IPEEE.

Clarification to AmerGen Response

Conclusion

It is noted that the RAI 4h response from January 9, 2006 mischaracterized the sensitivity case as "NRC Recommended Revised Evaluation". This characterization should be replaced with "Sensitivity to Failure Probability of Buildings".

This newly proposed calculation indicated above is not judged to represent a realistic evaluation of the net value of the SAMAs related to building upgrades. The Baseline model adequately characterizes the risk profile due to high wind hazards. Therefore, we do not believe that there is a change needed.

For the proposed sensitivity, it is clear that:

- The baseline risk would increase significantly if the hypothetical case were performed.
- The cost averted would increase significantly if the hypothetical case were performed.

The two SAMAs would be found individually to be cost beneficial.

This is also the current input to the decision makers and is judged to remain similar given this hypothetical situation.

Considerations

Considerations in the assessment of the risk profile due to extreme weather include the following:

1. The CT and FPS buildings have margin to wind loading above the design code estimate.
2. The wind speed at the site is significantly less than 85 mph based on historical records.
3. Oyster Creek has a procedure to shut the plant down if winds greater than 85 mph are anticipated.

All of these factors are considered in the SAMA evaluation by using a wind speed and occurrence frequency adopted from the INEEL nuclear power plant LOOP frequency data which is approximately a factor of 3 below the upper bound estimate using recent historical evidence. The hypothetical calculation as requested by the NRC would need to explicitly incorporate the cited considerations into a model to ensure that the risk is accurately reflected.

Design

Key to the Oyster Creek base model evaluation is that the existing buildings have realistic wind capabilities greater than 85 mph because of the design margin considered in standard building codes.

The nuclear plant historical data of the causes of a LOOP, as recorded by INEEL, resulted in the estimate of extreme weather conditional probability. This data is judged applicable to Oyster Creek.

The occurrence of an event that causes a LOOP and building failures of the FPS building and the CT buildings is then assigned the probability for the conservative end of the extreme weather cases.

Alternatively, the use of the SER curve from the NRC is considered also appropriate if the realistic assessment of building capability is also used in place of the design minimum.

The interpretation of the Oyster Creek design and the recurrence frequency of extreme weather is as follows:

- Extreme weather with winds greater than 85 mph may occur at frequencies of 1 to 2E-2/yr. based on NRC input (however, see data from NOAA discussed below which indicates no data above 87 mph).
- The design of the buildings is evaluated as equivalent to a design of 85 mph wind loading. This is judged to represent realistic wind capability of approximately 100 mph.

Data

It is noted that a survey of peak wind speed in the Lacy Township area from 1930 to 1996 resulted in no cases of peak wind gusts greater than 87 mph.(1)

According to the National Climatic Data Center, http://ww.ncdc.noaa.gov, the largest peak gust recorded for New Jersey was 87 mph at the Atlantic City State Marina over the time period between 1930 and 1996. (There is no specific time frame associated with these numbers, therefore the reasons for these large gusts was unattainable.)

A Coastline monitoring system was installed along the New Jersey coastline by Stevens Institute of Technology. This institute has 3 sampling locations (Atlantic City, Avalon, and Long Beach Island) that contain data from 2000 through 2005. According to the data acquired, https://cmn.dl.stevens-tech.edu/, the highest verified(2) peak gust was 60.5 knots, which is approximately 70 mph.

The worst storm passing through the site location in the past decade was Hurricane Floyd. This occurred September 16, 1999. The hurricane passed directly over the monitoring station located in Avalon, New Jersey. The hurricane by this point was a Class 2 hurricane. The data shows that peak gusts were less than 50 knots, 58 mph.

This would lead to the conclusion that the probability of wind speeds greater than 87 mph is less than $\frac{0.5}{66 years} = 7.5E-3/yr$ assuming a uniform prior and a Bayesian update. This is less than the 1 to 2E-2/yr that is suggested by the NRC SER estimated points.

Additional investigation for the time period 1996 to 2005 did not identify any cases of wind speeds in the Lacy Township > 85 mph. The site meteorological data for the 3 year period examined in the SAMA assessment found the 33 foot "met" tower data to always be less than 60 mph. This would lead to an estimate of

$$\frac{0.5}{76 years} = 6.6E-3$$

(1) National Climate Data Center (NCDC), www.ncdc.noaa.gov.

(2) The raw data indicates a gust of 102 knots at Long Beach Island. Upon closer evaluation, it can be deduced that this peak gust is an anomaly due to a recording system restart. Reviewing the weather patterns off the coast of New Jersey verifies that there was no storm activity.

Oyster Creek Specific Procedure

A more sophisticated model could be developed that also appropriately characterizes risk, recognizing the pre-emptive steps for a plant shutdown given anticipated wind speeds greater than 85 mph.

Oyster Creek Procedure ABN-31 (Rev 2) Section 3.6 Step F directs that:

If forecasts indicate expected, sustained wind speeds ≥ 85 mph, **and** directed by Senior Manager, Operations,

then **COMMENCE** a plant shutdown in accordance with Procedure 203, Plant Shutdown.

This procedure protects the plant from being at-power when the extreme weather condition occurs. This procedure is judged to substantially mitigate the risk associated with extreme weather.

This procedural guidance is not explicitly included in the Oyster Creek PRA assessment of the extreme weather conditions. If the higher frequency of extreme weather specified by the NRC is used, then the conditional probability of failure to shutdown via procedure ABN-31 would also be credited. This would produce an event frequency very similar to that included in the current model. It is believed that the current model adequately addresses site historical data, plant capabilities, and procedures. The sensitivity case does not suggest the need for any revision of modeling or results.

Reference to original RAI Response: RAI 5a

As commented above for RAI 4f, the response to this RAI involves combining the results of two different determinations of benefit.

Based on discussions with Staff, the following clarifications are needed:

How does this inconsistency impact the response to this RAI?

Clarification to AmerGen Response

RAI 5a is an assessment of the combined net value of implementing SAMAs 109, 125B, 127, and 134 – the highest priority SAMAs from a net value consideration.

The approach taken for RAI 5a is judged to be consistent and straightforward and to produce a realistic assessment of the net value for the implementation of all of the SAMA items.

As discussed in the main report and previous RAI submittal, the SAMA were evaluated using the controlled, current PRA model. This model does not have fire initiating events modeled. Therefore, a separate model was used to evaluate the benefit of the SAMA that relate to fire risk. The benefit of Fire SAMA 125B is determined in the main report assuming SAMA 109 would also be implemented. Because SAMA 109 would be implemented in conjunction, as part of the group of four cost-beneficial SAMA, the additional benefit provided by SAMA 125B is correctly treated in the sensitivity. Also, note that a factor of two (2) is applied to these results to include external event impact, consistent with previous RAI responses 2B and 2C.

SAMA 109, 127, and 134 are evaluated with the internal events PRA model and using a factor of 2 change in benefit to represent the effects of external events. This may be too conservative for SAMA 134.

SAMA 125B was assessed separately as dictated by the fire model. No significant overlap is judged to result between internal events and fire events PRAs for this SAMA.

The input to the decision makers remains appropriate and these four SAMAs remain with a positive net value and can be considered cost beneficial when considered individually or as a group.

REFERENCES

[1] ASME RA-Sa-2003, Addenda to ASME RA-S-2002, Standard for Probabilistic Risk Assessment for Nuclear Power Plant Applications, December 2003.

[2] NRC Regulatory Guide, RG 1.200, An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities, February 2004.