Entergy®

Entergy Operations, Inc.
1340 Echelon Parkway
Jackson, MS 39213
Tel 601-368-5138

Ron Gaston
Director, Nuclear Licensing

10 CFR 50.90

0CAN111901

November 14, 2019

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

Subject: Response to Request for Additional Information Related to License Amendment Request to Incorporate Tornado Missile Risk Evaluator into the Licensing Basis

Arkansas Nuclear One, Units 1 and 2
NRC Docket Nos. 50-313 and 50-368
Renewed Facility Operating License Nos. DPR-51 and NPF-6

By letter dated April 29, 2019 (Reference 1), Entergy Operations, Inc. (Entergy), requested NRC approval of a proposed change to the license basis documents for Arkansas Nuclear One, Unit 1 (ANO-1) and Unit 2 (ANO-2) to use the Tornado Missile Risk Evaluator (TMRE) methodology as the licensing basis to qualify several components that have been identified as not conforming to the unit specific current licensing basis. During the course of review, the NRC determined additional information was required to complete the review process.

The NRC initially notified Entergy of the request for additional information (RAI) on September 20, 2019. The RAI was formalized in an email dated October 7, 2019 (Reference 2), with a 90-day response period beginning September 20, 2019 (i.e., response due December 19, 2019).

Entergy's RAI response is included in the attached enclosure. The responses do not impact the no significant hazards consideration provided in the original amendment request (Reference 1).

No new regulatory commitments are included in this submittal.

In accordance with 10 CFR 50.91, Entergy is notifying the State of Arkansas of Entergy's TMRE application RAI response by transmitting a copy of this letter and enclosure to the designated State Official.

A001
NRR

If there are any questions or if additional information is needed, please contact Tim Arnold at 479-858-7826.

I declare under penalty of perjury that the foregoing is true and correct.
Executed on November 14, 2019.

Respectfully,

Ron Gaston

RWG/dbb

Enclosure: Response to Request for Additional Information Related to Proposed Adoption of a Tornado Missile Risk Evaluator

Attachments to Enclosure:

1. List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129
2. Supporting Figures

References:

1. Entergy Operations, Inc. (Entergy) letter to U. S. Nuclear Regulatory Commission (NRC), *License Amendment Request to Incorporate Tornado Missile Risk Evaluator into the Licensing Basis*, Arkansas Nuclear One, Units 1 and 2 (0CAN041904) (ML19119A090), dated April 29, 2019.
2. NRC email to Entergy, *Final RAI #1 RE: License Amendment Request to Incorporate Tornado Missile Risk Evaluator (TMRE) into Licensing Basis (EPID L-2019-LLA-0093),* (0CNA101901) (ML19280A040), dated October 7, 2019.

cc: NRC Region IV Regional Administrator

NRC Senior Resident Inspector – Arkansas Nuclear One

NRC Project Manager – Arkansas Nuclear One

Designated Arkansas State Official

Enclosure to

0CAN111901

Response to Request for Additional Information Related to Proposed Adoption of a Tornado Missile Risk Evaluator

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION RELATED TO PROPOSED ADOPTION OF A TORNADO MISSILE RISK EVALUATOR

By letter dated April 29, 2019 (Reference 1), Entergy Operations, Inc. (Entergy), requested NRC approval of a proposed change to the license basis documents for Arkansas Nuclear One, Unit 1 (ANO-1) and Unit 2 (ANO-2) to use the Tornado Missile Risk Evaluator (TMRE) methodology as the licensing basis to qualify several components that have been identified as not conforming to the unit specific current licensing basis. During the course of review, the NRC determined additional information was required to complete the review process.

The NRC initially notified Entergy of the request for additional information (RAI) on September 20, 2019. The RAI was formalized in email dated October 7, 2019 (Reference 2), with a 90-day response period beginning September 20, 2019 (i.e., response due December 19, 2019).

Each question associated with the subject RAI is repeated below followed immediately by Entergy's response to the specific question.

PRA RAI 01 – ANO-1 Internal Events PRA Model Full-Scope Peer Review

Regulatory Guide (RG) 1.200, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment [PRA] Results for Risk Informed Activities," Revision 2, March 2009 (ADAMS Accession No. ML090410014) endorses American Society for Mechanical Engineers/American Nuclear Society (ASME/ANS) RA-Sa–2009, "Addenda to ASME/ANS RAS– 2008, Standard for Level 1 / Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications," (the PRA Standard). According to the regulatory position in Section C.2 of RG 1.200, when the staff's regulatory positions contained in Appendices A through D are taken into account, use of a peer review can be used to demonstrate that the PRA [with regard to an at-power Level 1/LERF PRA for internal events (IEs) (excluding external hazards)] is adequate to support a risk-informed application.

Section 4.1 of Attachment 1 of the licensee amendment request states that a peer review of the ANO-1 probabilistic safety assessment (PSA) model was performed in August 2009. However, Section 4.2 of Attachment 1 of the LAR states that the latest full-scope peer review for ANO-1 was conducted in July 2009 using RG 1.200, Revision 1 (ADAMS Accession No. ML070240001). Based on the information provided in the LAR, the NRC staff could not determine which revision of RG 1.200 the licensee used to perform the peer review of the ANO-1 IE probabilistic risk assessment (PRA) model.

Therefore, the NRC staff requests that the licensee:

a. Clarify which revision of RG 1.200 was used to perform the peer review of the ANO-1 IEPRA model that formed the basis for the ANO-1 TMRE PRA model.

b. If the peer review was conducted against Revision 1 of RG 1.200, provide justification, such as a gap assessment, that the differences between the currently and formerly endorsed PRA standards do not impact the technical acceptability of the ANO-1 TMRE PRA.

Entergy Response

a. The ANO-1 IE at-power PRA model used for the TMRE application was reviewed to meet the requirements of RG 1.200, Revision 2. A peer review was performed in August 2009 against the ANO-1 model using Nuclear Energy Institute (NEI) 05-04, "Process for Performing Internal Events PRA Peer Reviews Using the ASME/ANS PRA Standard," the ASME/ANS RA-Sa-2009 PRA Standard, and RG 1.200, Revision 2. This ANO-1 PRA model was used to support other risk informed license amendment request (LAR) submittals such as Technical Specification Task Force (TSTF)-425 (Reference 3) and National Fire Protection Association (NFPA)-805 (Reference 4).

b. The ANO-1 IE at-power 2009 peer review was conducted using RG 1.200, Revision 2.

PRA RAI 02 – ANO-1 Nonconforming SSCs Not Included in the TMRE Analysis

Section 2.3 of the enclosure to the LAR, identifies two nonconforming, safety-related structures, systems, and components (SSCs) for ANO-1 that were not incorporated into the TMRE PRA models. These SSCs are: (1) conduit EC1493, which includes the reactor head vent solenoid valve, and (2) small bore service water piping (HCD-65-2" and HCD-65-2") to VCH-4A and 4B pumps. The justification provided by the licensee for their exclusion was that they were evaluated as having a negligible impact on risk in the IE PRA and therefore not included in the TMRE PRA.

Part 2 of the 2009 ASME/ANS PRA Standard contains several supporting requirements (SRs) that allow screening of SSCs from the IEPRA. However, the self-assessment of SR SY-A15 for application to the TMRE PRA in Appendix D of NEI 17-02, Revision 1B, "Tornado Missile Risk Evaluator Industry Guidance Document" (ADAMS Accession No. ML18262A328), specifically states that the "... failure of SSCs due to tornado missiles shall not use the exclusions of SY-A15." The NRC staff's comments on the self-assessment for SY-A15 provides additional clarification on not using screening for the TMRE PRA. The licensee's comment for ANO-1 for SY-A15 in Table 9 in Enclosure Attachment 1 to the LAR states, "The TMRE process was followed as described," which appears to the NRC staff to be inconsistent with the screening of the two nonconforming SSCs identified above.

Therefore, the NRC staff requests that the licensee describe how the exclusion of the two nonconformances identified above is consistent with the guidance in NEI 17-02, Revision 1B. In particular, address the statement in the self-assessment for SRs for development of the TMRE PRA that states that the failure of SSCs due to tornado missiles shall not use the exclusions of SR SY-A15. Alternately, the NRC staff requests that the licensee demonstrate that the exclusion of the two nonconformances identified above does not impact this LAR.

Entergy Response

Conduit EC1493 contains cables associated with the red-train Reactor Coolant System (RCS) high point vent valves. All of these valves are normally closed. Failure of the cables in the conduit would prevent opening valves to vent the RCS. Venting of the RCS, however, is not included in the IE PRA model. Therefore, failure of the cables in EC1493 would have no impact on the IE model. The red-train RCS vents were not screened from the IE PRA model using any of the criteria in SR SY-A15. Because the high point vents are not considered in the IE PRA model, failure would not affect risk determined for the TMRE analysis.

The two small-bore Service Water pipes (HCD-65-2" and HCD-66-2") provide cooling water flow to the VCH-4A and 4B Emergency Switchgear Room Chiller units, which provide room cooling for the electrical switchgear rooms. Analyses performed for the IE PRA model determined that the room cooling provided by VCH-4A and VCH-4B was not required for PRA components to function. Therefore, failures of VCH-4A or VCH-4B were not included in the IE PRA model. VCH-4A and VCH-4B were not screened from the IE PRA model using any of the criteria in SR SY-A15 and were not included in the TRME analysis because the chiller units are not needed to fulfill any PRA-related function.

A secondary effect from failure of HCD-65-2" and HCD-66-2" could be flooding. The pipes are located in the Turbine Building. No equipment in the Turbine Building that is credited in the IE PRA model would be available after a tornado-induced loss of offsite power (LOOP) event. Additionally, the Turbine Building is designed to be sealed from the Auxiliary Building to minimize the potential for flooding to propagate from the Turbine Building to PRA-related equipment located in the Auxiliary Building Therefore, any secondary effects caused by flooding would not impact the TMRE analysis.

PRA RAI 03 – ANO Tornado Missile Walkdown Area

RG 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," Revision 3, (ADAMS Accession No. ML17317A256), Staff Regulatory Guidance Section C.2, states that the engineering analyses conducted to justify any proposed licensing basis change should be appropriate for the nature and scope of the proposed change.

Section 3.4.2 of NEI 17-02, Revision 1B, states that in the case of targets greater than 1500 feet from the plant reference point, a qualitative evaluation of the missile inventory within 2500 feet from the outlying target(s) should be done. The intent of this evaluation is to determine whether the missile inventory used for the TMRE is applicable to all the targets.

Section 3.3.3 of the enclosure to the LAR states the missile walkdown was performed in accordance with Section 3.4 of NEI 17-02 and the walkdown area was defined by a 2500 feet radius from the center point between the two reactor buildings, but does not state if all targets satisfied the criteria of NEI 17-02, Revision 1B. Based on the information provided in the LAR, it is unclear to the NRC staff if the qualitative evaluation identified in NEI 17-02 was performed and whether such an evaluation resulted in changes to the missile inventory. Therefore, the NRC staff requests that the licensee:

a. Confirm that the ANO TMRE methodology includes a qualitative evaluation of the missile inventory within 2500 feet of targets that are further than 1500 feet from the plant reference point and changes the missile inventory, if necessary.

b. If such qualitative evaluation is not included in the ANO TMRE methodology, justify that exclusion for current and future applications of the ANO TMRE.

Entergy Response

a. NEI 17-02, Revision 1B, requires a qualitative evaluation of missile inventory within 2500 feet of any target located more than 1500 feet from the plant area reference point. The SSCs that are included in the TMRE evaluations are located within the power block area and within 1500 feet of the reference point. These structures include the Turbine Buildings, Auxiliary Buildings, Intake Structures, tank areas, and the Alternate AC Diesel Generator. Figure 1 of Attachment 2 of this enclosure shows the 1500-foot radius from the plant reference point and the aforementioned structures are less than 1500 feet from the reference point. Therefore, an assessment of targets greater than 1500 feet from the plant reference point is not necessary.

b. Because the targets included in the TMRE evaluations are less than 1500 feet from the reference point, no further evaluation is included in the current TMRE analysis. The area outside the 1500-foot radius includes wooded areas and several buildings, but no SSCs that are considered in the PRA models. Should a new SSC be added outside the 1500-foot radius in the future, that SSC would be required to meet current requirements, i.e., the use of TMRE would not be allowed.

PRA RAI 04 – ANO Multiunit LOOP

Section C.6.3 of RG 1.174, Revision 3, states that the licensee's submittal should discuss measures used to ensure the PRA is acceptable for the application PRA, such as a report of a peer review augmented by a discussion of the appropriateness of the PRA model for supporting a risk assessment of the licensing basis change being considered.

Section 6 of NEI 17-02, Revision 1B, describes the TMRE PRA model to be used in the analyses. The appropriate event and fault trees, at a minimum, cause a reactor trip and loss of offsite power (LOOP). Section 6.2 of NEI 17-02, Revision 1B, states that for multi-unit sites, the tornado event should be assumed to result in a multi-unit LOOP event. Further, a generic list of TMRE-relevant SRs is provided in NEI 17-02, Revision 1B, Appendix D.

In Enclosure Attachments 1 and 2 of the LAR, the licensee discusses PRA technical adequacy for ANO Units 1 and 2, respectively. Section 4.2 in each attachment states that a systematic review of the SRs relative to the ANO-1 and ANO-2 TMRE model development was performed and documented in the "Additional ANO-1/ANO-2 TMRE Comments" column of Table 9. However, the NRC staff noted that two SRs related to multi-unit LOOP events (IE-A10 and IEB5) have no entries in either table and therefore, it is not clear to the NRC staff whether the ANO TMRE methodology is consistent with the guidance in NEI 17-02.

The NRC staff requests that the licensee confirm that the ANO TMRE methodology followed the guidance in Section 6.2 of NEI 17-02, Revision 1B, by assuming that the tornado event results in a multi-unit LOOP event. If the guidance is not followed, describe the ANO methodology with detailed justification or provide an updated TMRE analysis that incorporates multi-unit LOOP initiators.

Entergy Response

The ANO TMRE analysis followed the guidance in Section 6.2 of NEI 17-02, Revision 1B, by assuming that the tornado event results in a multi-unit LOOP event. The two entries for additional comments in the referenced Table 9 for each attachment are blank because there are no additional TMRE specific considerations or comments related to these items.

PRA RAI 05 – ANO TMRE Compliant-Case Conservatisms Sensitivity

Section C.2.5.1.2 of RG 1.174, Revision 3, states that in interpreting the results of a PRA, it is important to understand the impact of a specific assumption or choice of model on the predictions of the PRA.

Section 7.2.2 of NEI 17-02, Revision 1B, states that the licensee should review cut sets in the top 90 percent of the TMRE compliant case to identify conservatisms related to equipment failures only that could impact results and perform sensitivity studies to address SRs AS-A10, LE-C3 and SY-B7 in Appendix D.

Section 3.3.9 of the enclosure to the LAR states for the compliant-case sensitivity that compliant TMRE basic events were removed from both the compliant and degraded cases. This appears to the NRC staff to remove valid failures of exposed SSCs from both cases, whereas the intent of the sensitivity is to address conservatisms related to failure probabilities only in the compliant case. Therefore, the NRC staff requests that the licensee:

a. Provide justification that the approach for performing the compliant-case conservatism sensitivity study is appropriate to evaluate the compliant-case conservatisms consistent with the guidance in NEI 17-02, Revision 1B.

b. Alternatively, provide an updated sensitivity study that only impacts an identified conservatism in the compliant-case results.

Entergy Response

This response provides justification (a) that the approach used in the quantification is appropriate for evaluating the impact of the compliant-case conservatisms. The NEI 17-02, Revision 1B, guidance provides three examples of methodologies that can be used to evaluate the impact of the conservatism in compliant case failures. It is noted in the guidance that these are only provided as possible examples that are not intended to specify required methods.

The first two methods proposed in the NEI 17-02, Revision 1B, guidance involve altering the Exposed Equipment Failure Probability (EEFP) in the compliant case only. This is accomplished by either setting the EEFPs to false or estimating a more realistic value. As noted in the guidance, both of these methods are very conservative. Because the degraded case is unchanged, any decrease in risk from changing the compliant case will ultimately add to the change in core damage frequency (ΔCDF) and change in large early release frequency (ΔLERF) directly. Because the intent of the ΔCDF and ΔLERF calculations is to evaluate the risk impact of the non-conforming SSCs, the changes in these values in only the compliant case scenarios does not make a valid comparison to the base case, i.e., degraded case. The first two examples of evaluating the compliant case conservatism are meant to be an easy, bounding approach when the modeled conservatisms do not have a significant risk impact.

These methods are not pursued for the ANO TMRE due to the simplistic modeling of the compliant case scenarios. Many of the compliant case scenarios involve SSCs that are in compliance with the licensing-basis requirements, but are classified as vulnerable due to not meeting the NEI 17-02 tornado missile protection criteria. These scenarios are, in many cases, modeled conservatively as failing all SSCs in the affected area and without credit for intervening barriers, e.g., multiple block walls, that are not addressed specifically by NEI 17-02. Because scenarios involving barriers that are in compliance with licensing basis requirements are not the subject of this application and do not contribute to ΔCDF and ΔLERF, simplistic and conservative modeling is determined to be appropriate.

Because the first two methods are overly conservative and not applicable to the analysis, a third method is used. The third method of evaluating the compliant case conservatisms in the NEI 17-02 guidance evaluates the impact of changing the conservatisms in both the compliant and degraded cases. This is the method that was utilized in the sensitivity performed for the ANO TMRE quantification.

There are two ways the compliant case scenarios can affect the ΔCDF and ΔLERF calculation for the non-conforming SSCs. The compliant case scenario can be in a cutset with the basic event modeling a non-conformance, which results in the conservatism increasing the total risk from the non-conformance. The degraded case cutsets for each unit are reviewed to determine if any compliant case scenarios contribute significantly to the risk from the non-conformances. A summary of the conclusions from this review are presented below for each unit.

ANO-1 Review Results

CA-1 Fire Damper (386-foot elevation Room 128)

The fire damper non-conformance is modeled as two sets of EEFP values for Room 128. One set of EEFP values was calculated for the degraded case considering the total target area for all vulnerabilities and a second set of EEFP values was calculated for the compliant case by removing the target area associated with the three fire dampers. The top cutsets involving tornado missile impact to the ANO-1 controlled access (CA-1) area fire damper include failures of the #1 diesel generator (DG1): fail to start on demand, fail to load and run during first hour of operation, fail to run after first hour of operation, and test and maintenance. The first cutset including a compliant case scenario is cutset 36, which includes basic events F5-128-A and F5-76-A. The frequency of this scenario is 3.34E-08, which is only about 2% of the total CDF from the 128-A cutsets preceding it. Therefore, the compliant scenarios have a very minor impact on this non-conformance.

Demineralizer Area Conduits (354-foot elevation Room 73)

The conduits in the demineralizer area are modeled as divided into four correlation groups: 73-A, 73-B, 73-C, and 73-D. The top cutsets involving tornado missile impact to the demineralizer area conduits include battery D06 discharge at five hours (without AC charging). The first cutset including a compliant case scenario is cutset 57, which includes basic events F5-128-A and F5-73-A. The frequency of this scenario is 1.90E-08, which is only about 2% of the total CDF from the 73-A, 73-B, 73-C, and 73-D cutsets preceding it. Therefore, the compliant case scenarios have a very minor impact on this non-conformance.

Block-out FB-103-4 (368-foot elevation Room 104)

Penetrations in wall FB-103-4 include the block-out and several small penetrations at different elevations which are vulnerable from the south. The top cutset involving a tornado missile strike to the FB-103-4 is number 53, which includes TMRE basic events F5-104-EL and F5-128-A. Although this cutset includes a compliant case scenario, the total frequency of this event is 2.10E-08 Because the frequency is two orders of magnitude below the RG 1.174 acceptance criteria similar to the CA-1 fire damper and demineralizer area conduits non-conformances, it is concluded that a missile strike through the block-out FB-103-4 contributes a negligible amount of risk. Therefore, the compliant case scenario that affects the block-out FB-103-4 does not impact the overall results.

EFW Piping (404-foot elevation Room 170)

The top cutset involving a tornado missile strike to the Emergency Feedwater (EFW) steam piping in the penthouse area is number 487, which includes basic events F5-170-EFW and F5-76-A. Although this cutset includes a compliant case scenario, the total frequency of this event is 1.28E-09. Because the frequency is three orders of magnitude below the RG 1.174 acceptance criteria and an order of magnitude less than the CA-1 fire damper, demineralizer area conduits, and block-out FB-103-4 non-conformances, it is concluded that a missile strike to the EFW steam piping contributes a negligible amount of risk. Therefore, the compliant case scenario that affects the EFW piping does not impact the overall results.

<u>ANO-2 Review Results</u>

Emergency Diesel Exhaust Stacks (Above 386-foot elevation Outside Auxiliary Building West Wall)

The non-conforming Emergency Diesel Generator (EDG) exhaust is modeled as a failure of the affected EDG. The top cutsets involving tornado missile impact to the diesel exhaust include failures of the opposing EDG train: fail to run, test and maintenance, fail to run after first hour, and 4 kV breaker fail to trip. The first cutset including a compliant case scenario is cutset 239, which includes basic events F5-2076-A and F5-YARD-2K-4B-EXHAUST. The frequency of this scenario is 2.73E-09, which is only about 6% of the total CDF from the "B" EDG exhaust cutsets preceding it. Therefore, the compliant case scenarios have a very minor impact on this non-conformance.

EFW Piping (404-foot elevation Room 2155)

The top cutset involving a tornado missile strike to the EFW steam piping is number 966, which includes basic events F5-2101-A and F5-2155-EFW-3. Although this cutset includes a compliant case scenario, the total frequency of this event is 2.13E-10. Because the frequency is four orders of magnitude below the RG 1.174 acceptance criteria and two orders of magnitude less than the diesel exhaust non-conformance, it is concluded that a missile strike to the EFW steam piping contributes a negligible amount of risk. Therefore, the compliant case scenario that affects the EFW piping does not impact the overall results.

Conduit EC1373 (386-foot elevation Room 2136)

A tornado missile strike to non-conforming conduit EC1373 results in failure of the red-train EDG start air system due to loss of solenoid valve 2SV-2810-1. Therefore, the top cutsets involving this event include failure of the green-train EDG, which leads to a station blackout. The top cutsets are similar to the diesel exhaust stacks in that they are comprised of IE failures of the green-train EDG (fail to run, test and maintenance, fail to start, and 4 kV breaker fail to trip). The first cutset containing a compliant case scenario is cutset 910, having a probability of 2.44E-10, which is only about 4% of the preceding cutsets involving internal events. Therefore, the compliant case scenarios have a very minor impact on this non-conformance.

The other way the compliant case scenarios can impact the ΔCDF and ΔLERF calculation is by masking the importance of the non-conforming basic events. This is the scenario where the conservatism needs to be evaluated, since the compliant case scenarios do not significantly affect the total risk from non-conforming SSCs. This is accomplished by setting all compliant case tornado events to false. Because the compliant case scenarios do not significantly contribute to the total risk of the non-conformances, this is an easy way to evaluate if the conservatism in the compliant cases is masking risk from the non-conformances. As shown in the results of the sensitivity, the ΔCDF and ΔLERF do increase as a result of removing the compliant case scenarios. However, the ΔCDF and ΔLERF still meet the acceptance criteria of RG 1.174.

In summary, the compliant cases do not significantly impact the risk from the non-conforming SSCs because the top cutsets are comprised of IE failures and are not comprised of other tornado missile scenarios. This sensitivity is primarily evaluating whether the conservative compliant scenario modeling potentially masks the risk from the non-conformances. Therefore, the methods used in this sensitivity analysis are appropriate and provide a sufficient basis that compliant case assumptions do not have an impact on the cumulative risk for non-conforming SSCs.

PRA RAI 06 – Table Corrections

In the enclosure to the LAR on page 34 of 37, the ANO-1 TMRE Missile Distribution Sensitivity Results table provides the core damage frequency (CDF) and large early release frequency (LERF) for the degraded and compliant plants, and the difference (delta) between the two for the missile distribution sensitivity study.

In the enclosure to the LAR on page 36 of 37, the ANO-1 Single Event Cutset Sensitivity Results table provides the CDF and LERF for the degraded and compliant plants, and the delta between the two for the single event cutset sensitivity study.

The NRC staff noted that both tables indicate that the compliant plant CDF and LERF are greater than degraded plant CDF and LERF, but no explanation is provided in the LAR. Based on the NEI 17-02 guidance for modeling non-conforming SSCs in the compliant case and the basis for the risk assessment in the TMRE methodology, it is unclear to the NRC staff how the compliant case values are higher than the degraded case. Therefore, the NRC staff requests that the licensee explain the above-cited results and/or provide corrections to the tables as applicable.

Entergy Response

The values shown in the tables have been transposed between the compliant and degraded cases for each of the two tables identified. The corrected table corresponding to the table contained on Page 34 of 47 of the Reference 1 LAR is as follows:

ANO-1 TMRE Missile Distribution Sensitivity Results

	CDF (/yr)	LERF (/yr)
Degraded	1.69E-05	4.79E-06
Compliant	1.56E-05	4.52E-06
Delta	1.30E-06	2.70E-07

The corrected table corresponding to the table contained on Page 36 of 47 of the Reference 1 LAR is as follows:

ANO-1 Single Event Cutset Sensitivity Results

	CDF (/yr)	LERF (/yr)
Degraded	6.03E-06	7.74E-07
Compliant	5.43E-06	7.33E-07
Delta	6E-07	4.1E-08

Entergy requests that the NRC refer to the above tables in lieu of the corresponding tables contained on Pages 34 of 47 and 36 of 47 of the original Reference 1 LAR in completing its regulatory review.

PRA RAI 07 – ANO-1 Defense-In-Depth Considerations

One of the five key principles of risk-informed decisionmaking addresses defense-in-depth (DID) considerations. Section C.2.1.1.3, "Evaluating the Impact of the Proposed Licensing Basis Change on Defense in Depth," of RG 1.174, Revision 3, provides guidance on the consideration of DID as part of risk-informed decisionmaking for licensing basis changes.

Section 3.2 of the enclosure to the LAR states that non-conforming conduits in the ANO-1 demineralizer area if impacted by a tornado-generated missile could affect both trains of service water (SW). The same section also states that both trains of emergency feedwater (EFW) may also be impacted by a tornado-generated missile in the ANO-1 demineralizer area. The LAR further indicates that the TMRE PRA analysis demonstrates that the SW and EFW systems will remain "functional." Based on the information provided in the LAR, it appears to the NRC staff that SSC functionality from a PRA viewpoint is being used to support a DID conclusion. Further, the NRC staff notes that due to the potential for non-confirming conduits to affect both trains of SW or EFW and the lack of detailed cable tracing, a tornado-generated missile hit on the conduits would be modeled as a common-cause failure (CCF) of both trains of SW or EFW. Therefore, it is unclear to the NRC staff how PRA "functionality" is being claimed by the licensee. The guidance in Section C.2.1.1.3 of RG 1.174, Revision 3, does not support the use of PRA "functionality." The NRC staff requests that the licensee:

a. Clarify the statement that the TMRE PRA analysis demonstrates that the SW and EFW systems will remain "functional" following impact from a tornado-generated missile.

b. Justify how the use of "functionality" in a PRA model is consistent with the guidance on the DID considerations described in Section C.2.1.1.3 of RG 1.174, Revision 3, to meet the second key principle of risk-informed regulation. Alternately, provide a basis that does not rely on PRA "functionality" for why DID continues to be maintained despite the apparent CCFs of the SW and EFW systems.

Section 3.3.9 of the enclosure to the LAR discusses several sensitivity studies including the "ANO-1 Single Event Cutset Sensitivity." The LAR states that the base CDF cutset results contain several single-order cutsets (i.e., initiating event and one basic event) and identifies the most important of such basic events as tornado failures for Room 129 (Control Room), Room 98 (Corridor) and Room 97 (Cable Spreading Room). The guidance for Item 5, "Maintain multiple fission product barriers," in Section C.2.1.1.3 of RG 1.174, Revision 3, states that the evaluation of the proposed licensing basis change should demonstrate that the change does not (1) create a significant increase in the likelihood or consequence of an event that simultaneously challenges multiple barriers or (2) introduce a new event that would simultaneously impact multiple barriers. It appears to the NRC staff, that the single order cutsets in the base TMRE PRA model challenge DID by simultaneously impacting and failing multiple barriers. Therefore, the NRC staff requests that the licensee:

c. Describe the SSCs that are considered as being impacted by tornado-generated missiles in Room 129 (Control Room), Room 98 (Corridor) and Room 97 (Cable Spreading Room) and their modeling in the TMRE PRA (i.e., what SSCs the single basic event for the rooms represents).

d. Justify how simultaneous challenges to multiple barriers is avoided and consequently, DID is maintained given the insights from the ANO-1 TMRE PRA model base results as well as the "ANO-1 Single Event Cutset Sensitivity." The justification should include details about any conservatisms in modeling the impact of tornado-generated missiles as well as resulting failures of relevant SSCs in Room 129 (Control Room), Room 98 (Corridor) and Room 97 (Cable Spreading Room).

The ANO-1 TMRE "Missile Distribution Sensitivity" discussed in Section 3.3.9 of the enclosure to the LAR demonstrates a substantial increase in LERF. Section 3.3.9 of the enclosure to the LAR and the discussion for "Item 20" in Enclosure Attachment 3 of the LAR provides justification for why this result is conservative. However, the conservatisms discussed seem generally applicable to the entire TMRE model (i.e., to the total CDF and LERF), and therefore would apply to both the compliant and degraded cases. It is unclear to the NRC staff how they relate specifically to the modeling of the nonconformances that results in the calculated delta risk. For example, it is stated that a detailed evaluation of cable routing would allow fewer correlated failures and thus result in a lower risk, but these cables appear not to be related to any of the nonconformances listed in Table 1 of the LAR. As another example, the LAR states that much of the risk increase is caused by the multiplier applied to targets in the "bowling alley," but it is later explained in Item 20.c of Attachment 3 of the enclosure that none of the "highly exposed" SSCs are considered nonconformances. It appears to the NRC staff that there is an additional failure mode introduced that impacts LERF more adversely than CDF. Therefore, the NRC staff requests that the licensee:

e. Justify how a reasonable balance between accident mitigation and prevention is maintained as part of DID given the substantial increase in LERF for the ANO-1 TMRE "Missile Distribution Sensitivity" discussed in Section 3.3.9 of the LAR. The justification should include discussion of insights from the cited sensitivity study as well as any conservatisms in the determination of the change in risk (e.g., related to modeling the impact of tornado-generated missiles as well as resulting failures of relevant SSCs).

<u>Entergy Response</u>

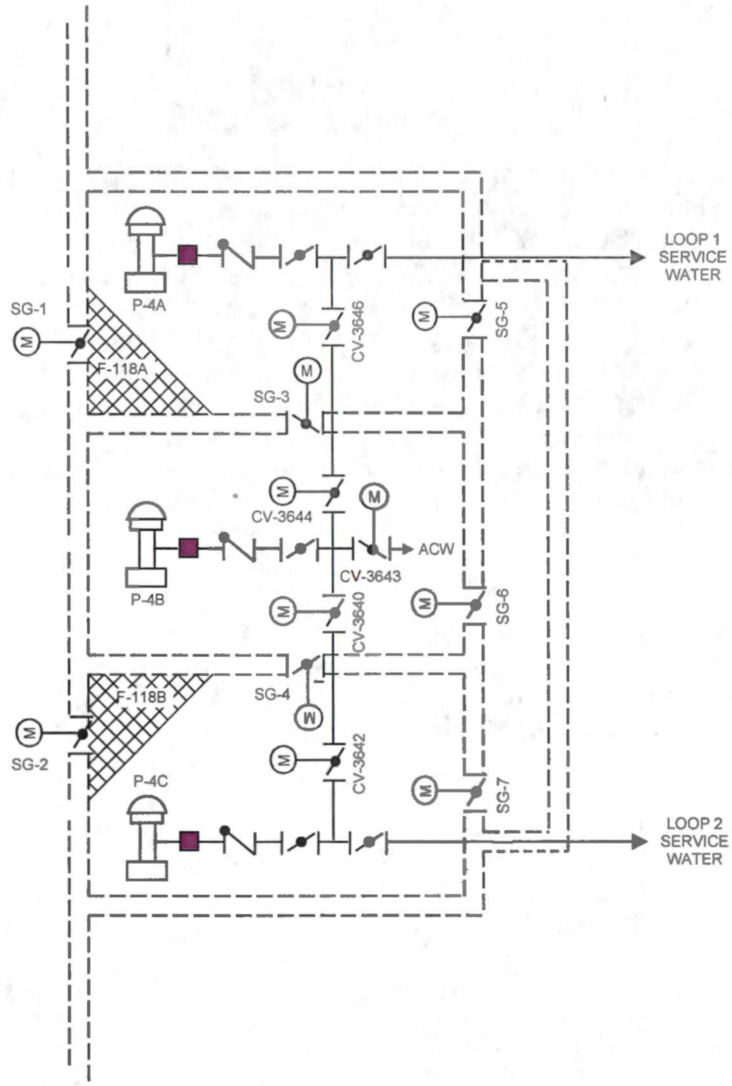
a. The first clarification to be made is that a single missile cannot impact the non-conforming SSCs affecting both the SW and EFW systems. The conduits and cables affecting the SW system components are located on the 354-foot elevation near Column Line 5.9 between Lines C and E in the demineralizer area. The SSCs that could affect the EFW system are not located in the demineralizer area. The conduits and cables affecting the EFW system components are located on the 368-foot elevation inside Room 104.

   The SSCs in the demineralizer area affect the following components for the SW system:

   - P-4C
   - CV-2806 (Loop 2 SW to EFW P-7A Suction)
   - CV-3851 (Loop 2 SW to EFW P-7A Suction)
   - CV-3644 (P-4A to P-4B SW Crosstie)
   - CV-3642 (P-4C to P-4B SW Crosstie)
   - CV-3640 (P-4C to P-4B SW Crosstie)
   - CV-3646 (P-4A to P-4B SW Crosstie)
   - CV-3820 (Loop I Supply to ICW Coolers)
   - CV-3643 (ACW Isolation Valve)
   - SG-3 ("A" / "B" SW Bay Cross-Connect)
   - SG-4 ("B" / "C" SW Bay Cross-Connect).

   Should P-4C be failed, the opposite train pump, nominally P-4A, would remain available. The swing SW pump, P-4B, would also remain available. Availability of P-4B is subject to the initial alignment. It may be running initially in which case no impact to SW system operation would occur. Alternatively, P-4B could be aligned in standby to either train. If aligned in standby to P-4A, then realignment to P-4C would be required with operation subject to the impacts discussed below for sluice gate alignment. If aligned in standby to P-4C, then operation could occur almost immediately.

A simplified drawing of the SW supply and cross-tie configuration is provided below:



Failure of valves CV-2806 and CV-3851 would prevent alignment of Loop 2 SW to EFW pump P-7A from the main Control Room. However, local operation of these valves would be possible. Although Loop 2 SW to EFW pump P-7A would not be available, this function would not be needed for several hours after the initial reactor trip. Additionally, Loop 1 SW to EFW pump P-7B would remain available.

Valves CV-3644, CV-3642, CV-3640, and CV-3646 are the SW loop cross-tie valves and are used to separate the Loop 1 and Loop 2 SW headers. These valves receive a signal to close on an Engineered Safeguards (ES) actuation. ES actuation is associated with RCS and/or Reactor Building pressure parameters. Following a tornado with coincident LOOP, an ES actuation is not assumed. Therefore, closure of these valves would not be demanded.

As with the loop cross-tie valves discussed above, the Loop 1 SW supply to the Intermediate Cooling Water (ICW) heat exchangers, CV-3820, receives a close signal on ES actuation. Because no ES signal would be generated following a tornado-induced event, this valve repositioning would not be demanded The same is true for the Auxiliary Cooling Water (ACW) isolation valve, CV-3643.

The SW bay cross-connect sluice gates, SG-3 and SG-4, fail as-is. During normal SW system operation, the SW bays are aligned to receive water from the Lake Dardanelle through SG-1 and SG-2. SG-1 located in the "A" SW bay provides flow to the "A" SW bay while SG-2 located in the "C" Circulating Water (CW) bay provides flow to the "C" SW bay. Lake water to the "B" or swing SW bay can be provided from either the "A" or "C" SW bay through SW bay cross-connect sluice gates, SG-3 and SG-4. SG-3 separates the "A" and "B" SW bays while SG-4 separates the "B" and "C" SW bays. SW bay cross-connect sluice gates are aligned based on SW pump configuration, SW pump P-4B preferred power supply, or as determined by Operations. Therefore, at least one of the cross-connect sluice gates is expected to be open. As a result, the swing SW pump P-4B could be available. If aligned to SW Loop 2, then P-4B could be started as directed by procedures. If aligned to SW Loop 1, then P-4B could be re-aligned to Loop 2 and started.

The physical layout of the conduits affecting these components is such that four scenarios are evaluated for missile strikes because a single missile strike would not be expected to impact all conduits at the same time. The first scenario considers a missile strike that could impact the following conduits that are considered non-conforming:

EC1281	EC2341

Failure of EC1281 would fail only SG-3 while failure of EC2341 would fail only SG-4. Therefore, for that scenario, all SW pumps along with cross-tie and isolation valves would remain available.

The second scenario considers a missile strike that could impact the following conduits that are considered non-conforming:

EC1593	EC1256	EC1255	EC2014
EC1254	EB2096	EA2013	

Failure of conduits EC1593, EC1254, EC1256, does not affect any SW system components. Failure of EC1255 could affect the Loop 2 SW to ICW valve CV-3820, and SW pump cross-tie valves CV-3640 and CV-3646. Failure of either conduit EC2014 or EB2096 could affect the Loop 2 SW to EFW pump suction valves CV-2806 and CV-3851, SW pump cross-tie valves CV-3642 and CV-3644, and the SW to ACW valve CV-3643. As stated previously, there is no demand for the SW to ICW/ACW or SW cross-tie valves to reposition during a tornado-induced event. Also as stated previously, the SW to EFW pump suction function would not be needed for several hours after the initial reactor trip. Additionally, Loop 1 SW to EFW pump P-7B would remain available.

Failure of conduit EA-2013 could affect P-4C. Availability of the sluice gates and P-4B would allow alignment to compensate for failed SW pump P-4C.

The third scenario considers a missile strike that could impact the following conduits that are considered non-conforming:

EC1593	EC1254	EC1256	EC1255

SW system components that could be affected by a missile strike on these conduits are detailed above. For this scenario, loop isolation using SW pump cross-tie / ACW supply valves CV-3642, CV-3643, and CV-3644 could occur, flow from P-4C would remain available, and Loop 2 SW to EFW pump P-7A would remain available. Additionally, availability of the sluice gates and P-4B would allow alignment to compensate for any random failures of the other two SW pumps.

The fourth scenario considers a missile strike that could impact the following conduits that are considered non-conforming:

EB2300	EC2508	EC2014
EB2096	EA2013	

Failure of conduits EB2300 and EC2508 does not affect any SW system components. SW system components that could be affected by a missile strike on the remaining conduits are detailed above. For this scenario, the two SW loops could be separated by closing valves CV-3640 and CV-3646. Also, availability of the sluice gates and P-4B would allow alignment to compensate for failed SW pump P-4C.

Based on the evaluations presented above, there is no one scenario that would cause failure of all components needed to render both SW loops unavailable.

The SSCs in Room 104 affect the following components for the EFW system (a simplified drawing of the EFW system is provided below):

CV-2627	CV-2667	CV-2663	CV-2869

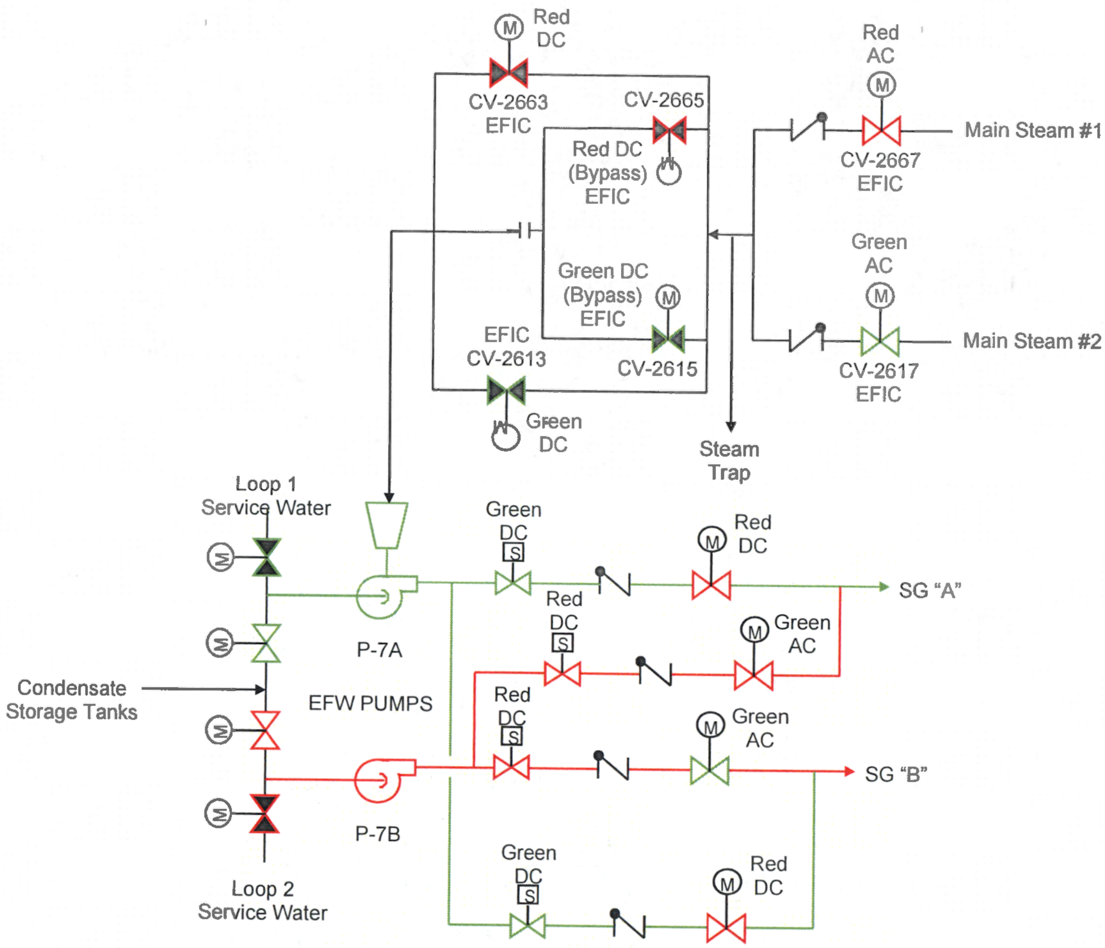
P-7B Auto-start signal from EFIC Channel A

AC power to D-03A Battery Charger

EFW Initiation and Control (EFIC) Channel B provides a redundant start signal to EFW pump P-7B given failure of the signal from EFIC Channel A. A tornado missile could fail the control power to CV-2627. The function of providing flow control from EFW pump P-7A to Steam Generator (SG) A is provided by upstream valve CV-2645.

A tornado missile could fail the power to CV-2667. This would prevent closing the valve which is normally open to allow steam flow to EFW pump P-7A from SG A. Closing this valve would only be required in the event of a steam line break, which is not assumed to occur during a tornado-induced LOOP event.

Cables affecting valve CV-2663 could be failed by a tornado missile thereby causing the valve to remain closed and preventing steam flow to EFW pump P-7A through one of two redundant paths. However, steam flow to P-7A would remain available through the redundant path.



Valve CV-2869 is the test header isolation valve for P-7B. This valve is normally closed except during surveillance testing. Therefore, failure of the cables for this valve has no impact on EFW functions.

The motor-driven EFW pump P-7B is considered inoperable because the control power for starting the pump could be impacted by loss of the AC power supply to battery charger D-03A. However, DC power would be available from the respective vital battery immediately after the impact of a tornado. Therefore, P-7B would start when needed. The spare battery charger (D-03B) could be aligned in the time that DC power is provided from the battery. If D-03B is initially providing DC control power, then there is no effect.

Based in the discussions above, all functions of the EFW system would be available following a tornado-induced event which impacts Room 104.

b. Although both trains of the SW system or the EFW system could be affected by a tornado missile, the discussions above in response to Part 7.a of this RAI show that any single tornado missile would not prevent either the SW or EFW system from fulfilling the required system function. Therefore, at least one layer of DID is provided for each system consistent with RG 1.174, Section C.2.1.1.3.

c. The SSCs that are impacted for the tornado-generated missile events in Room 129, Room 98, and Room 97 are presented in Table 1 of Attachment 1 to this enclosure along with PRA equipment affected by the impacted SSC.

A missile entering one of these rooms was assumed to impact and cause simultaneous failure of all SSCs located in the room. The SSCs failed in each room include components from the High Winds Equipment List (HWEL) as well as electrical raceways and conduits containing cables that support components from the HWEL. Due to the large number of SSCs (particularly cables), this results in impacts to a large number of plant components in each room.

d. In response to Regulatory Issue Summary (RIS) 2015-06, "Tornado Missile Protection," Entergy performed walk downs at ANO to identify potential discrepancies with the ANO current license basis related to tornado-generated missile protection. As part of the walk downs, SSCs were identified as being non-conforming. The non-conforming SSCs were entered in the corrective action program. The conditions that satisfied reporting criteria of 10 CFR 50.72 and/or 10 CFR 50.73 were reported to the NRC as outlined in Entergy's request to extend enforcement discretion as related to EGM 15-002, "Enforcement Discretion for Tornado Missile Protection Noncompliance," for ANO, which was subsequently approved by the NRC. Several non-conformances have been resolved by plant modifications at significant cost. Although the SSCs in Room 129, Room 98, and Room 97 are modeled as vulnerabilities in the TMRE PRA model, SSCs in these rooms were determined to have adequate protection to meet the requirements for licensing basis tornado missile protection. Therefore, there is no licensing basis change being requested for the SSCs in these rooms. The TMRE PRA models tornado-induced failure of components in these rooms due to the lack of missile protection meeting the NEI 17-02 criteria.

The modeling treatment of tornado-generated missile events in these rooms does not represent of a lack of DID. Rather, the results shown in the TMRE are a reflection of the conservatism used to simplify the TMRE analysis for these vulnerabilities that meet licensing basis missile protection requirements. The most significant conservatism is the correlation and assumed failure of all SSCs in each of room as a result of a single tornado missile entering the room. Because of the large area containing the SSCs in each of the rooms, it is considered physically impossible for a single tornado missile to enter one of the rooms through penetrations in the wall and then strike all of the SSCs in the room.

Additionally, the TMRE analysis assumes that any component struck by a tornado missile is failed, which is consistent with the NEI 17-02 guidance for missile fragility. This treatment is especially conservative for these rooms, which mostly contain electrical raceways. A missile strike to a cable tray or conduit is unlikely to result in failure of all cables contained within. Cables are flexible and robust components.

A tornado-generated missile impacting a cable, particularly one located in a cable tray, would be expected to push the cable away from the path of the missile. Failure of a cable requires severing the modelled conductor or disconnecting the cable from the endpoint to result in failure It is also conservative to assume that control cable damage is sufficient to fail the associated SSC, since operators may be able to manually operate equipment inside of the Category I boundary after the tornado. However, no credit was taken in the TMRE analysis for manual operation of any such failed components.

The DID for each room is demonstrated below:

Room 129 (Control Room)

As shown in Attachment 2, Figure 2, of this enclosure, the modeled vulnerabilities in the Control Room include several penetrations in the southern exterior wall (FB-129-6), which include Door 65. The intervening structures outside of this wall include several grouted block walls to the south and east. A tornado missile protection modification has been installed that reinforces the grouted block walls and adds a 5/16" steel plate to the exterior of the controlled access area. Because this modification does not meet the NEI 17-02 criteria of 1" of steel plating and it is not clear from the NEI 17-02 guidance whether a combination of 5/16" steel plate and a reinforced block wall is sufficient to prevent missile penetration, the modification was not credited in the TMRE analysis. The tornado resistance of the plated, reinforced, grouted block walls was determined to be adequate per the licensing basis. A separate part of the modification installed a 1" steel plating around Stairwell No. 3 that can be credited as part of the TMRE analysis. Additionally, the moisture separator reheaters (MSRs) are large robust components that may be credited for the TMRE analysis.

Because this vulnerability is adequately protected to comply with the licensing basis for tornado-generated missiles, a simplifying assumption was made that all SSCs in the Control Room are failed simultaneously by any missile entering the room. The physical layout of the Control Room makes this assumption overly conservative, since only certain combinations of panels can be vulnerable from a single missile trajectory.

The largest penetration considered for the Control Room is Door 65. The line of sight to the door is protected from the southeast by the stairwell missile shield and the MSR. Supporting figures are provided in Attachment 2 of this enclosure. The line of sight to the Control Room from the door is shown in Figure 3. All other penetrations are small diameter core bores that are only vulnerable to directly perpendicular, horizontal missiles. The penetrations in the south wall of the Control Room are shown in Figure 2. The potential missile trajectories into the Control Room are shown in Figures 3 and 4.

The trajectory through Door 65 can impact Control Room panels C-09, C-19, and C-100. All electrical raceways are located below the panels or below the door, so the raceways are not vulnerable. Loss of these panels results in failure of primary-to-secondary cooling due to loss of all EFW pumps. However, once-through cooling remains available, since SW, High Pressure Injection (HPI), and the electromatic relief valve (ERV) remain functional. Therefore, this missile trajectory does not result in core damage and DID is maintained.

The trajectory from Penetration 729 does not impact any main Control Room panels; therefore, there is no effect on risk.

The trajectory from Penetrations 722 and 723 can impact panels C86, C486-3, C19, C04, C03, C02, C01, and C100. For a missile that impacts these panels, both primary-to-secondary cooling and once-through cooling remain available. Therefore, there are multiple layers of DID to prevent core damage.

The trajectory from the remaining penetrations can impact panels C90, C91, C37-3, C37-4, C-16, C-14, C-13, C-12, C-11, and C-10. For a missile that impacts these panels, both primary-to-secondary cooling and once-through cooling remain available. Therefore, there are multiple layers of DID to prevent core damage.

Room 98 (Corridor)

The modeled TMRE vulnerability in Room 98 includes openings in the eastern exterior wall FB-98-3, which includes Door 56. No credit is taken for reducing the number of missiles for intervening barriers, and all SSCs are considered correlated for modeling simplicity.

This vulnerability is adequately protected against licensing basis tornado-generated missiles by the intervening structures in the turbine building. The credited intervening structures include steel building beams, steel building columns, switchgear units, and the ANO-1 turbine pedestal.

Although the conservative TMRE modeling treatment indicates a lack of DID, there are several layers of defense that prevent a single tornado-generated missile event in this room from challenging multiple fission product barriers. The most significant conservatism is the simplification that all SSCs located in Room 98 are correlated, which results in the simultaneous failure of all SSCs in the room from a single basic event. Room 98 is a long corridor that is approximately 10'-0" wide and 50'-0" long. It is not physically possible for a single tornado missile to strike all of the SSCs located in the corridor.

The majority of SSCs located in this room are electrical raceways that are routed along the ceiling of the corridor. These SSCs are protected by a W36x260 structural steel beam located outside of the room. Because the web of the beam is only 0.84" thick, it does not satisfy the NEI 17-02 criteria of 1" steel plate. However, the criteria would be satisfied by the beam in combination with other steel components such as steel conduit or cable tray structures. Because the vulnerability for Room 98 is not a non-conformance, no evaluation of these structures was performed. A more detailed TMRE model could consider the penetrations in the line of sight of the beam protected, since there are a significant number of steel conduits routed above the door in the Turbine Building that also provide protection.

The other penetrations below the level of the beam are protected by the non-safety switchgear. The switchgear is comprised of at least 0.27" of steel based on the primary and secondary enclosures. Because the line of sight to Room 98 is protected by two sets of switchgear, the total thickness is approximately 0.5" of steel. However, this does not satisfy the NEI 17-02 criteria of 1" steel plate. In addition to the switchgear, there are a significant number of electrical raceways routed through this area that could be considered and satisfy the criteria for 1" of equivalent steel shielding. A more detailed TMRE model could consider only the conduit in the first few feet inside Room 98 as vulnerable from these penetrations, since the electrical raceways in the room provide additional missile protection.

The other penetration to Room 98 is Door 56, which is also protected by the non-safety related switchgear. As discussed previously, the majority of SSCs in this room are located above the level of the door. The only SSCs on the HWEL that are not electrical raceways located above the door in this room are the battery chargers D-04A and D-04B. Although the battery chargers are modeled as vulnerable from this opening, they are actually located in an alcove outside of the battery room, which is protected by an 18" thick reinforced concrete wall. Therefore, more detailed TMRE modeling would only consider vertically routed conduits and cable trays as vulnerable from the doorway.

As discussed above, a tornado-generated missile entering Room 98 would not be expected to cause failure of multiple SSCs used to prevent core damage. A plant-specific evaluation of tornado-generated missile protection of this room concludes that all SSCs located in this room are adequately protected in accordance with the licensing basis. Because this TMRE vulnerability is not a non-conformance, the impact to the plant is modeled very simply and conservatively. As discussed above, a more detailed TMRE model would result in fewer vulnerable SSCs as well as a smaller EEFP due to crediting several of the intervening structures outside of the room.

Room 97 (Cable Spreading and Relay Rooms)

The modeled vulnerability in Rooms 97 include penetrations in the eastern walls FB-97-5 and FB-96-3. The Relay Room 96 is included as part of Room 97, since the two areas are only separated by a block fire wall that is not adequate for missile protection per the requirements of NEI 17-02. The penetrations in these walls include several core bores, blockouts, Door 45, and Door 44. There are tornado missile protection modifications installed that protect both doors as well as large heating, ventilation, and air conditioning (HVAC) penetrations in the Relay Room. Although Door 44 is protected from the east by the steel plate installed in the sample room, there is a line of sight that is only protected by switchgear. Although that protection is considered adequate for licensing-basis missiles, the switchgear does not provide 1" of steel and, therefore, the TMRE analysis does not consider this door protected per NEI 17-02.

This vulnerability is adequately protected against all licensing basis tornado-generated missiles by the intervening structures in the turbine building. The credited intervening structures include steel building columns, switchgear units, and installed tornado missile protection modifications.

The TMRE analysis models all SSCs located in Rooms 96 and 97 as correlated, so any single tornado missile entering the room is assumed to simultaneously fail all SSCs. This treatment is very conservative and results in the tornado-generated missile event in these rooms leading to core damage. However, there are several layers of defense that prevent a tornado missile event in this room from failing multiple fission product barriers.

With the exception of Door 44, all penetrations leading into this room are very small with the largest being a 36" x 12" grouted blockout (EEFP). Door 44 is only vulnerable from a very small line-of-sight that is protected by the non-safety related switchgear. Therefore, only very narrow missile trajectories are physically possible to enter the room. The cable spreading room and relay room combined are approximately 50'-0" by 30'-0"; therefore, only a small fraction of the SSCs in the rooms are actually vulnerable to impact from a single missile entering through a single penetration.

Additionally, it is unlikely that a tornado-generated missile would have sufficient energy to damage a significant number of cables in its line of sight. These rooms primarily contain conduits and cable trays. There is no guidance for how many cables a single tornado missile is capable of failing, so it is assumed that all of the cables fail. However, cables are robust components that can easily flex without failure when struck by a missile. The steel structural components that house the cables also provide some form of missile protection. Therefore, it is conservative to assume that all cables in a missile trajectory fail simultaneously.

Because the vulnerabilities for Room 97 are not non-conformances and because of the complexity of the required analysis to consider the hundreds of cables in these rooms, a more detailed TMRE analysis was not performed. The SSCs in these rooms are adequately protected per the licensing basis. Because this TMRE vulnerability is not non-conforming, the impact to the plant is modeled very conservatively and simply. As discussed above, a single tornado missile is only capable of damaging a small percentage of the total SSCs in the room. Therefore, adequate DID exists.

e. For the missile distribution sensitivity, the EEFPs for all SSCs with a risk achievement worth (RAW) greater than 2 are increased by a factor of 2.75. In total, 39 EEFPs had a RAW greater than 2 and subsequently the values for these EEFPs were increased.

In addition, any highly-exposed target is evaluated to determine if more than 1100 potential missiles are located within 100 feet of the target. If so, the EEFP for that target may be increased by a factor greater than 2.75. Six of the 39 SSCs above met the criteria in NEI 17-02, Revision 1B, as being highly exposed. One of these six, the fuel oil storage tank vents, was determined to have more than 1100 potential missiles within 100 feet. As a result, the EEFP for the fuel oil storage tank vents was increased by a factor of 3.85. None of the highly-exposed SSCs were considered a non-conformance.

The substantial increase in LERF for the sensitivity study is due to conservatisms in modelling of the SSCs in Rooms 98, 97, and 129 with the largest effect being that of Room 98. A missile impact to SSCs in one of these rooms is modelled as leading directly to core damage. When the accident sequence modelling is extended to LERF, the scenario is treated as a complete loss of secondary cooling which results in a dry SG at core melt. The combination of a dry SG and core melt results in an induced SG tube rupture, which is assumed to lead directly to LERF. Because of the high probability of an induced tube rupture occurring given a dry SG, scenarios involving Rooms 98, 97, and 129 result in the largest change in LERF. These rooms contribute about twice as much to overall LERF as to overall CDF for the base case. This explains why the model results in a larger increase in LERF than in CDF. Because the barriers for Rooms 98, 97, and 129 are considered vulnerabilities but not non-conformances, the increase in LERF from these rooms does not contribute to the increase in ΔLERF.

Another cause for the substantial increase in LERF with respect to the sensitivity is the increase in the EEFP representing failure of the SG safety relief valves (SRVs). These valves are considered as correlated failures such that a strike on one valve fails all SRVs. Also, failure of the SRV is modelled as causing the valve to stick open and depressurize the SG. Correlating the SRV failures in the model represents depressurization of both SGs. A depressurized SG results in a higher likelihood of an induced SG tube rupture. Given the rugged nature of the SRVs, there would be some chance that an impacted valve would not stick open. If the missile impact precludes opening a SRV, then the affected SG would not depressurize and no increase in LERF would be expected. Also, treating all SRVs on both SGs as a single, correlated failure adds another level of conservatism. Any reduction in the EEFP for SRVs or removal of the correlation between the valves would reduce the risk increase seen.

A similar situation exists for failure of the Main Steam Isolation Valves (MSIVs). That is, an impact to the MSIVs is modelled as preventing closure of the valves followed by subsequent depressurization of both SGs.

Failure of the SRVs or MSIVs alone does not result in core damage. Additional failures of other SSCs must occur. Some of these additional failures involve the four non-conformances identified in Table 1 of the original LAR enclosure. These additional failures, along with the high probability of an induced SG tube rupture given a depressurized SG, result in a larger relative increase in LERF than in CDF. These additional failures also contribute to the increase in the ΔLERF. However, a less conservative treatment of failures of the SRVs or MSIVs would result in a smaller change in LERF and ΔLERF.

Given the numerous conservatisms in modelling discussed above, it is concluded that a reasonable balance of DID is maintained with respect to accident prevention and mitigation.

PRA RAI 08 – Key Assumptions and Uncertainties that Could Affect the Application

Regulatory Position C. 3.3.2, "Assessment of Assumptions and Approximations," of RG 1.200, Revision 2, states in part:

> For each application that calls upon this regulatory guide, the applicant identifies the key assumptions and approximations relevant to that application. This will be used to identify sensitivity studies as input to the decision-making associated with the application.

Key assumptions and sources of uncertainty as well as their disposition in the context of this application are important elements of the NRC staff's review of and conclusion for this application. The licensee's response to Item 22 in Enclosure Attachment 3 to the LAR states, "Action to identify the key assumptions and sources of uncertainty, along with any potential impact on the TMRE application in the PRA model of record, is being tracked via a Condition Report." As a result, it appears to the NRC staff that key assumptions and sources of uncertainty for this application have neither been identified nor dispositioned.

Regulatory Position C.4.2, "Licensee Submittal Documentation," of RG 1.200, Revision 2, states in part:

> These assessments provide information to the NRC staff in their determination of whether the use of these assumptions and approximations is appropriate for the application, or whether sensitivity studies performed to support the decision are appropriate.

Regulatory Position, C.4.2, "Licensee Submittal Documentation," of RG 1.200, Revision 2, identifies key assumptions in the PRA that impact the application as information that the licensee should submit to support the NRC staff's conclusion that the proposed licensing basis change is consistent with the key principles of risk-informed regulation and NRC staff expectations.

Based on established guidance and precedent for decisionmaking and submittal documentation for risk-informed licensing actions, key assumptions and sources of uncertainty as well as their disposition in the context of this application need to be provided as part of the application. NRC staff cannot support its review of and conclusion for this application based on yet-to-be-determined information. Therefore, the NRC staff requests that the licensee:

a. Describe the approach used to identify and characterize the key assumptions and key sources of uncertainty that impact this application. The description should include discussion of how the licensee's approach is consistent with that in NUREG-1855, "Guidance on the Treatment of Uncertainties Associated with PRAs in Risk-Informed Decision Making," Revision 1 (ADAMS Accession No. ML17062A466), or RG 1.200, Revision 2.

b. Describe how each identified key assumption and key source of uncertainty was dispositioned for this application.

Entergy Response

a. For each unit, key assumptions and sources of uncertainty included in the PRA models are identified using the methodology described in NUREG-1855, Revision 1, "Guidance on the Treatment of Uncertainties Associated with PRAs in Risk-Informed Decisionmaking." A PRA notebook is used to document these assumptions and sources of uncertainty with a separate notebook developed for each unit.

b. For each unit, all sources of uncertainty identified in the associated Sources of Uncertainty notebook were reviewed to determine the potential for each source of uncertainty to impact the conclusions reached in the TMRE evaluations.

   The sources of uncertainty for ANO-1 along with the associated evaluation and disposition are listed in Table 2. For ANO-2, the information is presented in Table 3. These tables are included in Attachment 1 of this enclosure.

   Based on the evaluations documented in Tables 2 and 3, it is concluded that the sources of uncertainty identified would not impact the conclusions reached in the TMRE evaluations for ANO.

PRA RAI 09 – ANO-1 and ANO-2 Aggregate Results

Section C.2.4, "Acceptance Guidelines," of RG 1.174, Revision 3, provides acceptance guidelines for risk-informed decisionmaking.

The following PRA RAIs may result in changes to the ANO TMRE PRA models:

- PRA RAI 03 – ANO Tornado Missile Walkdown Area
- PRA RAI 04 – ANO Multiunit LOOP
- PRA RAI 07 – ANO-1 Defense-in-Depth Considerations

The following PRA RAIs address sensitivity studies and exceedance of RG 1.174 criteria.

- PRA RAI 05 – ANO TMRE Compliant-Case Conservatisms Sensitivity
- PRA RAI 08 – Key Assumptions and Uncertainties That Could Affect the Application

For any changes introduced as a result of these RAIs, the NRC staff requests that the licensee:

a. Provide updated ANO TMRE results and associated sensitivities that incorporate changes from the resolutions of these RAIs.

b. If the guidelines from RG 1.174 applicable to TMRE PRA as discussed in NEI 17-02 are exceeded, provide justification using one of the three methods described in Section 7.3 of NEI 17-02.

Entergy Response

a. As discussed in the responses to the previous RAI questions, no new analyses were performed. Therefore, there are no updated results or sensitivities to provide.

b. The only instance where the guidelines from RG 1.174 applicable to the TMRE PRA are exceeded is the ANO-1 TMRE Missile Distribution Sensitivity. The justification for acceptability of this result is detailed in the response to RAI Item 7.e.

REFERENCES

1. Entergy Operations, Inc. (Entergy) letter to U. S. Nuclear Regulatory Commission (NRC), *License Amendment Request to Incorporate Tornado Missile Risk Evaluator into the Licensing Basis*, Arkansas Nuclear One, Units 1 and 2 (0CAN041904) (ML19119A090), dated April 29, 2019.

2. NRC email to Entergy, *Final RAI #1 RE: License Amendment Request to Incorporate Tornado Missile Risk Evaluator (TMRE) into Licensing Basis (EPID L-2019-LLA-0093)*, (0CNA101901) (ML19280A040), dated October 7, 2019.

3. Entergy letter to NRC, *Application for Technical Specification Change Regarding Risk-Informed Justification for the Relocation of Specific Surveillance Frequency Requirements to a Licensee Controlled Program (TSTF-425)*, Arkansas Nuclear One, Unit 1 (1CAN031801) (ML18071A319), dated March 12, 2018.

4. Entergy letter to NRC, *License Amendment Request to Adopt NFPA 805 Performance-Based Standard for Fire Protection for Light Water Reactor Generating Plants (2001 Edition)*, Arkansas Nuclear One – Unit 1 (1CAN011401) (ML14029A438), dated January 29, 2014.

ATTACHMENTS

1. List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

2. Supporting Figures

Enclosure Attachment 1 to

0CAN111901

LIst of SSCs Assumed to be Affected by Tornado-Generated Misslles in Rooms 97, 98, and 129

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles In Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
129	C04	CV-1275	MAKEUP TANK OUTLET
129	C04	CV-1000	ERV ISOLATION
129	C04	C89	ESAS ANALOG SUBSYSTEM NO. 2
129	C04	C91	ESAS CABINET DIGITAL SUBSYSTEM 2
129	C04	C92	ESAS CABINET DIGITAL SUBSYSTEM 2
129	C04	CV-1207	SEAL INJ CONTROL VALVE
129	C04	PSV-1000	PZR ERV
129	C04	C88	ESAS ANALOG SUBSYSTEM NO 1
129	C04	C86	ESAS CABINET DIGITAL SUBSYSTEM 1
129	C04	C87	ESAS CABINET DIGITAL SUBSYSTEM 1
129	C04	C90	ESAS ANALOG SUBSYSTEM NO 3
129	C09	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
129	C09	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
129	C09	CV-2806	EFW P-7A SUCTION FROM SW
129	C09	CV-3851	EFW SERV WTR LOOP II ISOLATION
129	C09	CV-2617	EFW PP TURBINE K-3 STEAM FROM SG-B
129	C09	CV-2613	EFW PP TURBINE K-3 STEAM ADMISSION VLV
129	C09	CV-2615	EFW PUMP TURBINE K3 STEAM ADMISSION VALVE BYPASS
129	C09	C37-2	EFIC CABINET CHANNEL B (GREEN)
129	C09	CV-2645	P-7A TO SG-A CONTROL
129	C09	CV-2647	P-7A TO SG-B CONTROL
129	C09	SV-0621	MAIN STM ISOL CV-2692 CLOSURE
129	C09	SV-0711	MAIN STM ISOL CV-2691 CLOSURE
129	C09	P-7B	EMERGENCY F.W. PUMP
129	C09	CV-2803	EFW P-7B SUCTION FROM SW
129	C09	CV-3850	EFW SERV WTR LOOP I ISOLATION
129	C09	CV-2667	EFW PP TURBINE K-3 STEAM FROM SG-A
129	C09	CV-2663	EFW PP TURBINE K-3 STEAM ADMISSION VLV

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
129	C09	CV-2665	EFW PUMP TURBINE K3 STEAM ADMISSION VALVE BYPASS
129	C09	C37-1	EFIC CABINET CHANNEL A (RED)
129	C09	CV-2646	P-7B TO SG-A CONTROL VALVE
129	C09	CV-2648	P-7B TO SG-B CONTROL VALVE
129	C09	SV-0611	MAIN STM ISOL CV-2691 CLOSURE
129	C09	SV-0721	MAIN STM ISOL CV-2692 CLOSURE
129	C10	A-4	4160 VOLT BUS A-4
129	C10	B-6	480V LOAD CENTER BUS B-6
129	C10	B-5	480V LOAD CENTER BUS B-5
129	C10	B-56	MOTOR CONTROL CENTER
129	C10	K-4B	#2 EDG
129	C10	A-3	4160 VOLT BUS A-3
129	C10	K-4A	#1 EDG
129	C14	CV-1404	P-34A/B SUCT SUPP FROM RCS
129	C15	C486-1	AUXILIARY EQUIPMENT PANEL (RED)
129	C16	A-4	4160 VOLT BUS A-4
129	C16	P-4C	'C' SERVICE WATER PUMP
129	C16	CV-3642	P-4B TO P-4C DISCH CROSSOVER
129	C16	CV-3644	P-4A TO P-4B DISCH CROSSOVER
129	C16	P-34B	'B' LOOP DH REMOVAL PUMP
129	C16	P-36C	PRIMARY MAKEUP PUMP
129	C16	CV-3643	ACW LOOP ISOL
129	C16	CV-1227	HPI TO P-32B DISCHARGE
129	C16	CV-1228	HPI TO P-32A DISCHARGE
129	C16	CV-1400	LPI/DECAY HEAT BLOCK
129	C16	CV-1408	BWST T-3 OUTLET
129	C16	CV-1406	RB SUMP LINE B OUTLET
129	C16	CV-3811	LOOP 2 SUPPLY TO ICW COOLERS
129	C16	CV-3821	DECAY HEAT CLR SERVICE WTR E-35B INLET

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
129	C16	CV-1284	'C' HPI BLOCK VALVE
129	C16	CV-1285	HPI TO P-32D DISCH
129	C16	CV-5611	FIREWATER TO RB OUTSIDE ISOL
129	C16	CV-1410	DH SUCTION ISOL
129	C16	CV-1277	'B' DH LOOP DISCH TO MU PUMP P-36C SUCTION
129	C16	CV-1435	DECAY HEAT P-34B SUCTION FROM RCS
129	C16	CV-1437	DECAY HEAT P-34B SUCTION FROM BWST
129	C16	SV-0621	MAIN STM ISOL CV-2692 CLOSURE
129	C16	SV-0711	MAIN STM ISOL CV-2691 CLOSURE
129	C16	LT-1411	BWST LVL XMTR
129	C16	C91	ESAS CABINET DIGITAL SUBSYSTEM 2
129	C16	C92	ESAS CABINET DIGITAL SUBSYSTEM 2
129	C18	PSV-1000	PZR ERV
129	C18	A-3	4160 VOLT BUS A-3
129	C18	P-4A	'A' SERVICE WATER PUMP
129	C18	CV-3640	'B' DISCH TO LOOP II SW
129	C18	CV-3646	P-4A TO P-4B DISCH CROSSOVER
129	C18	P-34A	'A' LOOP DH REMOVAL PUMP
129	C18	P-36A	PRIMARY MAKEUP PUMP
129	C18	P-7B	EMERGENCY F.W PUMP
129	C18	CV-1405	RB SUMP LINE A OUTLET
129	C18	CV-1401	LPI/DECAY HEAT BLOCK
129	C18	CV-1219	HPI TO P-32C DISCHARGE
129	C18	CV-1220	HPI TO P-32D DISCHARGE
129	C18	CV-1407	BWST T-3 OUTLET
129	C18	CV-3820	LOOP 1 SUPPLY TO ICW COOLERS
129	C18	CV-3822	DECAY HEAT CLR SERVICE WTR E-35A INLET
129	C18	SG-5	SLUICE GATE
129	C18	CV-1278	HPI TO P-32A DISCH

Table 1

LIst of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
129	C18	CV-1279	HPI TO P-32B DISCH
129	C18	CV-5612	FIREWATER TO RB INSIDE ISOL
129	C18	SG-3	SLUICE GATE
129	C18	CV-1050	DH SUCTION ISOL
129	C18	CV-3643	ACW LOOP ISOL
129	C18	CV-1276	'A' DH LOOP DISCH TO MU PUMP P-36A SUCTION
129	C18	CV-1434	DECAY HEAT P-34A SUCTION FROM RCS
129	C18	CV-1436	DECAY HEAT P-34A SUCTION FROM BWST
129	C18	SV-0611	MAIN STM ISOL CV-2691 CLOSURE
129	C18	SV-0721	MAIN STM ISOL CV-2692 CLOSURE
129	C18	LT-1421	BWST LVL XMTR
129	C18	C539A	EFIC SIGNAL CONDITIONING CABINET
129	C18	C539B	EFIC SIGNAL CONDITIONING CABINET
129	C18	LT-1001	PZR LVL
129	C18	NE-0501	SOURCE RANGE NEUTRON DETECTOR ASSEMBLY
129	C18	PT-1042	B' LOOP RCS PRESS (WR)
129	C18	C86	SAS CABINET DIGITAL SUBSYSTEM 1
129	C18	C87	ESAS CABINET DIGITAL SUBSYSTEM 1
129	C19	VEF-24C	#2 EDG EXHAUST FAN
129	C19	VEF-24D	#2 EDG EXHAUST FAN
129	C19	VUC-1C	AUX BLDG DECAY HT REMOVAL UNIT COOLER
129	C19	VUC-1D	AUX BLDG DECAY HT REMOVAL UNIT COOLER
129	C19	CV-3807	SERV WTR TO DG2 CLRS
129	C19	CV-2613	EFW PP TURBINE K-3 STEAM ADMISSION VLV
129	C19	CV-2615	EFW PUMP TURBINE K3 STEAM ADMISSION VALVE BYPASS
129	C19	VEF-24A	#1 EDG EXHAUST FAN
129	C19	VEF-24B	#1 EDG EXHAUST FAN
129	C19	VUC-1A	AUX BLDG DECAY HT REMOVAL UNIT COOLER
129	C19	VUC-1B	AUX BLDG DECAY HT REMOVAL UNIT COOLER

Table 1 List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129			
Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
129	C19	CV-3806	SERV WTR TO DG1 CLRS
129	C19	CV-2663	EFW PP TURBINE K-3 STEAM ADMISSION VLV
129	C19	CV-2665	EFW PUMP TURBINE K3 STEAM ADMISSION VALVE BYPASS
129	C20	K-4B	#2 EDG
129	C20	K-4A	#1 EDG
129	C26	SG-6	SLUICE GATE
129	C26	SG-7	SLUICE GATE
129	C26	SG-2	SLUICE GATE
129	C26	SG-4	SLUICE GATE
129	C26	SG-5	SLUICE GATE
129	C26	SG-3	SLUICE GATE
129	C26	SG-1	SLUICE GATE
129	C27	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
129	C27	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
129	C30	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
129	C30	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
129	C30	PSV-1000	PZR ERV
129	C30	P-7B	EMERGENCY F.W. PUMP
129	C37-1	C37-1	EFIC CABINET CHANNEL A (RED)
129	C37-2	C37-2	EFIC CABINET CHANNEL B (GREEN)
129	C37-3	C37-3	EFIC CABINET CHANNEL C (YELLOW)
129	C37-4	C37-4	EFIC CABINET CHANNEL D (BLUE)
129	C41	C37-1	EFIC CABINET CHANNEL A (RED)
129	C41	TE-1012	'A' LOOP TH TEMP DUAL ELEMENT INCL TE-1014
129	C41	PT-1021	A' LOOP RCS PRESS (RPS)
129	C42	C37-2	EFIC CABINET CHANNEL B (GREEN)
129	C42	TE-1013	'A' LOOP TH TEMP
129	C4233	PSV-1000	PZR ERV
129	C43	C37-3	EFIC CABINET CHANNEL C (YELLOW)

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
129	C43	TE-1040	B LOOP TH TEMP TO RPS
129	C43	PT-1038	B LOOP RCS PRESS C RPS C43
129	C44	C37-4	EFIC CABINET CHANNEL D (BLUE)
129	C44	TE-1041	'B' LOOP TH TEMP
129	C4420	PSV-1000	PZR ERV
129	C4422	PSV-1000	PZR ERV
129	C4423	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
129	C4423	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
129	C4436	PSV-1000	PZR ERV
129	C4438	PSV-1000	PZR ERV
129	C4439	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
129	C4439	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
129	C486-1	C486-1	AUXILIARY EQUIPMENT PANEL (RED)
129	C486-2	C486-2	AUXILIARY EQUIPMENT PANEL (GREEN)
129	C486-3	C486-3	AUXILIARY EQUIPMENT PANEL (YELLOW)
129	C486-4	C486-4	AUXILIARY EQUIPMENT PANEL (BLUE)
129	C498	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
129	C86	C86	ESAS CABINET DIGITAL SUBSYSTEM 1
129	C87	C87	ESAS CABINET DIGITAL SUBSYSTEM 1
129	C88	C88	ESAS ANALOG SUBSYSTEM NO 1
129	C89	C89	ESAS ANALOG SUBSYSTEM NO. 2
129	C90	C90	ESAS ANALOG SUBSYSTEM NO 3
129	C91	C91	ESAS CABINET DIGITAL SUBSYSTEM 2
129	C92	C92	ESAS CABINET DIGITAL SUBSYSTEM 2
129	C9752	C37-2	EFIC CABINET CHANNEL B (GREEN)
129	C9753	C37-3	EFIC CABINET CHANNEL C (YELLOW)
129	CVC055	CV-2663	EFW PP TURBINE K-3 STEAM ADMISSION VLV
129	DC133	PSV-1000	PZR ERV
129	DC134	PSV-1000	PZR ERV

Table 1 List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129			
Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
129	DC135	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
129	DC135	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
129	DC135	PSV-1000	PZR ERV
129	DC136	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
129	DC136	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
129	DC136	PSV-1000	PZR ERV
129	DC140	PSV-1000	PZR ERV
129	DC141	PSV-1000	PZR ERV
129	DJ078	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
129	DJ078	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
129	DJ079	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
129	DJ079	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
129	DJ080	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
129	DJ080	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
129	DJ081	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
129	DJ081	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
129	DJ082	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
129	DJ082	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
129	EC1098	K-4A	#1 EDG
129	EC1098	P-7B	EMERGENCY F.W. PUMP
129	EC1098	C88	ESAS ANALOG SUBSYSTEM NO 1
129	EC1098	CV-2646	P-7B TO SG-A CONTROL VALVE
129	EC1098	CV-2648	P-7B TO SG-B CONTROL VALVE
129	EC1098	RS-1	120 VAC DISTRIBUTION PNL RS1
129	EC1152	TE-1012	'A' LOOP TH TEMP DUAL ELEMENT INCL TE-1014
129	EC1152	C88	ESAS ANALOG SUBSYSTEM NO 1
129	EC1157	C486-1	AUXILIARY EQUIPMENT PANEL (RED)
129	EC1159	C86	ESAS CABINET DIGITAL SUBSYSTEM 1
129	EC1160	C86	ESAS CABINET DIGITAL SUBSYSTEM 1

Table 1 List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129			
Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
129	EC1160	C89	ESAS ANALOG SUBSYSTEM NO. 2
129	EC1161	C88	ESAS ANALOG SUBSYSTEM NO 1
129	EC1161	C86	ESAS CABINET DIGITAL SUBSYSTEM 1
129	EC1161	C87	ESAS CABINET DIGITAL SUBSYSTEM 1
129	EC1221	K-4A	#1 EDG
129	EC1221	C88	ESAS ANALOG SUBSYSTEM NO 1
129	EC1221	CV-2646	P-7B TO SG-A CONTROL VALVE
129	EC1221	CV-2648	P-7B TO SG-B CONTROL VALVE
129	EC1222	K-4A	#1 EDG
129	EC1224	TE-1012	'A' LOOP TH TEMP DUAL ELEMENT INCL TE-1014
129	EC1226	C486-1	AUXILIARY EQUIPMENT PANEL (RED)
129	EC1226	CV-2646	P-7B TO SG-A CONTROL VALVE
129	EC1226	CV-2648	P-7B TO SG-B CONTROL VALVE
129	EC1227	RS-1	120 VAC DISTRIBUTION PNL RS1
129	EC1268	RS-1	120 VAC DISTRIBUTION PNL RS1
129	EC1283	SG-3	SLUICE GATE
129	EC1286	LT-1421	BWST LVL XMTR
129	EC1311	CV-5612	FIREWATER TO RB INSIDE ISOL
129	EC1311	SG-1	SLUICE GATE
129	EC1311	CV-1050	DH SUCTION ISOL
129	EC1360	CV-1050	DH SUCTION ISOL
129	EC1361	CV-1050	DH SUCTION ISOL
129	EC1362	CV-1050	DH SUCTION ISOL
129	EC1393	C86	ESAS CABINET DIGITAL SUBSYSTEM 1
129	EC1393	C90	ESAS ANALOG SUBSYSTEM NO 3
129	EC1457	P-7B	EMERGENCY F.W. PUMP
129	EC1459	SG-3	SLUICE GATE
129	EC1460	CV-2646	P-7B TO SG-A CONTROL VALVE
129	EC1460	CV-2648	P-7B TO SG-B CONTROL VALVE

Table 1 List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129			
Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
129	EC1483	SG-1	SLUICE GATE
129	EC1486	SG-5	SLUICE GATE
129	EC1486	SG-3	SLUICE GATE
129	EC1490	A-3	4160 VOLT BUS A-3
129	EC1508	C37-1	EFIC CABINET CHANNEL A (RED)
129	EC1508	CV-2663	EFW PP TURBINE K-3 STEAM ADMISSION VLV
129	EC1508	C511	TRIP INTERFACE EQUIPMENT TIE CHAN A
129	EC1522	C37-1	EFIC CABINET CHANNEL A (RED)
129	EC1522	CV-2646	P-7B TO SG-A CONTROL VALVE
129	EC1522	CV-2648	P-7B TO SG-B CONTROL VALVE
129	EC1522	CV-2663	EFW PP TURBINE K-3 STEAM ADMISSION VALVE
129	EC1526	C37-1	EFIC CABINET CHANNEL A (RED)
129	EC1527	C37-1	EFIC CABINET CHANNEL A (RED)
129	EC1537	C37-1	EFIC CABINET CHANNEL A (RED)
129	EC1555	LT-1421	BWST LVL XMTR
129	EC1555	C539A	EFIC SIGNAL CONDITIONING CABINET
129	EC1555	C539B	EFIC SIGNAL CONDITIONING CABINET
129	EC1555	LT-1001	PZR LVL
129	EC1555	NE-0501	SOURCE RANGE NEUTRON DETECTOR ASSEMBLY
129	EC1555	PT-1042	B' LOOP RCS PRESS (WR)
129	EC1598	C86	ESAS CABINET DIGITAL SUBSYSTEM 1
129	EC2092	K-4B	#2 EDG
129	EC2092	C89	ESAS ANALOG SUBSYSTEM NO. 2
129	EC2092	PT-1022	A LOOP RCS PRESS (ESAS #2)
129	EC2092	C486-2	AUXILIARY EQUIPMENT PANEL (GREEN)
129	EC2092	CV-2645	P-7A TO SG-A CONTROL
129	EC2092	CV-2647	P-7A TO SG-B CONTROL
129	EC2092	LT-1411	BWST LVL XMTR
129	EC2092	RS-2	120 VAC DISTRIBUTION PNL RS2

Table 1 List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129			
Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
129	EC2169	TE-1013	'A' LOOP TH TEMP
129	EC2176	K-4B	#2 EDG
129	EC2176	C89	ESAS ANALOG SUBSYSTEM NO. 2
129	EC2176	PT-1022	A LOOP RCS PRESS (ESAS #2)
129	EC2176	C486-2	AUXILIARY EQUIPMENT PANEL (GREEN)
129	EC2176	CV-2645	P-7A TO SG-A CONTROL
129	EC2176	CV-2647	P-7A TO SG-B CONTROL
129	EC2176	LT-1411	BWST LVL XMTR
129	EC2176	RS-2	120 VAC DISTRIBUTION PNL RS2
129	EC2182	C88	ESAS ANALOG SUBSYSTEM NO 1
129	EC2182	C91	ESAS CABINET DIGITAL SUBSYSTEM 2
129	EC2183	CV-1275	MAKEUP TANK OUTLET
129	EC2183	C89	ESAS ANALOG SUBSYSTEM NO. 2
129	EC2183	C91	ESAS CABINET DIGITAL SUBSYSTEM 2
129	EC2183	C92	ESAS CABINET DIGITAL SUBSYSTEM 2
129	EC2266	C89	ESAS ANALOG SUBSYSTEM NO. 2
129	EC2266	PT-1022	A LOOP RCS PRESS (ESAS #2)
129	EC2267	RS-2	120 VAC DISTRIBUTION PNL RS2
129	EC2268	K-4B	#2 EDG
129	EC2268	TE-1013	'A' LOOP TH TEMP
129	EC2269	K-4B	#2 EDG
129	EC2271	TE-1013	'A' LOOP TH TEMP
129	EC2306	RS-2	120 VAC DISTRIBUTION PNL RS2
129	EC2330	C486-2	AUXILIARY EQUIPMENT PANEL (GREEN)
129	EC2330	CV-2645	P-7A TO SG-A CONTROL
129	EC2330	CV-2647	P-7A TO SG-B CONTROL
129	EC2330	LT-1411	BWST LVL XMTR
129	EC2342	SG-4	SLUICE GATE
129	EC2343	SG-4	SLUICE GATE

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles In Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
129	EC2406	SG-6	SLUICE GATE
129	EC2406	SG-7	SLUICE GATE
129	EC2406	SG-4	SLUICE GATE
129	EC2452	CV-1410	DH SUCTION ISOL
129	EC2454	CV-1410	DH SUCTION ISOL
129	EC2455	CV-1410	DH SUCTION ISOL
129	EC2700	C486-2	AUXILIARY EQUIPMENT PANEL (GREEN)
129	EC2700	CV-2645	P-7A TO SG-A CONTROL
129	EC2700	CV-2647	P-7A TO SG-B CONTROL
129	EC2745	SG-2	SLUICE GATE
129	EC2757	CV-2613	EFW PP TURBINE K-3 STEAM ADMISSION VLV
129	EC2757	CV-2615	EFW PUMP TURBINE K3 STEAM ADMISSION VALVE BYPASS
129	EC2757	C512	TRIP INTERFACE EQUIPMENT TIE CHAN B
129	EC2760	C512	TRIP INTERFACE EQUIPMENT TIE CHAN B
129	EC2760	C37-2	EFIC CABINET CHANNEL B (GREEN)
129	EC2769	C37-2	EFIC CABINET CHANNEL B (GREEN)
129	EC2769	CV-2645	P-7A TO SG-A CONTROL
129	EC2769	CV-2647	P-7A TO SG-B CONTROL
129	EC2769	CV-2613	EFW PP TURBINE K-3 STEAM ADMISSION VLV
129	EC2771	C37-2	EFIC CABINET CHANNEL B (GREEN)
129	EC2775	C37-2	EFIC CABINET CHANNEL B (GREEN)
129	EC2780	C37-2	EFIC CABINET CHANNEL B (GREEN)
129	EC2780	CV-2613	EFW PP TURBINE K-3 STEAM ADMISSION VLV
129	EC2794	CV-1400	LPI/DECAY HEAT BLOCK
129	EC2803	C37-2	EFIC CABINET CHANNEL B (GREEN)
129	EC2805	C37-2	EFIC CABINET CHANNEL B (GREEN)
129	EC2805	C486-2	AUXILIARY EQUIPMENT PANEL (GREEN)
129	EC2805	CV-2645	P-7A TO SG-A CONTROL
129	EC2805	CV-2647	P-7A TO SG-B CONTROL

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
129	EC2810	C512	TRIP INTERFACE EQUIPMENT TIE CHAN B
129	EC2811	CV-2613	EFW PP TURBINE K-3 STEAM ADMISSION VLV
129	EC2811	CV-2615	EFW PUMP TURBINE K3 STEAM ADMISSION VALVE BYPASS
129	EC2811	C512	TRIP INTERFACE EQUIPMENT TIE CHAN B
129	EC2827	LT-1411	BWST LVL XMTR
129	EC2832	CV-2613	EFW PP TURBINE K-3 STEAM ADMISSION VLV
129	EC2832	CV-2615	EFW PUMP TURBINE K3 STEAM ADMISSION VALVE BYPASS
129	EC3002	C486-3	AUXILIARY EQUIPMENT PANEL (YELLOW)
129	EC3002	RS-3	120 VAC DISTRIBUTION PNL RS3
129	EC3008	C486-3	AUXILIARY EQUIPMENT PANEL (YELLOW)
129	EC3009	RS-3	120 VAC DISTRIBUTION PNL RS3
129	EC3011	C486-3	AUXILIARY EQUIPMENT PANEL (YELLOW)
129	EC3011	RS-3	120 VAC DISTRIBUTION PNL RS3
129	EC3019	C90	ESAS ANALOG SUBSYSTEM NO 3
129	EC3020	TE-1040	B LOOP TH TEMP TO RPS
129	EC3021	TE-1040	B LOOP TH TEMP TO RPS
129	EC3023	TE-1040	B LOOP TH TEMP TO RPS
129	EC3027	RS-3	120 VAC DISTRIBUTION PNL RS3
129	EC3030	C486-3	AUXILIARY EQUIPMENT PANEL (YELLOW)
129	EC3031	C486-3	AUXILIARY EQUIPMENT PANEL (YELLOW)
129	EC3035	C37-3	EFIC CABINET CHANNEL C (YELLOW)
129	EC3036	C37-3	EFIC CABINET CHANNEL C (YELLOW)
129	EC3038	C486-3	AUXILIARY EQUIPMENT PANEL (YELLOW)
129	EC3043	C90	ESAS ANALOG SUBSYSTEM NO 3
129	EC4013	C486-4	AUXILIARY EQUIPMENT PANEL (BLUE)
129	EC4013	RS-4	120 VAC DISTRIBUTION PNL RS4
129	EC4019	RS-4	120 VAC DISTRIBUTION PNL RS4
129	EC4022	C486-4	AUXILIARY EQUIPMENT PANEL (BLUE)

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated MIssiles In Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
129	EC4022	RS-4	120 VAC DISTRIBUTION PNL RS4
129	EC4027	TE-1041	'B' LOOP TH TEMP
129	EC4028	C486-4	AUXILIARY EQUIPMENT PANEL (BLUE)
129	EC4029	TE-1041	'B' LOOP TH TEMP
129	EC4034	C486-4	AUXILIARY EQUIPMENT PANEL (BLUE)
129	EC4036	C37-4	EFIC CABINET CHANNEL D (BLUE)
129	EC4037	C37-4	EFIC CABINET CHANNEL D (BLUE)
129	EJ1001	C486-1	AUXILIARY EQUIPMENT PANEL (RED)
129	EJ1001	CV-2646	P-7B TO SG-A CONTROL VALVE
129	EJ1001	CV-2648	P-7B TO SG-B CONTROL VALVE
129	EJ1006	LT-2618	STM GEN E24A LOW RANGE LEVEL (EFIC)
129	EJ1006	LT-2620	STM GEN E24A UPPER RNG LEVL (EFIC)
129	EJ1006	PT-2618A	E24A MAIN STM PRESS-MSLI
129	EJ1006	LT-2667	STM GEN E24B LOW RANGE LEVEL (EFIC)
129	EJ1006	LT-2669	STM GEN E24B UPPER RANGE LEVEL (EFIC)
129	EJ1006	PT-2667A	E24B MAIN STM PRESS-MSLI
129	EJ1006	C37-1	EFIC CABINET CHANNEL A (RED)
129	EJ1010	C37-1	EFIC CABINET CHANNEL A (RED)
129	EJ1010	CV-2646	P-7B TO SG-A CONTROL VALVE
129	EJ1010	CV-2648	P-7B TO SG-B CONTROL VALVE
129	EJ1024	C486-1	AUXILIARY EQUIPMENT PANEL (RED)
129	EJ1024	CV-2646	P-7B TO SG-A CONTROL VALVE
129	EJ1024	CV-2648	P-7B TO SG-B CONTROL VALVE
129	EJ2002	LT-2622	SG E-24A LOW RANGE LEVEL (EFIC)
129	EJ2002	LT-2624	STM GEN E24A UPPER RANGE LEVEL (EFIC)
129	EJ2002	PT-2618B	PT-E24A MAIN STM PRESS-MSLI
129	EJ2002	LT-2671	STM GEN E24B LOW RANGE LEVEL
129	EJ2002	LT-2673	STM GEN E24B UPPER RNG LEVEL (EFIC)
129	EJ2002	PT-2667B	PT-E24B MAIN STM PRESS-MSLI

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
129	EJ2002	C486-2	AUXILIARY EQUIPMENT PANEL (GREEN)
129	EJ2002	CV-2645	P-7A TO SG-A CONTROL
129	EJ2002	CV-2647	P-7A TO SG-B CONTROL
129	EJ2003	C37-2	EFIC CABINET CHANNEL B (GREEN)
129	EJ2008	LT-2622	SG E-24A LOW RANGE LEVEL (EFIC)
129	EJ2008	LT-2624	STM GEN E24A UPPER RANGE LEVEL (EFIC)
129	EJ2008	PT-2618B	PT-E24A MAIN STM PRESS-MSLI
129	EJ2008	LT-2671	STM GEN E24B LOW RANGE LEVEL
129	EJ2008	LT-2673	STM GEN E24B UPPER RNG LEVEL (EFIC)
129	EJ2008	PT-2667B	PT-E24B MAIN STM PRESS-MSLI
129	EJ2013	C37-2	EFIC CABINET CHANNEL B (GREEN)
129	EJ2013	CV-2645	P-7A TO SG-A CONTROL
129	EJ2013	CV-2647	P-7A TO SG-B CONTROL
129	EJ2024	CV-2645	P-7A TO SG-A CONTROL
129	EJ2024	CV-2647	P-7A TO SG-B CONTROL
129	EJ2025	C486-2	AUXILIARY EQUIPMENT PANEL (GREEN)
129	EJ2025	CV-2645	P-7A TO SG-A CONTROL
129	EJ2025	CV-2647	P-7A TO SG-B CONTROL
129	EJ2027	C486-2	AUXILIARY EQUIPMENT PANEL (GREEN)
129	EJ2027	CV-2645	P-7A TO SG-A CONTROL
129	EJ2027	CV-2647	P-7A TO SG-B CONTROL
129	EJ2035	C37-2	EFIC CABINET CHANNEL B (GREEN)
129	EJ3006	LT-2668	SG E-24A LOW RANGE LEVEL (EFIC)
129	EJ3006	LT-2670	STM GEN E24A UPPER RANGE LEVEL (EFIC)
129	EJ3006	PT-2668A	E24A MAIN STM PRESS-MSLI
129	EJ3006	LT-2617	STM GEN E24B LOW RANGE LEVEL (EFIC)
129	EJ3006	LT-2619	STM GEN E24B UPPER RNG LEVEL (EFIC)
129	EJ3006	PT-2617A	E24B MAIN STM PRESS-MSLI
129	EJ4003	LT-2672	SG A LOW RANGE LEVEL (EFIC)

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
129	EJ4003	LT-2674	STM GEN E24A UPPER RANGE LEVEL (EFIC)
129	EJ4003	PT-2668B	PT-E24A MAIN STM PRESS-MSLI
129	EJ4003	LT-2621	SG E-24B LOW RANGE LEVEL (EFIC)
129	EJ4003	LT-2623	STM GEN E24B UPPER RANGE LEVEL (EFIC)
129	EJ4003	PT-2617B	E24B MAIN STM PRESS-MSLI
129	ER1007	C37-1	EFIC CABINET CHANNEL A (RED)
129	ER1007	TE-1012	'A' LOOP TH TEMP DUAL ELEMENT INCL TE-1014
129	ER1007	PT-1021	'A' LOOP RCS PRESS (RPS)
129	ER1008	C37-1	EFIC CABINET CHANNEL A (RED)
129	ER1008	TE-1012	'A' LOOP TH TEMP DUAL ELEMENT INCL TE-1014
129	ER1008	PT-1021	'A' LOOP RCS PRESS (RPS)
129	ER1023	C37-1	EFIC CABINET CHANNEL A (RED)
129	ER1024	C37-1	EFIC CABINET CHANNEL A (RED)
129	ER1025	TE-1012	'A' LOOP TH TEMP DUAL ELEMENT INCL TE-1014
129	ER1025	PT-1021	'A' LOOP RCS PRESS (RPS)
129	ER2010	C37-2	EFIC CABINET CHANNEL B (GREEN)
129	ER2010	TE-1013	'A' LOOP TH TEMP
129	ER2012	C37-2	EFIC CABINET CHANNEL B (GREEN)
129	ER2012	TE-1013	'A' LOOP TH TEMP
129	ER2020	C91	ESAS CABINET DIGITAL SUBSYSTEM 2
129	ER2020	C92	ESAS CABINET DIGITAL SUBSYSTEM 2
129	ER2022	C91	ESAS CABINET DIGITAL SUBSYSTEM 2
129	ER2025	C37-2	EFIC CABINET CHANNEL B (GREEN)
129	ER2026	TE-1013	'A' LOOP TH TEMP
129	ER3004	C37-3	EFIC CABINET CHANNEL C (YELLOW)
129	ER3004	TE-1040	B LOOP TH TEMP TO RPS
129	ER3004	PT-1038	B LOOP RCS PRESS C RPS C43
129	ER3006	C37-3	EFIC CABINET CHANNEL C (YELLOW)
129	ER3006	TE-1040	B LOOP TH TEMP TO RPS

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
129	ER3006	PT-1038	B LOOP RCS PRESS C RPS C43
129	ER3007	C90	ESAS ANALOG SUBSYSTEM NO 3
129	ER3007	PT-1040	B' LOOP RCS PRESS (ESAS #3)
129	ER3007	PT-2407	RB PRESS (ESAS #3)
129	ER3010	C37-3	EFIC CABINET CHANNEL C (YELLOW)
129	ER3010	PT-1038	B LOOP RCS PRESS C RPS C43
129	ER3011	TE-1040	B LOOP TH TEMP TO RPS
129	ER4004	PT-2668B	PT-E24A MAIN STM PRESS-MSLI
129	ER4004	PT-2617B	E24B MAIN STM PRESS-MSLI
129	ER4004	C37-4	EFIC CABINET CHANNEL D (BLUE)
129	ER4004	TE-1041	'B' LOOP TH TEMP
129	ER4017	C37-4	EFIC CABINET CHANNEL D (BLUE)
129	ER4017	TE-1041	'B' LOOP TH TEMP
129	ER4018	TE-1041	'B' LOOP TH TEMP
129	ER4020	C37-4	EFIC CABINET CHANNEL D (BLUE)
129	ER406	LT-2672	SG A LOW RANGE LEVEL (EFIC)
129	ER406	LT-2674	STM GEN E24A UPPER RANGE LEVEL (EFIC)
129	ER406	PT-2668B	PT-E24A MAIN STM PRESS-MSLI
129	ER406	LT-2623	STM GEN E24B UPPER RANGE LEVEL (EFIC)
129	ER406	PT-2617B	E24B MAIN STM PRESS-MSLI
129	ER406	C37-4	EFIC CABINET CHANNEL D (BLUE)
129	ER406	TE-1041	'B' LOOP TH TEMP
129	FC022	C37-2	EFIC CABINET CHANNEL B (GREEN)
129	FC022	C37-3	EFIC CABINET CHANNEL C (YELLOW)
129	FJ022	C37-1	EFIC CABINET CHANNEL A (RED)
129	FJ022	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
129	FJ022	C37-4	EFIC CABINET CHANNEL D (BLUE)
129	J4088	C48	NNI AUX CONTROL SYS (Y-PWR)

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
129	J4088	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
129	J4088	CV-1207	SEAL INJ CONTROL VALVE
129	J4187	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
129	J4187	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
129	J4193	CV-1207	SEAL INJ CONTROL VALVE
129	J4200	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
129	J4200	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
129	J4201	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
129	J4201	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
129	J4258	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
129	J4258	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
129	J4740	C37-1	EFIC CABINET CHANNEL A (RED)
129	J4740	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
129	J4740	C37-4	EFIC CABINET CHANNEL D (BLUE)
129	J4779	C37-1	EFIC CABINET CHANNEL A (RED)
129	J4779	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
129	J4781	C37-4	EFIC CABINET CHANNEL D (BLUE)
129	J4781	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
129	JB317	TE-1041	'B' LOOP TH TEMP
129	JB317	C486-4	AUXILIARY EQUIPMENT PANEL (BLUE)
129	JB317	RS-4	120 VAC DISTRIBUTION PNL RS4
129	JB318	TE-1040	B LOOP TH TEMP TO RPS
129	JB318	C486-3	AUXILIARY EQUIPMENT PANEL (YELLOW)
129	JB318	RS-3	120 VAC DISTRIBUTION PNL RS3
129	JB319	K-4B	#2 EDG
129	JB319	TE-1013	'A' LOOP TH TEMP
129	JB320	K-4A	#1 EDG

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
129	JB320	TE-1012	'A' LOOP TH TEMP DUAL ELEMENT INCL TE-1014
129	JB320	C88	ESAS ANALOG SUBSYSTEM NO 1
129	JB320	C486-1	AUXILIARY EQUIPMENT PANEL (RED)
129	JB320	CV-2646	P-7B TO SG-A CONTROL VALVE
129	JB320	CV-2648	P-7B TO SG-B CONTROL VALVE
129	JB320	RS-1	120 VAC DISTRIBUTION PNL RS1
129	JB386	K-4A	#1 EDG
129	JB386	P-7B	EMERGENCY F.W. PUMP
129	JB386	C88	ESAS ANALOG SUBSYSTEM NO 1
129	JB386	CV-2646	P-7B TO SG-A CONTROL VALVE
129	JB386	CV-2648	P-7B TO SG-B CONTROL VALVE
129	JB386	RS-1	120 VAC DISTRIBUTION PNL RS1
129	JB387	K-4B	#2 EDG
129	JB387	C89	ESAS ANALOG SUBSYSTEM NO. 2
129	JB387	PT-1022	A LOOP RCS PRESS (ESAS #2)
129	JB387	C486-2	AUXILIARY EQUIPMENT PANEL (GREEN)
129	JB387	CV-2645	P-7A TO SG-A CONTROL
129	JB387	CV-2647	P-7A TO SG-B CONTROL
129	JB387	LT-1411	BWST LVL XMTR
129	JB387	RS-2	120 VAC DISTRIBUTION PNL RS2
129	JB389	C37-4	EFIC CABINET CHANNEL D (BLUE)
129	JB389	TE-1041	'B' LOOP TH TEMP
129	JB390	K-4B	#2 EDG
129	JB390	TE-1013	'A' LOOP TH TEMP
129	JB390	C89	ESAS ANALOG SUBSYSTEM NO. 2
129	JB390	PT-1022	A LOOP RCS PRESS (ESAS #2)
129	JB390	C486-2	AUXILIARY EQUIPMENT PANEL (GREEN)
129	JB390	CV-2645	P-7A TO SG-A CONTROL
129	JB390	CV-2647	P-7A TO SG-B CONTROL

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
129	JB390	LT-1411	BWST LVL XMTR
129	JB390	RS-2	120 VAC DISTRIBUTION PNL RS2
129	JB391	C37-3	EFIC CABINET CHANNEL C (YELLOW)
129	JB391	TE-1040	B LOOP TH TEMP TO RPS
129	JB391	PT-1038	B LOOP RCS PRESS C RPS C43
129	JB392	C37-2	EFIC CABINET CHANNEL B (GREEN)
129	JB392	TE-1013	'A' LOOP TH TEMP
129	JB393	C37-1	EFIC CABINET CHANNEL A (RED)
129	JB393	TE-1012	'A' LOOP TH TEMP DUAL ELEMENT INCL TE-1014
129	JB393	PT-1021	A' LOOP RCS PRESS (RPS)
129	JB510	SG-4	SLUICE GATE
129	JB511	SG-3	SLUICE GATE
129	JB536	SG-6	SLUICE GATE
129	JB536	SG-7	SLUICE GATE
129	JB536	SG-2	SLUICE GATE
129	JB536	SG-4	SLUICE GATE
129	JB537	CV-5612	FIREWATER TO RB INSIDE ISOL
129	JB537	SG-1	SLUICE GATE
129	JB537	CV-1050	DH SUCTION ISOL
129	JB716	LT-2622	SG E-24A LOW RANGE LEVEL (EFIC)
129	JB716	LT-2624	STM GEN E24A UPPER RANGE LEVEL (EFIC)
129	JB716	PT-2618B	PT-E24A MAIN STM PRESS-MSLI
129	JB716	LT-2671	STM GEN E24B LOW RANGE LEVEL
129	JB716	LT-2673	STM GEN E24B UPPER RNG LEVEL (EFIC)
129	JB716	PT-2667B	PT-E24B MAIN STM PRESS-MSLI
129	JB716	C486-2	AUXILIARY EQUIPMENT PANEL (GREEN)
129	JB716	CV-2645	P-7A TO SG-A CONTROL
129	JB716	CV-2647	P-7A TO SG-B CONTROL
129	JB716	C37-2	EFIC CABINET CHANNEL B (GREEN)

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles In Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
129	JB734	CV-2613	EFW PP TURBINE K-3 STEAM ADMISSION VLV
129	JB734	CV-2615	EFW PUMP TURBINE K3 STEAM ADMISSION VALVE BYPASS
129	JB734	C512	TRIP INTERFACE EQUIPMENT TIE CHAN B
129	JB734	C37-2	EFIC CABINET CHANNEL B (GREEN)
129	JB886	P-7B	EMERGENCY F W PUMP
129	JB886	CV-2667	EFW PP TURBINE K-3 STEAM FROM SG-A
129	JB886	CV-2663	EFW PP TURBINE K-3 STEAM ADMISSION VLV
129	JB886	CV-2665	EFW PUMP TURBINE K3 STEAM ADMISSION VALVE BYPASS
129	JB886	C511	TRIP INTERFACE EQUIPMENT TIE CHAN A
129	JB886	LT-2618	STM GEN E24A LOW RANGE LEVEL (EFIC)
129	JB886	LT-2620	STM GEN E24A UPPER RNG LEVL (EFIC)
129	JB886	PT-2618A	E24A MAIN STM PRESS-MSLI
129	JB886	LT-2667	STM GEN E24B LOW RANGE LEVEL (EFIC)
129	JB886	LT-2669	STM GEN E24B UPPER RANGE LEVEL (EFIC)
129	JB886	PT-2667A	E24B MAIN STM PRESS-MSLI
129	JB886	C486-1	AUXILIARY EQUIPMENT PANEL (RED)
129	JB886	CV-2646	P-7B TO SG-A CONTROL VALVE
129	JB886	CV-2648	P-7B TO SG-B CONTROL VALVE
129	JB886	C37-1	EFIC CABINET CHANNEL A (RED)
129	RS-1	RS-1	120 VAC DISTRIBUTION PNL RS1
129	RS-2	RS-2	120 VAC DISTRIBUTION PNL RS2
129	RS-3	RS-3	120 VAC DISTRIBUTION PNL RS3
129	RS-4	RS-4	120 VAC DISTRIBUTION PNL RS4
129	TI-1432	TI-1432	DH CLR E35B LP INJ TO REACT
129	TI-1433	TI-1433	DH CLR E35A LP INJ TO REACT
129	VC041	PSV-1000	PZR ERV
129	VC051	C37-2	EFIC CABINET CHANNEL B (GREEN)
129	VC051	C37-1	EFIC CABINET CHANNEL A (RED)

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
129	VC051	CV-2646	P-7B TO SG-A CONTROL VALVE
129	VC051	CV-2648	P-7B TO SG-B CONTROL VALVE
129	VC052	CV-2613	EFW PP TURBINE K-3 STEAM ADMISSION VLV
129	VC052	P-7B	EMERGENCY F.W. PUMP
129	VC052	CV-2803	EFW P-7B SUCTION FROM SW
129	VC052	CV-3850	EFW SERV WTR LOOP I ISOLATION
129	VC052	CV-2667	EFW PP TURBINE K-3 STEAM FROM SG-A
129	VC053	C37-2	EFIC CABINET CHANNEL B (GREEN)
129	VC053	CV-2645	P-7A TO SG-A CONTROL
129	VC053	CV-2647	P-7A TO SG-B CONTROL
129	VC114	CV-1410	DH SUCTION ISOL
129	VC117	LT-1411	BWST LVL XMTR
129	VC122	A-4	4160 VOLT BUS A-4
129	VC129	CV-3822	DECAY HEAT CLR SERVICE WTR E-35A INLET
129	VC129	C539A	EFIC SIGNAL CONDITIONING CABINET
129	VC129	C539B	EFIC SIGNAL CONDITIONING CABINET
129	VC129	LT-1001	PZR LVL
129	VC129	NE-0501	SOURCE RANGE NEUTRON DETECTOR ASSEMBLY
129	VC129	PT-1042	'B' LOOP RCS PRESS (WR)
129	VC130	CV-1278	HPI TO P-32A DISCH
129	VC130	CV-1279	HPI TO P-32B DISCH
129	VC182	C37-2	EFIC CABINET CHANNEL B (GREEN)
129	VC182	C37-3	EFIC CABINET CHANNEL C (YELLOW)
129	VC194	C88	ESAS ANALOG SUBSYSTEM NO 1
129	VC194	C86	ESAS CABINET DIGITAL SUBSYSTEM 1
129	VC196	C89	ESAS ANALOG SUBSYSTEM NO. 2
129	VC196	PT-1022	A LOOP RCS PRESS (ESAS #2)
129	VC196	C91	ESAS CABINET DIGITAL SUBSYSTEM 2
129	VC198	C90	ESAS ANALOG SUBSYSTEM NO 3

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles In Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
129	VC199	C90	ESAS ANALOG SUBSYSTEM NO 3
129	VC199	C91	ESAS CABINET DIGITAL SUBSYSTEM 2
129	VC205	C90	ESAS ANALOG SUBSYSTEM NO 3
129	VJ015	CV-2645	P-7A TO SG-A CONTROL
129	VJ015	CV-2647	P-7A TO SG-B CONTROL
129	VJ015	C37-2	EFIC CABINET CHANNEL B (GREEN)
129	VJ015	SV-0611	MAIN STM ISOL CV-2691 CLOSURE
129	VJ015	SV-0721	MAIN STM ISOL CV-2692 CLOSURE
129	VJ048	C37-4	EFIC CABINET CHANNEL D (BLUE)
129	VJ048	TE-1041	'B' LOOP TH TEMP
129	VJ062	C88	ESAS ANALOG SUBSYSTEM NO 1
129	VJ065	C92	ESAS CABINET DIGITAL SUBSYSTEM 2
F2-98-A	EC1175	A-3	4160 VOLT BUS A-3
F2-98-A	EC1179	A-3	4160 VOLT BUS A-3
98	EC1180	A-3	4160 VOLT BUS A-3
98	EC1182	A-3	4160 VOLT BUS A-3
98	JB343	A-3	4160 VOLT BUS A-3
98	JB345	A-3	4160 VOLT BUS A-3
98	JB346	A-3	4160 VOLT BUS A-3
98	EC2006	A-4	4160 VOLT BUS A-4
98	EC2022	A-4	4160 VOLT BUS A-4
98	EC2025	A-4	4160 VOLT BUS A-4
98	EC2128	A-4	4160 VOLT BUS A-4
98	EC2211	A-4	4160 VOLT BUS A-4
98	EC2216	A-4	4160 VOLT BUS A-4
98	EC2229	A-4	4160 VOLT BUS A-4
98	EC225	A-4	4160 VOLT BUS A-4
98	EC229	A-4	4160 VOLT BUS A-4
98	EC2319	A-4	4160 VOLT BUS A-4

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles In Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
98	EC235	A-4	4160 VOLT BUS A-4
98	JB347	A-4	4160 VOLT BUS A-4
98	JB348	A-4	4160 VOLT BUS A-4
98	EC2020	B-5	480V LOAD CENTER BUS B-5
98	EC2020	B-56	MOTOR CONTROL CENTER
98	EC1175	B-6	480V LOAD CENTER BUS B-6
98	EC1179	B-6	480V LOAD CENTER BUS B-6
98	EC1193	B-6	480V LOAD CENTER BUS B-6
98	EC1259	B-6	480V LOAD CENTER BUS B-6
98	EC2017	B-6	480V LOAD CENTER BUS B-6
98	EC2020	B-6	480V LOAD CENTER BUS B-6
98	EC2022	B-6	480V LOAD CENTER BUS B-6
98	EC2128	B-6	480V LOAD CENTER BUS B-6
98	EC2211	B-6	480V LOAD CENTER BUS B-6
98	EC2216	B-6	480V LOAD CENTER BUS B-6
98	EC2227	B-6	480V LOAD CENTER BUS B-6
98	EC2229	B-6	480V LOAD CENTER BUS B-6
98	EC225	B-6	480V LOAD CENTER BUS B-6
98	EC229	B-6	480V LOAD CENTER BUS B-6
98	EC2319	B-6	480V LOAD CENTER BUS B-6
98	EC235	B-6	480V LOAD CENTER BUS B-6
98	JB343	B-6	480V LOAD CENTER BUS B-6
98	JB345	B-6	480V LOAD CENTER BUS B-6
98	JB346	B-6	480V LOAD CENTER BUS B-6
98	JB347	B-6	480V LOAD CENTER BUS B-6
98	JB348	B-6	480V LOAD CENTER BUS B-6
98	EB203	B-65	MOTOR CONTROL CENTER
98	EB204	B-65	MOTOR CONTROL CENTER
98	EB2274	B-65	MOTOR CONTROL CENTER

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
98	EB2275	B-65	MOTOR CONTROL CENTER
98	EC206	C187	EFIC Tie cabinet
98	EC207	C187	EFIC Tie cabinet
98	EC208	C187	EFIC Tie cabinet
98	EC209	C187	EFIC Tie cabinet
98	EC2131	C187	EFIC Tie cabinet
98	EC2216	C187	EFIC Tie cabinet
98	EC2218	C187	EFIC Tie cabinet
98	EC2227	C187	EFIC Tie cabinet
98	EC2228	C187	EFIC Tie cabinet
98	EC2229	C187	EFIC Tie cabinet
98	EC224	C187	EFIC Tie cabinet
98	EC225	C187	EFIC Tie cabinet
98	EC229	C187	EFIC Tie cabinet
98	EC235	C187	EFIC Tie cabinet
98	EC2759	C187	EFIC Tie cabinet
98	EC2788	C187	EFIC Tie cabinet
98	JB347	C187	EFIC Tie cabinet
98	JB348	C187	EFIC Tie cabinet
98	EJ1002	C37-1	EFIC CABINET CHANNEL A (RED)
98	EJ1004	C37-1	EFIC CABINET CHANNEL A (RED)
98	JB711	C37-1	EFIC CABINET CHANNEL A (RED)
98	ER2005	C37-2	EFIC CABINET CHANNEL B (GREEN)
98	ER201	C37-2	EFIC CABINET CHANNEL B (GREEN)
98	ER202	C37-2	EFIC CABINET CHANNEL B (GREEN)
98	DJ001	C47	NNI AUX CONTROL SYS (X-PWR)
98	J4064	C47	NNI AUX CONTROL SYS (X-PWR)
98	DJ001	C48	NNI AUX CONTROL SYS (Y-PWR)
98	J4064	C48	NNI AUX CONTROL SYS (Y-PWR)

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
98	EJ1002	C486-1	AUXILIARY EQUIPMENT PANEL (RED)
98	EJ1004	C486-1	AUXILIARY EQUIPMENT PANEL (RED)
98	JB711	C486-1	AUXILIARY EQUIPMENT PANEL (RED)
98	EJ2012	C486-2	AUXILIARY EQUIPMENT PANEL (GREEN)
98	ER202	C486-2	AUXILIARY EQUIPMENT PANEL (GREEN)
98	C4093	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
98	DC018	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
98	DC019	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
98	DJ001	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
98	DJ048	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
98	DJ049	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
98	J4064	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
98	J4801	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
98	J9053	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
98	EC1498	C511	TRIP INTERFACE EQUIPMENT TIE CHAN A
98	EC1504	C511	TRIP INTERFACE EQUIPMENT TIE CHAN A
98	JB711	C511	TRIP INTERFACE EQUIPMENT TIE CHAN A
98	EC209	C512	TRIP INTERFACE EQUIPMENT TIE CHAN B
98	EC2757	C512	TRIP INTERFACE EQUIPMENT TIE CHAN B
98	EC2770	C512	TRIP INTERFACE EQUIPMENT TIE CHAN B
98	DJ001	C539A	EFIC SIGNAL CONDITIONING CABINET
98	J4064	C539A	EFIC SIGNAL CONDITIONING CABINET
98	DJ048	C540A	EFIC SIGNAL CONDITIONING CABINET

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
98	DJ049	C540A	EFIC SIGNAL CONDITIONING CABINET
98	EC206	C540A	EFIC SIGNAL CONDITIONING CABINET
98	EC207	C540A	EFIC SIGNAL CONDITIONING CABINET
98	EC208	C540A	EFIC SIGNAL CONDITIONING CABINET
98	EC209	C540A	EFIC SIGNAL CONDITIONING CABINET
98	EC210	C540A	EFIC SIGNAL CONDITIONING CABINET
98	EC234	C540A	EFIC SIGNAL CONDITIONING CABINET
98	EC2806	C540A	EFIC SIGNAL CONDITIONING CABINET
98	ER202	C540A	EFIC SIGNAL CONDITIONING CABINET
98	J4064	C540A	EFIC SIGNAL CONDITIONING CABINET
98	J4801	C540A	EFIC SIGNAL CONDITIONING CABINET
98	J9053	C540A	EFIC SIGNAL CONDITIONING CABINET
98	EC206	C540B	EFIC SIGNAL CONDITIONING CABINET
98	EC207	C540B	EFIC SIGNAL CONDITIONING CABINET
98	EC208	C540B	EFIC SIGNAL CONDITIONING CABINET
98	EC209	C540B	EFIC SIGNAL CONDITIONING CABINET
98	EC210	C540B	EFIC SIGNAL CONDITIONING CABINET
98	EC234	C540B	EFIC SIGNAL CONDITIONING CABINET
98	EC2806	C540B	EFIC SIGNAL CONDITIONING CABINET
98	ER2005	C89	ESAS ANALOG SUBSYSTEM NO. 2
98	ER201	C89	ESAS ANALOG SUBSYSTEM NO. 2
98	ER202	C89	ESAS ANALOG SUBSYSTEM NO. 2
98	C4108	CV-1000	ERV Isolation
98	EC207	CV-1000	ERV Isolation
98	EC208	CV-1000	ERV Isolation
98	EC209	CV-1000	ERV Isolation
98	EC2025	CV-1227	HPI TO P-32B DISCHARGE
98	EC2027	CV-1227	HPI TO P-32B DISCHARGE
98	EC207	CV-1227	HPI TO P-32B DISCHARGE

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles In Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
98	EC208	CV-1227	HPI TO P-32B DISCHARGE
98	EC209	CV-1227	HPI TO P-32B DISCHARGE
98	EC210	CV-1227	HPI TO P-32B DISCHARGE
98	EC2025	CV-1228	HPI TO P-32A DISCHARGE
98	EC2027	CV-1228	HPI TO P-32A DISCHARGE
98	EC207	CV-1228	HPI TO P-32A DISCHARGE
98	EC208	CV-1228	HPI TO P-32A DISCHARGE
98	EC209	CV-1228	HPI TO P-32A DISCHARGE
98	EC210	CV-1228	HPI TO P-32A DISCHARGE
98	EC2020	CV-1275	MAKEUP TANK OUTLET
98	EC2020	CV-1277	'B' DH LOOP DISCH TO MU PUMP P-36C SUCTION
98	EC2025	CV-1400	LPI/DECAY HEAT BLOCK
98	EC207	CV-1400	LPI/DECAY HEAT BLOCK
98	EC208	CV-1400	LPI/DECAY HEAT BLOCK
98	EC209	CV-1400	LPI/DECAY HEAT BLOCK
98	EC210	CV-1400	LPI/DECAY HEAT BLOCK
98	EC1498	CV-1401	LPI/DECAY HEAT BLOCK
98	EC1504	CV-1401	LPI/DECAY HEAT BLOCK
98	JB711	CV-1401	LPI/DECAY HEAT BLOCK
98	C4092	CV-1404	P-34A/B SUCT SUPP FROM RCS
98	C4170	CV-1404	P-34A/B SUCT SUPP FROM RCS
98	DC018	CV-1404	P-34A/B SUCT SUPP FROM RCS
98	EB203	CV-1404	P-34A/B SUCT SUPP FROM RCS
98	EB204	CV-1404	P-34A/B SUCT SUPP FROM RCS
98	EB205	CV-1404	P-34A/B SUCT SUPP FROM RCS
98	EC224	CV-1404	P-34A/B SUCT SUPP FROM RCS
98	EC225	CV-1404	P-34A/B SUCT SUPP FROM RCS
98	EC230	CV-1404	P-34A/B SUCT SUPP FROM RCS
98	EC231	CV-1404	P-34A/B SUCT SUPP FROM RCS

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
98	EC232	CV-1404	P-34A/B SUCT SUPP FROM RCS
98	EC233	CV-1404	P-34A/B SUCT SUPP FROM RCS
98	EC234	CV-1404	P-34A/B SUCT SUPP FROM RCS
98	EC241	CV-1404	P-34A/B SUCT SUPP FROM RCS
98	EC2025	CV-1406	RB SUMP LINE B OUTLET
98	EC2028	CV-1406	RB SUMP LINE B OUTLET
98	EC207	CV-1406	RB SUMP LINE B OUTLET
98	EC208	CV-1406	RB SUMP LINE B OUTLET
98	EC209	CV-1406	RB SUMP LINE B OUTLET
98	EC210	CV-1406	RB SUMP LINE B OUTLET
98	EC2520	CV-1406	RB SUMP LINE B OUTLET
98	EC2025	CV-1408	BWST T-3 OUTLET
98	EC207	CV-1408	BWST T-3 OUTLET
98	EC208	CV-1408	BWST T-3 OUTLET
98	EC209	CV-1408	BWST T-3 OUTLET
98	EC210	CV-1408	BWST T-3 OUTLET
98	EC2027	CV-1410	DH SUCTION ISOL
98	EC207	CV-1410	DH SUCTION ISOL
98	EC208	CV-1410	DH SUCTION ISOL
98	EC209	CV-1410	DH SUCTION ISOL
98	EC210	CV-1410	DH SUCTION ISOL
98	EC2018	CV-1435	DECAY HEAT P-34B SUCTION FROM RCS
98	EC2018	CV-1437	DECAY HEAT P-34B SUCTION FROM BWST
98	EC207	CV-2613	EFW PP TURBINE K-3 STEAM ADMISSION VLV
98	EC208	CV-2613	EFW PP TURBINE K-3 STEAM ADMISSION VLV
98	EC209	CV-2613	EFW PP TURBINE K-3 STEAM ADMISSION VLV
98	EC2174	CV-2613	EFW PP TURBINE K-3 STEAM ADMISSION VLV
98	EC2757	CV-2613	EFW PP TURBINE K-3 STEAM ADMISSION VLV
98	EC2759	CV-2613	EFW PP TURBINE K-3 STEAM ADMISSION VLV

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles In Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
98	EC2851	CV-2613	EFW PP TURBINE K-3 STEAM ADMISSION VLV
98	EC207	CV-2615	EFW PUMP TURBINE K3 STEAM ADMISSION VALVE BYPASS
98	EC208	CV-2615	EFW PUMP TURBINE K3 STEAM ADMISSION VALVE BYPASS
98	EC209	CV-2615	EFW PUMP TURBINE K3 STEAM ADMISSION VALVE BYPASS
98	EC2174	CV-2615	EFW PUMP TURBINE K3 STEAM ADMISSION VALVE BYPASS
98	EC2757	CV-2615	EFW PUMP TURBINE K3 STEAM ADMISSION VALVE BYPASS
98	EC2759	CV-2615	EFW PUMP TURBINE K3 STEAM ADMISSION VALVE BYPASS
98	EC2851	CV-2615	EFW PUMP TURBINE K3 STEAM ADMISSION VALVE BYPASS
98	EC207	CV-2617	EFW PP TURBINE K-3 STEAM FROM SG-B
98	EC208	CV-2617	EFW PP TURBINE K-3 STEAM FROM SG-B
98	EC209	CV-2617	EFW PP TURBINE K-3 STEAM FROM SG-B
98	EC210	CV-2617	EFW PP TURBINE K-3 STEAM FROM SG-B
98	EC2174	CV-2617	EFW PP TURBINE K-3 STEAM FROM SG-B
98	C4096	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
98	C9688	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
98	DJ004	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
98	EC207	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
98	EC208	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
98	EC209	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
98	EC210	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
98	EC208	CV-2645	P-7A TO SG-A CONTROL
98	EC209	CV-2645	P-7A TO SG-A CONTROL
98	EC210	CV-2645	P-7A TO SG-A CONTROL
98	EC2131	CV-2645	P-7A TO SG-A CONTROL
98	EC2216	CV-2645	P-7A TO SG-A CONTROL

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
98	EC229	CV-2645	P-7A TO SG-A CONTROL
98	EC235	CV-2645	P-7A TO SG-A CONTROL
98	EC2795	CV-2645	P-7A TO SG-A CONTROL
98	EJ2012	CV-2645	P-7A TO SG-A CONTROL
98	ER202	CV-2645	P-7A TO SG-A CONTROL
98	TB670	CV-2645	P-7A TO SG-A CONTROL
98	EJ1002	CV-2646	P-7B TO SG-A CONTROL VALVE
98	EJ1004	CV-2646	P-7B TO SG-A CONTROL VALVE
98	JB711	CV-2646	P-7B TO SG-A CONTROL VALVE
98	TB669	CV-2646	P-7B TO SG-A CONTROL VALVE
98	EC208	CV-2647	P-7A TO SG-B CONTROL
98	EC209	CV-2647	P-7A TO SG-B CONTROL
98	EC210	CV-2647	P-7A TO SG-B CONTROL
98	EC2131	CV-2647	P-7A TO SG-B CONTROL
98	EC2216	CV-2647	P-7A TO SG-B CONTROL
98	EC229	CV-2647	P-7A TO SG-B CONTROL
98	EC235	CV-2647	P-7A TO SG-B CONTROL
98	EC2795	CV-2647	P-7A TO SG-B CONTROL
98	EJ2012	CV-2647	P-7A TO SG-B CONTROL
98	ER202	CV-2647	P-7A TO SG-B CONTROL
98	TB670	CV-2647	P-7A TO SG-B CONTROL
98	EJ1002	CV-2648	P-7B TO SG-B CONTROL VALVE
98	EJ1004	CV-2648	P-7B TO SG-B CONTROL VALVE
98	JB711	CV-2648	P-7B TO SG-B CONTROL VALVE
98	TB669	CV-2648	P-7B TO SG-B CONTROL VALVE
98	EC1504	CV-2663	EFW PP TURBINE K-3 STEAM ADMISSION VALVE
98	EC1530	CV-2663	EFW PP TURBINE K-3 STEAM ADMISSION VALVE
98	JB711	CV-2663	EFW PP TURBINE K-3 STEAM ADMISSION VALVE
98	EC1504	CV-2665	EFW PUMP TURBINE K3 STEAM ADMISSION VALVE BYPASS

Table 1 List of SSCs Assumed to be Affected by Tornado-Generated Missiles In Rooms 97, 98, and 129			
Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
98	EC1530	CV-2665	EFW PUMP TURBINE K3 STEAM ADMISSION VALVE BYPASS
98	JB711	CV-2665	EFW PUMP TURBINE K3 STEAM ADMISSION VALVE BYPASS
98	EC1498	CV-2667	EFW PP TURBINE K-3 STEAM FROM SG-A
98	EC1504	CV-2667	EFW PP TURBINE K-3 STEAM FROM SG-A
98	JB711	CV-2667	EFW PP TURBINE K-3 STEAM FROM SG-A
98	DC018	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
98	DC019	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
98	DC262	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
98	DJ004	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
98	EC1530	CV-2803	EFW P-7B SUCTION FROM SW
98	EB203	CV-2806	EFW P-7A SUCTION FROM SW
98	EB204	CV-2806	EFW P-7A SUCTION FROM SW
98	EB205	CV-2806	EFW P-7A SUCTION FROM SW
98	EC2006	CV-2806	EFW P-7A SUCTION FROM SW
98	EC207	CV-2806	EFW P-7A SUCTION FROM SW
98	EC208	CV-2806	EFW P-7A SUCTION FROM SW
98	EC209	CV-2806	EFW P-7A SUCTION FROM SW
98	EC210	CV-2806	EFW P-7A SUCTION FROM SW
98	EC2173	CV-2806	EFW P-7A SUCTION FROM SW
98	EC241	CV-2806	EFW P-7A SUCTION FROM SW
98	EC2486	CV-2806	EFW P-7A SUCTION FROM SW
98	EC2488	CV-2806	EFW P-7A SUCTION FROM SW
98	EB203	CV-3642	P-4B TO P-4C DISCH CROSSOVER
98	EB204	CV-3642	P-4B TO P-4C DISCH CROSSOVER
98	EB205	CV-3642	P-4B TO P-4C DISCH CROSSOVER
98	EB206	CV-3642	P-4B TO P-4C DISCH CROSSOVER
98	EB207	CV-3642	P-4B TO P-4C DISCH CROSSOVER
98	EC2021	CV-3642	P-4B TO P-4C DISCH CROSSOVER

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
98	EC2026	CV-3642	P-4B TO P-4C DISCH CROSSOVER
98	EC206	CV-3642	P-4B TO P-4C DISCH CROSSOVER
98	EC2172	CV-3642	P-4B TO P-4C DISCH CROSSOVER
98	EC2226	CV-3642	P-4B TO P-4C DISCH CROSSOVER
98	EC224	CV-3642	P-4B TO P-4C DISCH CROSSOVER
98	EC225	CV-3642	P-4B TO P-4C DISCH CROSSOVER
98	EC230	CV-3642	P-4B TO P-4C DISCH CROSSOVER
98	EC231	CV-3642	P-4B TO P-4C DISCH CROSSOVER
98	EC232	CV-3642	P-4B TO P-4C DISCH CROSSOVER
98	EC233	CV-3642	P-4B TO P-4C DISCH CROSSOVER
98	EC234	CV-3642	P-4B TO P-4C DISCH CROSSOVER
98	EC1153	CV-3643	ACW LOOP ISOL
98	EC1258	CV-3643	ACW LOOP ISOL
98	EC2018	CV-3643	ACW LOOP ISOL
98	JB343	CV-3643	ACW LOOP ISOL
98	EB203	CV-3644	P-4A TO P-4B DISCH CROSSOVER
98	EB204	CV-3644	P-4A TO P-4B DISCH CROSSOVER
98	EB205	CV-3644	P-4A TO P-4B DISCH CROSSOVER
98	EB206	CV-3644	P-4A TO P-4B DISCH CROSSOVER
98	EB207	CV-3644	P-4A TO P-4B DISCH CROSSOVER
98	EC2021	CV-3644	P-4A TO P-4B DISCH CROSSOVER
98	EC2026	CV-3644	P-4A TO P-4B DISCH CROSSOVER
98	EC206	CV-3644	P-4A TO P-4B DISCH CROSSOVER
98	EC2172	CV-3644	P-4A TO P-4B DISCH CROSSOVER
98	EC2226	CV-3644	P-4A TO P-4B DISCH CROSSOVER
98	EC224	CV-3644	P-4A TO P-4B DISCH CROSSOVER
98	EC225	CV-3644	P-4A TO P-4B DISCH CROSSOVER
98	EC230	CV-3644	P-4A TO P-4B DISCH CROSSOVER
98	EC231	CV-3644	P-4A TO P-4B DISCH CROSSOVER

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated MIssIles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
98	EC232	CV-3644	P-4A TO P-4B DISCH CROSSOVER
98	EC233	CV-3644	P-4A TO P-4B DISCH CROSSOVER
98	EC234	CV-3644	P-4A TO P-4B DISCH CROSSOVER
98	EB1029	CV-3806	SERV WTR TO DG1 CLRS
98	EC1182	CV-3806	SERV WTR TO DG1 CLRS
98	EC1203	CV-3806	SERV WTR TO DG1 CLRS
98	EC1260	CV-3806	SERV WTR TO DG1 CLRS
98	JB346	CV-3806	SERV WTR TO DG1 CLRS
98	TB561	CV-3806	SERV WTR TO DG1 CLRS
98	EC207	CV-3807	SERV WTR TO DG2 CLRS
98	EC208	CV-3807	SERV WTR TO DG2 CLRS
98	EC209	CV-3807	SERV WTR TO DG2 CLRS
98	EC210	CV-3807	SERV WTR TO DG2 CLRS
98	EC2175	CV-3807	SERV WTR TO DG2 CLRS
98	EC2208	CV-3807	SERV WTR TO DG2 CLRS
98	EC2313	CV-3807	SERV WTR TO DG2 CLRS
98	EC2314	CV-3807	SERV WTR TO DG2 CLRS
98	EC235	CV-3807	SERV WTR TO DG2 CLRS
98	EC2025	CV-3811	LOOP 2 SUPPLY TO ICW COOLERS
98	EC2028	CV-3811	LOOP 2 SUPPLY TO ICW COOLERS
98	EC207	CV-3811	LOOP 2 SUPPLY TO ICW COOLERS
98	EC208	CV-3811	LOOP 2 SUPPLY TO ICW COOLERS
98	EC209	CV-3811	LOOP 2 SUPPLY TO ICW COOLERS
98	EC210	CV-3811	LOOP 2 SUPPLY TO ICW COOLERS
98	EC2028	CV-3821	DECAY HEAT CLR SERVICE WTR E-35B INLET
98	EC207	CV-3821	DECAY HEAT CLR SERVICE WTR E-35B INLET
98	EC208	CV-3821	DECAY HEAT CLR SERVICE WTR E-35B INLET
98	EC209	CV-3821	DECAY HEAT CLR SERVICE WTR E-35B INLET
98	EC210	CV-3821	DECAY HEAT CLR SERVICE WTR E-35B INLET

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
98	EC230	CV-3821	DECAY HEAT CLR SERVICE WTR E-35B INLET
98	EC231	CV-3821	DECAY HEAT CLR SERVICE WTR E-35B INLET
98	EC232	CV-3821	DECAY HEAT CLR SERVICE WTR E-35B INLET
98	EC2325	CV-3821	DECAY HEAT CLR SERVICE WTR E-35B INLET
98	EC233	CV-3821	DECAY HEAT CLR SERVICE WTR E-35B INLET
98	EC1530	CV-3850	EFW SERV WTR LOOP I ISOLATION
98	EB203	CV-3851	EFW SERV WTR LOOP II ISOLATION
98	EB204	CV-3851	EFW SERV WTR LOOP II ISOLATION
98	EB205	CV-3851	EFW SERV WTR LOOP II ISOLATION
98	EC2006	CV-3851	EFW SERV WTR LOOP II ISOLATION
98	EC207	CV-3851	EFW SERV WTR LOOP II ISOLATION
98	EC208	CV-3851	EFW SERV WTR LOOP II ISOLATION
98	EC209	CV-3851	EFW SERV WTR LOOP II ISOLATION
98	EC210	CV-3851	EFW SERV WTR LOOP II ISOLATION
98	EC2173	CV-3851	EFW SERV WTR LOOP II ISOLATION
98	EC241	CV-3851	EFW SERV WTR LOOP II ISOLATION
98	EC2486	CV-3851	EFW SERV WTR LOOP II ISOLATION
98	EC2488	CV-3851	EFW SERV WTR LOOP II ISOLATION
98	EC206	CV-5611	FIREWATER TO RB OUTSIDE ISOL
98	EC2172	CV-5611	FIREWATER TO RB OUTSIDE ISOL
98	EC2324	CV-5611	FIREWATER TO RB OUTSIDE ISOL
98	JB250	CV-5611	FIREWATER TO RB OUTSIDE ISOL
98	EC2126	D-02	MOTOR CONTROL CENTER
98	EC229	D-02	MOTOR CONTROL CENTER
98	D-04A	D-04A	04A BATTERY CHARGER FOR D06
98	EB205	D-04A	04A BATTERY CHARGER FOR D06
98	EB2306	D-04A	04A BATTERY CHARGER FOR D06
98	EC2545	D-04A	D04A BATTERY CHARGER FOR D06
98	D-04B	D-04B	D04B BATTERY CHARGER FOR D06

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
98	EB204	D-04B	D04B BATTERY CHARGER FOR D06
98	EB205	D-04B	D04B BATTERY CHARGER FOR D06
98	EB2275	D-04B	D04B BATTERY CHARGER FOR D06
98	EB2306	D-04B	D04B BATTERY CHARGER FOR D06
98	EC2546	D-04B	D04B BATTERY CHARGER FOR D06
98	EC2124	D-06	125V DC STATION BATTERY BANK TO BUS D02
98	EC2822	D-06	125V DC STATION BATTERY BANK TO BUS D02
98	EC2210	D-11	125 VDC DISTRIBUTION PNL NO 1 D11
98	EC2215	D-11	125 VDC DISTRIBUTION PNL NO 1 D11
98	EC229	D-11	125 VDC DISTRIBUTION PNL NO 1 D11
98	EC235	D-11	125 VDC DISTRIBUTION PNL NO 1 D11
98	EC1183	D-21	125 VDC DISTRIBUTION PNL NO 2 D21
98	EC2127	D-21	125 VDC DISTRIBUTION PNL NO 2 D21
98	EC229	D-21	125 VDC DISTRIBUTION PNL NO 2 D21
98	EC208	D-25	MOTOR CONTROL CENTER
98	EC209	D-25	MOTOR CONTROL CENTER
98	EC2216	D-25	MOTOR CONTROL CENTER
98	EC229	D-25	MOTOR CONTROL CENTER
98	EC1175	K-4A	#1 EDG
98	EC1179	K-4A	#1 EDG
98	EC1180	K-4A	#1 EDG
98	EC1182	K-4A	#1 EDG
98	EC1193	K-4A	#1 EDG
98	EC1203	K-4A	#1 EDG
98	EC1204	K-4A	#1 EDG
98	EC1258	K-4A	#1 EDG
98	JB343	K-4A	#1 EDG
98	JB345	K-4A	#1 EDG
98	JB346	K-4A	#1 EDG

Table 1 List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129			
Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
98	EC2022	K-4B	#2 EDG
98	EC208	K-4B	#2 EDG
98	EC209	K-4B	#2 EDG
98	EC210	K-4B	#2 EDG
98	EC2128	K-4B	#2 EDG
98	EC2208	K-4B	#2 EDG
98	EC2211	K-4B	#2 EDG
98	EC2216	K-4B	#2 EDG
98	EC2217	K-4B	#2 EDG
98	EC2227	K-4B	#2 EDG
98	EC2228	K-4B	#2 EDG
98	EC225	K-4B	#2 EDG
98	EC229	K-4B	#2 EDG
98	EC2313	K-4B	#2 EDG
98	EC2315	K-4B	#2 EDG
98	EC2319	K-4B	#2 EDG
98	EC235	K-4B	#2 EDG
98	JB347	K-4B	#2 EDG
98	JB348	K-4B	#2 EDG
98	EC206	LT-1002	PZR LVL
98	EC207	LT-1002	PZR LVL
98	EC208	LT-1002	PZR LVL
98	EC209	LT-1002	PZR LVL
98	EC210	LT-1002	PZR LVL
98	EC234	LT-1002	PZR LVL
98	EC2806	LT-1002	PZR LVL
98	ER202	LT-1002	PZR LVL
98	EJ3002	LT-2617	STM GEN E24B LOW RANGE LEVEL (EFIC)
98	EJ3004	LT-2617	STM GEN E24B LOW RANGE LEVEL (EFIC)

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated MIssIles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
98	JB713	LT-2617	STM GEN E24B LOW RANGE LEVEL (EFIC)
98	EJ1003	LT-2618	STM GEN E24A LOW RANGE LEVEL (EFIC)
98	EJ1004	LT-2618	STM GEN E24A LOW RANGE LEVEL (EFIC)
98	JB711	LT-2618	STM GEN E24A LOW RANGE LEVEL (EFIC)
98	EJ3002	LT-2619	STM GEN E24B UPPER RNG LEVEL (EFIC)
98	EJ3004	LT-2619	STM GEN E24B UPPER RNG LEVEL (EFIC)
98	JB713	LT-2619	STM GEN E24B UPPER RNG LEVEL (EFIC)
98	EJ1003	LT-2620	STM GEN E24A UPPER RNG LEVL (EFIC)
98	EJ1004	LT-2620	STM GEN E24A UPPER RNG LEVL (EFIC)
98	JB711	LT-2620	STM GEN E24A UPPER RNG LEVL (EFIC)
98	ER201	LT-2622	SG E-24A LOW RANGE LEVEL (EFIC)
98	ER202	LT-2622	SG E-24A LOW RANGE LEVEL (EFIC)
98	ER201	LT-2624	STM GEN E24A UPPER RANGE LEVEL (EFIC)
98	ER202	LT-2624	STM GEN E24A UPPER RANGE LEVEL (EFIC)
98	EJ1003	LT-2667	STM GEN E24B LOW RANGE LEVEL (EFIC)
98	EJ1004	LT-2667	STM GEN E24B LOW RANGE LEVEL (EFIC)
98	JB711	LT-2667	STM GEN E24B LOW RANGE LEVEL (EFIC)
98	EJ3002	LT-2668	SG E-24A LOW RANGE LEVEL (EFIC)
98	EJ3004	LT-2668	SG E-24A LOW RANGE LEVEL (EFIC)
98	JB713	LT-2668	SG E-24A LOW RANGE LEVEL (EFIC)
98	EJ1003	LT-2669	STM GEN E24B UPPER RANGE LEVEL (EFIC)
98	EJ1004	LT-2669	STM GEN E24B UPPER RANGE LEVEL (EFIC)
98	JB711	LT-2669	STM GEN E24B UPPER RANGE LEVEL (EFIC)
98	EJ3002	LT-2670	STM GEN E24A UPPER RANGE LEVEL (EFIC)
98	EJ3004	LT-2670	STM GEN E24A UPPER RANGE LEVEL (EFIC)
98	JB713	LT-2670	STM GEN E24A UPPER RANGE LEVEL (EFIC)
98	ER201	LT-2671	STM GEN E24B LOW RANGE LEVEL
98	ER202	LT-2671	STM GEN E24B LOW RANGE LEVEL
98	ER201	LT-2673	STM GEN E24B UPPER RNG LEVEL (EFIC)

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
98	ER202	LT-2673	STM GEN E24B UPPER RNG LEVEL (EFIC)
98	EC206	NE-0502	SOURCE RANGE NEUTRON DETECTOR ASSEMBLY
98	EC207	NE-0502	SOURCE RANGE NEUTRON DETECTOR ASSEMBLY
98	EC208	NE-0502	SOURCE RANGE NEUTRON DETECTOR ASSEMBLY
98	EC209	NE-0502	SOURCE RANGE NEUTRON DETECTOR ASSEMBLY
98	EC210	NE-0502	SOURCE RANGE NEUTRON DETECTOR ASSEMBLY
98	EC234	NE-0502	SOURCE RANGE NEUTRON DETECTOR ASSEMBLY
98	EC2806	NE-0502	SOURCE RANGE NEUTRON DETECTOR ASSEMBLY
98	ER202	NE-0502	SOURCE RANGE NEUTRON DETECTOR ASSEMBLY
98	EC2017	P-34B	'B' LOOP DH REMOVAL PUMP
98	EC2026	P-34B	'B' LOOP DH REMOVAL PUMP
98	EC206	P-34B	'B' LOOP DH REMOVAL PUMP
98	EC2227	P-34B	'B' LOOP DH REMOVAL PUMP
98	EC224	P-34B	'B' LOOP DH REMOVAL PUMP
98	EC225	P-34B	'B' LOOP DH REMOVAL PUMP
98	EC1153	P-36A	PRIMARY MAKEUP PUMP
98	EC1258	P-36A	PRIMARY MAKEUP PUMP
98	JB343	P-36A	PRIMARY MAKEUP PUMP
98	EC2019	P-36C	PRIMARY MAKEUP PUMP
98	EC1153	P-4A	'A' SERVICE WATER PUMP
98	EC1258	P-4A	'A' SERVICE WATER PUMP
98	JB343	P-4A	'A' SERVICE WATER PUMP
98	EC2017	P-4C	'C' SERVICE WATER PUMP
98	EC2021	P-4C	'C' SERVICE WATER PUMP
98	EC206	P-4C	'C' SERVICE WATER PUMP
98	EC2172	P-4C	'C' SERVICE WATER PUMP
98	EC2226	P-4C	'C' SERVICE WATER PUMP
98	EC224	P-4C	'C' SERVICE WATER PUMP
98	EC225	P-4C	'C' SERVICE WATER PUMP

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
98	EC1498	P-7B	EMERGENCY F W. PUMP
98	EC1504	P-7B	EMERGENCY F.W. PUMP
98	JB711	P-7B	EMERGENCY F.W. PUMP
98	C0302	PSV-1000	PZR ERV
98	C4099	PSV-1000	PZR ERV
98	ER2005	PT-1022	A LOOP RCS PRESS (ESAS #2)
98	ER201	PT-1022	A LOOP RCS PRESS (ESAS #2)
98	ER202	PT-1022	A LOOP RCS PRESS (ESAS #2)
98	EC206	PT-1041	B' LOOP RCS PRESS (WR)
98	EC207	PT-1041	B' LOOP RCS PRESS (WR)
98	EC208	PT-1041	B' LOOP RCS PRESS (WR)
98	EC209	PT-1041	B' LOOP RCS PRESS (WR)
98	EC210	PT-1041	B' LOOP RCS PRESS (WR)
98	EC234	PT-1041	B' LOOP RCS PRESS (WR)
98	EC2806	PT-1041	B' LOOP RCS PRESS (WR)
98	ER202	PT-1041	B' LOOP RCS PRESS (WR)
98	ER2005	PT-2406	RB PRESS (ESAS #2)
98	ER201	PT-2406	RB PRESS (ESAS #2)
98	ER202	PT-2406	RB PRESS (ESAS #2)
98	EJ3002	PT-2617A	E24B MAIN STM PRESS-MSLI
98	EJ3004	PT-2617A	E24B MAIN STM PRESS-MSLI
98	JB713	PT-2617A	E24B MAIN STM PRESS-MSLI
98	EJ1002	PT-2618A	E24A MAIN STM PRESS-MSLI
98	EJ1004	PT-2618A	E24A MAIN STM PRESS-MSLI
98	JB711	PT-2618A	E24A MAIN STM PRESS-MSLI
98	EJ2012	PT-2618B	PT-E24A MAIN STM PRESS-MSLI
98	ER201	PT-2618B	PT-E24A MAIN STM PRESS-MSLI
98	ER202	PT-2618B	PT-E24A MAIN STM PRESS-MSLI
98	EJ1002	PT-2667A	E24B MAIN STM PRESS-MSLI

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
98	EJ1004	PT-2667A	E24B MAIN STM PRESS-MSLI
98	JB711	PT-2667A	E24B MAIN STM PRESS-MSLI
98	EJ2012	PT-2667B	PT-E24B MAIN STM PRESS-MSLI
98	ER201	PT-2667B	PT-E24B MAIN STM PRESS-MSLI
98	ER202	PT-2667B	PT-E24B MAIN STM PRESS-MSLI
98	EJ3002	PT-2668A	E24A MAIN STM PRESS-MSLI
98	EJ3004	PT-2668A	E24A MAIN STM PRESS-MSLI
98	JB713	PT-2668A	E24A MAIN STM PRESS-MSLI
98	EC2130	RA-2	125 VDC DISTRIBUTION PNL RA2
98	EC229	RA-2	125 VDC DISTRIBUTION PNL RA2
98	EC1154	RS-1	120 VAC DISTRIBUTION PNL RS1
98	EC1182	RS-1	120 VAC DISTRIBUTION PNL RS1
98	EC1193	RS-1	120 VAC DISTRIBUTION PNL RS1
98	JB345	RS-1	120 VAC DISTRIBUTION PNL RS1
98	JB346	RS-1	120 VAC DISTRIBUTION PNL RS1
98	EC2184	RS-2	120 VAC DISTRIBUTION PNL RS2
98	EC3007	RS-3	120 VAC DISTRIBUTION PNL RS3
98	EC4021	RS-4	120 VAC DISTRIBUTION PNL RS4
98	EC2019	SV-0621	MAIN STM ISOL CV-2692 CLOSURE
98	EC206	SV-0621	MAIN STM ISOL CV-2692 CLOSURE
98	EC207	SV-0621	MAIN STM ISOL CV-2692 CLOSURE
98	EC208	SV-0621	MAIN STM ISOL CV-2692 CLOSURE
98	EC209	SV-0621	MAIN STM ISOL CV-2692 CLOSURE
98	EC2131	SV-0621	MAIN STM ISOL CV-2692 CLOSURE
98	EC2216	SV-0621	MAIN STM ISOL CV-2692 CLOSURE
98	EC2218	SV-0621	MAIN STM ISOL CV-2692 CLOSURE
98	EC2227	SV-0621	MAIN STM ISOL CV-2692 CLOSURE
98	EC2228	SV-0621	MAIN STM ISOL CV-2692 CLOSURE
98	EC2229	SV-0621	MAIN STM ISOL CV-2692 CLOSURE

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
98	EC224	SV-0621	MAIN STM ISOL CV-2692 CLOSURE
98	EC225	SV-0621	MAIN STM ISOL CV-2692 CLOSURE
98	EC229	SV-0621	MAIN STM ISOL CV-2692 CLOSURE
98	EC235	SV-0621	MAIN STM ISOL CV-2692 CLOSURE
98	EC2759	SV-0621	MAIN STM ISOL CV-2692 CLOSURE
98	EC2788	SV-0621	MAIN STM ISOL CV-2692 CLOSURE
98	JB347	SV-0621	MAIN STM ISOL CV-2692 CLOSURE
98	JB348	SV-0621	MAIN STM ISOL CV-2692 CLOSURE
98	EC2019	SV-0711	MAIN STM ISOL CV-2691 CLOSURE
98	EC206	SV-0711	MAIN STM ISOL CV-2691 CLOSURE
98	EC207	SV-0711	MAIN STM ISOL CV-2691 CLOSURE
98	EC208	SV-0711	MAIN STM ISOL CV-2691 CLOSURE
98	EC209	SV-0711	MAIN STM ISOL CV-2691 CLOSURE
98	EC2131	SV-0711	MAIN STM ISOL CV-2691 CLOSURE
98	EC2216	SV-0711	MAIN STM ISOL CV-2691 CLOSURE
98	EC2218	SV-0711	MAIN STM ISOL CV-2691 CLOSURE
98	EC2227	SV-0711	MAIN STM ISOL CV-2691 CLOSURE
98	EC2228	SV-0711	MAIN STM ISOL CV-2691 CLOSURE
98	EC2229	SV-0711	MAIN STM ISOL CV-2691 CLOSURE
98	EC224	SV-0711	MAIN STM ISOL CV-2691 CLOSURE
98	EC225	SV-0711	MAIN STM ISOL CV-2691 CLOSURE
98	EC229	SV-0711	MAIN STM ISOL CV-2691 CLOSURE
98	EC235	SV-0711	MAIN STM ISOL CV-2691 CLOSURE
98	EC2759	SV-0711	MAIN STM ISOL CV-2691 CLOSURE
98	EC2788	SV-0711	MAIN STM ISOL CV-2691 CLOSURE
98	JB347	SV-0711	MAIN STM ISOL CV-2691 CLOSURE
98	JB348	SV-0711	MAIN STM ISOL CV-2691 CLOSURE
98	ER2005	TE-1013	'A' LOOP TH TEMP
98	ER201	TE-1013	'A' LOOP TH TEMP

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
98	ER202	TE-1013	'A' LOOP TH TEMP
98	EC1154	VEF-24A	#1 EDG exhaust fan
98	EC1181	VEF-24A	#1 EDG exhaust fan
98	EC1193	VEF-24A	#1 EDG exhaust fan
98	JB345	VEF-24A	#1 EDG exhaust fan
98	JB346	VEF-24A	#1 EDG exhaust fan
98	EC1154	VEF-24B	#1 EDG exhaust fan
98	EC1181	VEF-24B	#1 EDG exhaust fan
98	EC1193	VEF-24B	#1 EDG exhaust fan
98	JB345	VEF-24B	#1 EDG exhaust fan
98	JB346	VEF-24B	#1 EDG exhaust fan
98	EC207	VEF-24C	#2 EDG exhaust fan
98	EC208	VEF-24C	#2 EDG exhaust fan
98	EC209	VEF-24C	#2 EDG exhaust fan
98	EC210	VEF-24C	#2 EDG exhaust fan
98	EC2175	VEF-24C	#2 EDG exhaust fan
98	EC2205	VEF-24C	#2 EDG exhaust fan
98	EC2208	VEF-24C	#2 EDG exhaust fan
98	EC2216	VEF-24C	#2 EDG exhaust fan
98	EC229	VEF-24C	#2 EDG exhaust fan
98	EC235	VEF-24C	#2 EDG exhaust fan
98	EC207	VEF-24D	#2 EDG exhaust fan
98	EC208	VEF-24D	#2 EDG exhaust fan
98	EC209	VEF-24D	#2 EDG exhaust fan
98	EC210	VEF-24D	#2 EDG exhaust fan
98	EC2175	VEF-24D	#2 EDG exhaust fan
98	EC2205	VEF-24D	#2 EDG exhaust fan
98	EC2208	VEF-24D	#2 EDG exhaust fan
98	EC2216	VEF-24D	#2 EDG exhaust fan

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
98	EC229	VEF-24D	#2 EDG exhaust fan
98	EC235	VEF-24D	#2 EDG exhaust fan
98	EC2021	VUC-1C	AUX BLDG DECAY HT REMOVAL UNIT COOLER
98	EC207	VUC-1C	AUX BLDG DECAY HT REMOVAL UNIT COOLER
98	EC208	VUC-1C	AUX BLDG DECAY HT REMOVAL UNIT COOLER
98	EC209	VUC-1C	AUX BLDG DECAY HT REMOVAL UNIT COOLER
98	EC210	VUC-1C	AUX BLDG DECAY HT REMOVAL UNIT COOLER
98	EC2175	VUC-1C	AUX BLDG DECAY HT REMOVAL UNIT COOLER
98	EC207	VUC-1D	AUX BLDG DECAY HT REMOVAL UNIT COOLER
98	EC208	VUC-1D	AUX BLDG DECAY HT REMOVAL UNIT COOLER
98	EC209	VUC-1D	AUX BLDG DECAY HT REMOVAL UNIT COOLER
98	EC210	VUC-1D	AUX BLDG DECAY HT REMOVAL UNIT COOLER
98	EC2175	VUC-1D	AUX BLDG DECAY HT REMOVAL UNIT COOLER
98	EC2205	VUC-1D	AUX BLDG DECAY HT REMOVAL UNIT COOLER
98	EC2216	VUC-1D	AUX BLDG DECAY HT REMOVAL UNIT COOLER
98	EC229	VUC-1D	AUX BLDG DECAY HT REMOVAL UNIT COOLER
98	EC235	VUC-1D	AUX BLDG DECAY HT REMOVAL UNIT COOLER
98	EC2211	Y-22	Y22 INVERTER
98	EC2212	Y-22	Y22 INVERTER
98	EC2213	Y-22	Y22 INVERTER
98	EC2215	Y-22	Y22 INVERTER
98	EC2229	Y-22	Y22 INVERTER
98	EC229	Y-22	Y22 INVERTER
98	EC235	Y-22	Y22 INVERTER
98	JB347	Y-22	Y22 INVERTER
98	JB348	Y-22	Y22 INVERTER
98	EC2211	Y-24	Y24 INVERTER
98	EC2212	Y-24	Y24 INVERTER
98	EC2214	Y-24	Y24 INVERTER

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles In Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
98	EC2215	Y-24	Y24 INVERTER
98	EC2229	Y-24	Y24 INVERTER
98	EC229	Y-24	Y24 INVERTER
98	EC235	Y-24	Y24 INVERTER
98	JB347	Y-24	Y24 INVERTER
98	JB348	Y-24	Y24 INVERTER
98	EC2229	Y-25	Y25 SWING INVERTER
98	EC229	Y-25	Y25 SWING INVERTER
98	EC234	Y-25	Y25 SWING INVERTER
98	EC235	Y-25	Y25 SWING INVERTER
98	EC2549	Y-25	Y25 SWING INVERTER
98	EC2550	Y-25	Y25 SWING INVERTER
98	EC2806	Y-25	Y25 SWING INVERTER
98	JB348	Y-25	Y25 SWING INVERTER
97	C4090	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
97	C4092	CV-1404	P-34A/B SUCT SUPP FROM RCS
97	C4093	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
97	C4096	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
97	C4099	PSV-1000	PZR ERV
97	C4108	CV-1000	ERV Isolation
97	C4233	PSV-1000	PZR ERV
97	C4293	CV-1207	SEAL INJ CONTROL VALVE
97	C4420	PSV-1000	PZR ERV
97	C4422	PSV-1000	PZR ERV
97	C4423	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
97	C4423	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
97	C543	LT-1411	BWST LVL XMTR
97	C544	LT-1421	BWST LVL XMTR
97	CVC055	CV-2663	EFW PP TURBINE K-3 STEAM ADMISSION VALVE

Table 1 List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129			
Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
97	DC017	CV-1275	MAKEUP TANK OUTLET
97	DC030	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
97	DC030	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
97	DC030	PSV-1000	PZR ERV
97	DC032	CV-1207	SEAL INJ CONTROL VALVE
97	DC032	PSV-1000	PZR ERV
97	DC033	CV-1207	SEAL INJ CONTROL VALVE
97	DC033	PSV-1000	PZR ERV
97	DC034	CV-1207	SEAL INJ CONTROL VALVE
97	DC034	PSV-1000	PZR ERV
97	DC035	CV-1207	SEAL INJ CONTROL VALVE
97	DC035	PSV-1000	PZR ERV
97	DC036	CV-1207	SEAL INJ CONTROL VALVE
97	DC036	PSV-1000	PZR ERV
97	DC037	CV-1207	SEAL INJ CONTROL VALVE
97	DC037	PSV-1000	PZR ERV
97	DC038	CV-1207	SEAL INJ CONTROL VALVE
97	DC038	PSV-1000	PZR ERV
97	DC039	CV-1207	SEAL INJ CONTROL VALVE
97	DC039	PSV-1000	PZR ERV
97	DC040	CV-1207	SEAL INJ CONTROL VALVE
97	DC040	PSV-1000	PZR ERV
97	DC058	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
97	DC058	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
97	DC058	PSV-1000	PZR ERV
97	DC060	PSV-1000	PZR ERV
97	DC061	PSV-1000	PZR ERV
97	DC068	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
97	DC068	CV-1000	ERV Isolation

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated MIssiles In Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
97	DC069	PSV-1000	PZR ERV
97	DC070	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
97	DC070	CV-1000	ERV Isolation
97	DC070	PSV-1000	PZR ERV
97	DC071	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
97	DC071	CV-1000	ERV Isolation
97	DC071	PSV-1000	PZR ERV
97	DC072	PSV-1000	PZR ERV
97	DC074	PSV-1000	PZR ERV
97	DC077	CV-1000	ERV Isolation
97	DC077	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
97	DC077	PSV-1000	PZR ERV
97	DC078	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
97	DC079	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
97	DC085	CV-1404	P-34A/B SUCT SUPP FROM RCS
97	DC086	CV-1404	P-34A/B SUCT SUPP FROM RCS
97	DC087	CV-1404	P-34A/B SUCT SUPP FROM RCS
97	DC088	CV-1404	P-34A/B SUCT SUPP FROM RCS
97	DC098	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
97	DC098	CV-1404	P-34A/B SUCT SUPP FROM RCS
97	DC098	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
97	DC099	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
97	DC099	PSV-1000	PZR ERV
97	DC099	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
97	DC101	CV-1275	MAKEUP TANK OUTLET
97	DC102	CV-1275	MAKEUP TANK OUTLET
97	DC103	CV-1275	MAKEUP TANK OUTLET
97	DC103	CV-2619	ATMOS DUMP 'B' BLOCK VALVE

Table 1 List of SSCs Assumed to be Affected by Tornado-Generated Missiles In Rooms 97, 98, and 129			
Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
97	DC103	CV-2667	EFW PP TURBINE K-3 STEAM FROM SG-A
97	DC104	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
97	DC104	CV-1275	MAKEUP TANK OUTLET
97	DC104	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
97	DC104	PSV-1000	PZR ERV
97	DC105	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
97	DC106	CV-1207	SEAL INJ CONTROL VALVE
97	DC106	PSV-1000	PZR ERV
97	DC157	PSV-1000	PZR ERV
97	DC163	CV-1207	SEAL INJ CONTROL VALVE
97	DC163	PSV-1000	PZR ERV
97	DC227	PSV-1000	PZR ERV
97	DC239	CV-1000	ERV Isolation
97	DC239	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
97	DC240	CV-1000	ERV Isolation
97	DC240	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
97	DC241	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
97	DC241	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
97	DC242	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
97	DC242	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
97	DC243	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
97	DJ022	C47	NNI AUX CONTROL SYS (X-PWR)
97	DJ022	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
97	DJ023	C47	NNI AUX CONTROL SYS (X-PWR)
97	DJ023	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
97	DJ023	C48	NNI AUX CONTROL SYS (Y-PWR)
97	DJ023	C539A	EFIC SIGNAL CONDITIONING CABINET

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
97	DJ023	C540A	EFIC SIGNAL CONDITIONING CABINET
97	DJ024	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
97	DJ024	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
97	DJ024	C37-1	EFIC CABINET CHANNEL A (RED)
97	DJ024	C37-3	EFIC CABINET CHANNEL C (YELLOW)
97	DJ024	C37-2	EFIC CABINET CHANNEL B (GREEN)
97	DJ024	C37-4	EFIC CABINET CHANNEL D (BLUE)
97	DJ024	PSV-1000	PZR ERV
97	DJ024	C88	ESAS ANALOG SUBSYSTEM NO 1
97	DJ024	C90	ESAS ANALOG SUBSYSTEM NO 3
97	DJ025	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
97	DJ025	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
97	DJ025	C90	ESAS ANALOG SUBSYSTEM NO 3
97	DJ026	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
97	DJ026	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
97	DJ026	C90	ESAS ANALOG SUBSYSTEM NO 3
97	DJ027	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
97	DJ027	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
97	DJ027	C90	ESAS ANALOG SUBSYSTEM NO 3
97	DJ028	CV-1207	SEAL INJ CONTROL VALVE
97	DJ028	C90	ESAS ANALOG SUBSYSTEM NO 3
97	DJ029	CV-1207	SEAL INJ CONTROL VALVE
97	DJ030	CV-1207	SEAL INJ CONTROL VALVE
97	DJ031	CV-1207	SEAL INJ CONTROL VALVE
97	DJ032	CV-1207	SEAL INJ CONTROL VALVE
97	DJ033	CV-1207	SEAL INJ CONTROL VALVE
97	DJ034	CV-1207	SEAL INJ CONTROL VALVE
97	DJ035	C47	NNI AUX CONTROL SYS (X-PWR)
97	DJ035	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles In Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
97	DJ035	CV-1207	SEAL INJ CONTROL VALVE
97	DJ036	C47	NNI AUX CONTROL SYS (X-PWR)
97	DJ036	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
97	DJ036	CV-1207	SEAL INJ CONTROL VALVE
97	DJ036	C88	ESAS ANALOG SUBSYSTEM NO 1
97	DJ037	CV-1207	SEAL INJ CONTROL VALVE
97	DJ037	C47	NNI AUX CONTROL SYS (X-PWR)
97	DJ037	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
97	DJ037	C88	ESAS ANALOG SUBSYSTEM NO 1
97	DJ038	C48	NNI AUX CONTROL SYS (Y-PWR)
97	DJ038	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
97	DJ038	CV-1207	SEAL INJ CONTROL VALVE
97	DJ038	C47	NNI AUX CONTROL SYS (X-PWR)
97	DJ038	C88	ESAS ANALOG SUBSYSTEM NO 1
97	DJ039	C48	NNI AUX CONTROL SYS (Y-PWR)
97	DJ039	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
97	DJ039	C90	ESAS ANALOG SUBSYSTEM NO 3
97	DJ040	C48	NNI AUX CONTROL SYS (Y-PWR)
97	DJ040	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
97	DJ040	C90	ESAS ANALOG SUBSYSTEM NO 3
97	DJ041	C48	NNI AUX CONTROL SYS (Y-PWR)
97	DJ041	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
97	DJ043	C90	ESAS ANALOG SUBSYSTEM NO 3
97	DJ044	C90	ESAS ANALOG SUBSYSTEM NO 3
97	DJ045	C90	ESAS ANALOG SUBSYSTEM NO 3

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
97	DJ046	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
97	DJ046	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
97	DJ097	C48	NNI AUX CONTROL SYS (Y-PWR)
97	DJ097	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
97	DJ097	C47	NNI AUX CONTROL SYS (X-PWR)
97	DJ097	C88	ESAS ANALOG SUBSYSTEM NO 1
97	DJ098	C48	NNI AUX CONTROL SYS (Y-PWR)
97	DJ098	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
97	DJ098	CV-1207	SEAL INJ CONTROL VALVE
97	DJ098	C47	NNI AUX CONTROL SYS (X-PWR)
97	DJ098	C88	ESAS ANALOG SUBSYSTEM NO 1
97	DJ099	CV-1207	SEAL INJ CONTROL VALVE
97	DJ109	CV-1207	SEAL INJ CONTROL VALVE
97	DJ110	C48	NNI AUX CONTROL SYS (Y-PWR)
97	DJ110	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
97	DJ110	C47	NNI AUX CONTROL SYS (X-PWR)
97	DJ110	C539A	EFIC SIGNAL CONDITIONING CABINET
97	DJ110	C540A	EFIC SIGNAL CONDITIONING CABINET
97	DJ110	C88	ESAS ANALOG SUBSYSTEM NO 1
97	DJ111	C47	NNI AUX CONTROL SYS (X-PWR)
97	DJ111	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
97	DJ111	C48	NNI AUX CONTROL SYS (Y-PWR)
97	DJ111	C539A	EFIC SIGNAL CONDITIONING CABINET
97	DJ115	C47	NNI AUX CONTROL SYS (X-PWR)
97	DJ115	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
97	DJ116	C47	NNI AUX CONTROL SYS (X-PWR)

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles In Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
97	DJ116	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
97	DJ117	C47	NNI AUX CONTROL SYS (X-PWR)
97	DJ117	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
97	DJ118	C47	NNI AUX CONTROL SYS (X-PWR)
97	DJ118	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
97	DJ119	C47	NNI AUX CONTROL SYS (X-PWR)
97	DJ119	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
97	EC1015	B-6	480V LOAD CENTER BUS B-6
97	EC1015	K-4A	#1 EDG
97	EC1018	SG-5	SLUICE GATE
97	EC1018	SG-3	SLUICE GATE
97	EC1018	CV-1050	DH Suction Isol
97	EC1018	CV-1434	DECAY HEAT P-34A SUCTION FROM RCS
97	EC1018	CV-1436	DECAY HEAT P-34A SUCTION FROM BWST
97	EC1018	C539A	EFIC SIGNAL CONDITIONING CABINET
97	EC1018	C539B	EFIC SIGNAL CONDITIONING CABINET
97	EC1018	LT-1001	PZR LVL
97	EC1018	NE-0501	SOURCE RANGE NEUTRON DETECTOR ASSEMBLY
97	EC1018	PT-1042	B' LOOP RCS PRESS (WR)
97	EC1019	VEF-24A	#1 EDG exhaust fan
97	EC1019	VEF-24B	#1 EDG exhaust fan
97	EC1019	VUC-1A	AUX BLDG DECAY HT REMOVAL UNIT COOLER
97	EC1019	VUC-1B	AUX BLDG DECAY HT REMOVAL UNIT COOLER
97	EC1019	CV-3806	SERV WTR TO DG1 CLRS
97	EC1020	CV-1405	RB SUMP LINE A OUTLET
97	EC1020	CV-1401	LPI/DECAY HEAT BLOCK
97	EC1020	CV-1407	BWST T-3 OUTLET

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
97	EC1020	CV-3820	LOOP 1 SUPPLY TO ICW COOLERS
97	EC1020	CV-3822	DECAY HEAT CLR SERVICE WTR E-35A INLET
97	EC1020	CV-1276	'A' DH LOOP DISCH TO MU PUMP P-36A SUCTION
97	EC1021	CV-1219	HPI TO P-32C DISCHARGE
97	EC1021	CV-1220	HPI TO P-32D DISCHARGE
97	EC1021	CV-1407	BWST T-3 OUTLET
97	EC1022	A-3	4160 VOLT BUS A-3
97	EC1022	B-5	480V LOAD CENTER BUS B-5
97	EC1022	K-4A	#1 EDG
97	EC1023	K-4A	#1 EDG
97	EC1023	P-36A	PRIMARY MAKEUP PUMP
97	EC1023	VUC-1A	AUX BLDG DECAY HT REMOVAL UNIT COOLER
97	EC1023	VUC-1B	AUX BLDG DECAY HT REMOVAL UNIT COOLER
97	EC1024	A-3	4160 VOLT BUS A-3
97	EC1024	P-4A	'A' SERVICE WATER PUMP
97	EC1024	P-34A	'A' LOOP DH REMOVAL PUMP
97	EC1024	CV-3640	'B' DISCH TO LOOP II SW
97	EC1024	CV-3646	P-4A TO P-4B DISCH CROSSOVER
97	EC1025	P-4A	'A' SERVICE WATER PUMP
97	EC1025	P-34A	'A' LOOP DH REMOVAL PUMP
97	EC1025	P-36A	PRIMARY MAKEUP PUMP
97	EC1026	CV-3640	'B' DISCH TO LOOP II SW
97	EC1026	CV-3646	P-4A TO P-4B DISCH CROSSOVER
97	EC1026	P-4A	'A' SERVICE WATER PUMP
97	EC1026	CV-1220	HPI TO P-32D DISCHARGE
97	EC1027	P-7B	EMERGENCY F.W. PUMP
97	EC1056	B-5	480V LOAD CENTER BUS B-5
97	EC1098	K-4A	#1 EDG
97	EC1098	P-7B	EMERGENCY F.W. PUMP

Table 1 List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129			
Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
97	EC1098	C88	ESAS ANALOG SUBSYSTEM NO 1
97	EC1098	CV-2646	P-7B TO SG-A CONTROL VALVE
97	EC1098	CV-2648	P-7B TO SG-B CONTROL VALVE
97	EC1098	RS-1	120 VAC DISTRIBUTION PNL RS1
97	EC1140	K-4A	#1 EDG
97	EC1140	CV-3640	'B' DISCH TO LOOP II SW
97	EC1140	CV-3646	P-4A TO P-4B DISCH CROSSOVER
97	EC1140	P-4A	'A' SERVICE WATER PUMP
97	EC1140	P-34A	'A' LOOP DH REMOVAL PUMP
97	EC1140	VEF-24A	#1 EDG EXHAUST FAN
97	EC1140	VEF-24B	#1 EDG EXHAUST FAN
97	EC1140	C88	ESAS ANALOG SUBSYSTEM NO 1
97	EC1140	C86	ESAS CABINET DIGITAL SUBSYSTEM 1
97	EC1140	C87	ESAS CABINET DIGITAL SUBSYSTEM 1
97	EC1141	A-3	4160 VOLT BUS A-3
97	EC1141	P-36A	PRIMARY MAKEUP PUMP
97	EC1141	CV-3643	ACW LOOP ISOL
97	EC1142	CV-1401	LPI/DECAY HEAT BLOCK
97	EC1142	CV-1407	BWST T-3 OUTLET
97	EC1142	CV-3820	LOOP 1 SUPPLY TO ICW COOLERS
97	EC1143	VEF-24A	#1 EDG EXHAUST FAN
97	EC1143	VEF-24B	#1 EDG EXHAUST FAN
97	EC1143	VUC-1A	AUX BLDG DECAY HT REMOVAL UNIT COOLER
97	EC1143	VUC-1B	AUX BLDG DECAY HT REMOVAL UNIT COOLER
97	EC1143	CV-3806	SERV WTR TO DG1 CLRS
97	EC1144	K-4A	#1 EDG
97	EC1144	VEF-24A	#1 EDG EXHAUST FAN
97	EC1144	VEF-24B	#1 EDG EXHAUST FAN
97	EC1144	C88	ESAS ANALOG SUBSYSTEM NO 1

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles In Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
97	EC1144	C86	ESAS CABINET DIGITAL SUBSYSTEM 1
97	EC1144	C89	ESAS ANALOG SUBSYSTEM NO 2
97	EC1145	A-3	4160 VOLT BUS A-3
97	EC1145	B-5	480V LOAD CENTER BUS B-5
97	EC1145	K-4A	#1 EDG
97	EC1146	A-3	4160 VOLT BUS A-3
97	EC1146	B-5	480V LOAD CENTER BUS B-5
97	EC1146	K-4A	#1 EDG
97	EC1147	K-4A	#1 EDG
97	EC1147	VEF-24A	#1 EDG EXHAUST FAN
97	EC1147	VEF-24B	#1 EDG EXHAUST FAN
97	EC1147	C88	ESAS ANALOG SUBSYSTEM NO 1
97	EC1147	CV-2646	P-7B TO SG-A CONTROL VALVE
97	EC1147	CV-2648	P-7B TO SG-B CONTROL VALVE
97	EC1151	B-5	480V LOAD CENTER BUS B-5
97	EC1153	P-4A	'A' SERVICE WATER PUMP
97	EC1153	P-36A	PRIMARY MAKEUP PUMP
97	EC1153	CV-3643	ACW LOOP ISOL
97	EC1154	VEF-24A	#1 EDG EXHAUST FAN
97	EC1154	VEF-24B	#1 EDG EXHAUST FAN
97	EC1154	RS-1	120 VAC DISTRIBUTION PNL RS1
97	EC1159	C86	ESAS CABINET DIGITAL SUBSYSTEM 1
97	EC1160	C86	ESAS CABINET DIGITAL SUBSYSTEM 1
97	EC1160	C89	ESAS ANALOG SUBSYSTEM NO. 2
97	EC1161	C88	ESAS ANALOG SUBSYSTEM NO 1
97	EC1161	C86	ESAS CABINET DIGITAL SUBSYSTEM 1
97	EC1161	C87	ESAS CABINET DIGITAL SUBSYSTEM 1
97	EC1212	CV-1401	LPI/DECAY HEAT BLOCK
97	EC1213	CV-1405	RB SUMP LINE A OUTLET

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated MIssiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
97	EC1213	CV-3820	LOOP 1 SUPPLY TO ICW COOLERS
97	EC1213	CV-3640	'B' DISCH TO LOOP II SW
97	EC1213	CV-3646	P-4A TO P-4B DISCH CROSSOVER
97	EC1214	P-4A	'A' SERVICE WATER PUMP
97	EC1214	P-34A	'A' LOOP DH REMOVAL PUMP
97	EC1214	P-36A	PRIMARY MAKEUP PUMP
97	EC1221	K-4A	#1 EDG
97	EC1221	C88	ESAS ANALOG SUBSYSTEM NO 1
97	EC1221	CV-2646	P-7B TO SG-A CONTROL VALVE
97	EC1221	CV-2648	P-7B TO SG-B CONTROL VALVE
97	EC1254	CV-1401	LPI/DECAY HEAT BLOCK
97	EC1255	CV-1405	RB SUMP LINE A OUTLET
97	EC1255	CV-3820	LOOP 1 SUPPLY TO ICW COOLERS
97	EC1255	CV-3640	'B' DISCH TO LOOP II SW
97	EC1255	CV-3646	P-4A TO P-4B DISCH CROSSOVER
97	EC1256	SV-0611	MAIN STM ISOL CV-2691 CLOSURE
97	EC1256	SV-0721	MAIN STM ISOL CV-2692 CLOSURE
97	EC1269	CV-3640	'B' DISCH TO LOOP II SW
97	EC1269	CV-3646	P-4A TO P-4B DISCH CROSSOVER
97	EC1269	P-4A	'A' SERVICE WATER PUMP
97	EC1269	SV-0611	MAIN STM ISOL CV-2691 CLOSURE
97	EC1269	SV-0721	MAIN STM ISOL CV-2692 CLOSURE
97	EC1376	CV-1050	DH SUCTION ISOL
97	EC1376	CV-1434	DECAY HEAT P-34A SUCTION FROM RCS
97	EC1376	CV-1436	DECAY HEAT P-34A SUCTION FROM BWST
97	EC1387	LT-1421	BWST LVL XMTR
97	EC1391	LT-1421	BWST LVL XMTR
97	EC1456	P-7B	EMERGENCY F.W. PUMP
97	EC1458	P-7B	EMERGENCY F.W. PUMP

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
97	EC1458	CV-1220	HPI TO P-32D DISCHARGE
97	EC1485	SG-5	SLUICE GATE
97	EC1485	SG-3	SLUICE GATE
97	EC1495	P-7B	EMERGENCY F.W. PUMP
97	EC1495	CV-1401	LPI/DECAY HEAT BLOCK
97	EC1495	C511	RIP INTERFACE EQUIPMENT TIE CHAN A
97	EC1498	P-7B	EMERGENCY F.W PUMP
97	EC1498	CV-1401	LPI/DECAY HEAT BLOCK
97	EC1498	CV-2667	EFW PP TURBINE K-3 STEAM FROM SG-A
97	EC1498	C511	TRIP INTERFACE EQUIPMENT TIE CHAN A
97	EC1505	C511	TRIP INTERFACE EQUIPMENT TIE CHAN A
97	EC1507	CV-2667	EFW PP TURBINE K-3 STEAM FROM SG-A
97	EC1509	P-7B	EMERGENCY F.W. PUMP
97	EC1509	CV-1401	LPI/DECAY HEAT BLOCK
97	EC1514	P-7B	EMERGENCY F.W. PUMP
97	EC1514	SV-0611	MAIN STM ISOL CV-2691 CLOSURE
97	EC1514	SV-0721	MAIN STM ISOL CV-2692 CLOSURE
97	EC1522	C37-1	EFIC CABINET CHANNEL A (RED)
97	EC1522	CV-2646	P-7B TO SG-A CONTROL VALVE
97	EC1522	CV-2648	P-7B TO SG-B CONTROL VALVE
97	EC1522	CV-2663	EFW PP TURBINE K-3 STEAM ADMISSION VALVE
97	EC1537	C37-1	EFIC CABINET CHANNEL A (RED)
97	EC1542	C37-1	EFIC CABINET CHANNEL A (RED)
97	EC1542	C486-1	AUXILIARY EQUIPMENT PANEL (RED)
97	EC1542	CV-2646	P-7B TO SG-A CONTROL VALVE
97	EC1542	CV-2648	P-7B TO SG-B CONTROL VALVE
97	EC1554	LT-1421	BWST LVL XMTR
97	EC1558	C539A	EFIC SIGNAL CONDITIONING CABINET
97	EC1558	C539B	EFIC SIGNAL CONDITIONING CABINET

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
97	EC1558	LT-1001	PZR LVL
97	EC1558	NE-0501	SOURCE RANGE NEUTRON DETECTOR ASSEMBLY
97	EC1558	PT-1042	B' LOOP RCS PRESS (WR)
97	EC1564	CV-2663	EFW PP TURBINE K-3 STEAM ADMISSION VALVE
97	EC1564	CV-2665	EFW PUMP TURBINE K3 STEAM ADMISSION VALVE BYPASS
97	EC1593	CV-1278	HPI TO P-32A DISCH
97	EC1593	CV-1279	HPI TO P-32B DISCH
97	EC2013	K-4B	#2 EDG
97	EC2022	A-4	4160 VOLT BUS A-4
97	EC2022	K-4B	#2 EDG
97	EC2022	B-6	480V LOAD CENTER BUS B-6
97	EC2025	A-4	4160 VOLT BUS A-4
97	EC2025	CV-1227	HPI TO P-32B DISCHARGE
97	EC2025	CV-1228	HPI TO P-32A DISCHARGE
97	EC2025	CV-1400	LPI/DECAY HEAT BLOCK
97	EC2025	CV-1408	BWST T-3 OUTLET
97	EC2025	CV-1406	RB SUMP LINE B OUTLET
97	EC2025	CV-3811	LOOP 2 SUPPLY TO ICW COOLERS
97	EC2028	CV-1406	RB SUMP LINE B OUTLET
97	EC2028	CV-3811	LOOP 2 SUPPLY TO ICW COOLERS
97	EC2028	CV-3821	DECAY HEAT CLR SERVICE WTR E-35B INLET
97	EC2092	K-4B	#2 EDG
97	EC2092	C89	ESAS ANALOG SUBSYSTEM NO. 2
97	EC2092	PT-1022	A LOOP RCS PRESS (ESAS #2)
97	EC2092	C486-2	AUXILIARY EQUIPMENT PANEL (GREEN)
97	EC2092	CV-2645	P-7A TO SG-A CONTROL
97	EC2092	CV-2647	P-7A TO SG-B CONTROL
97	EC2092	LT-1411	BWST LVL XMTR
97	EC2092	RS-2	120 VAC DISTRIBUTION PNL RS2

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
97	EC2146	VEF-24C	#2 EDG EXHAUST FAN
97	EC2146	VEF-24D	#2 EDG EXHAUST FAN
97	EC2146	VUC-1C	AUX BLDG DECAY HT REMOVAL UNIT COOLER
97	EC2146	VUC-1D	AUX BLDG DECAY HT REMOVAL UNIT COOLER
97	EC2146	CV-3807	SERV WTR TO DG2 CLRS
97	EC2147	A-4	4160 VOLT BUS A-4
97	EC2147	P-4C	'C' SERVICE WATER PUMP
97	EC2147	CV-3643	ACW LOOP ISOL
97	EC2147	CV-1435	DECAY HEAT P-34B SUCTION FROM RCS
97	EC2147	CV-1437	DECAY HEAT P-34B SUCTION FROM BWST
97	EC2148	P-34B	'B' LOOP DH REMOVAL PUMP
97	EC2148	P-36C	PRIMARY MAKEUP PUMP
97	EC2149	CV-3644	P-4A TO P-4B DISCH CROSSOVER
97	EC2149	P-4C	'C' SERVICE WATER PUMP
97	EC2149	CV-3642	P-4B TO P-4C DISCH CROSSOVER
97	EC2149	SV-0621	MAIN STM ISOL CV-2692 CLOSURE
97	EC2149	SV-0711	MAIN STM ISOL CV-2691 CLOSURE
97	EC2150	C89	ESAS ANALOG SUBSYSTEM NO. 2
97	EC2150	PT-1022	A LOOP RCS PRESS (ESAS #2)
97	EC2150	C486-2	AUXILIARY EQUIPMENT PANEL (GREEN)
97	EC2150	CV-2645	P-7A TO SG-A CONTROL
97	EC2150	CV-2647	P-7A TO SG-B CONTROL
97	EC2151	A-4	4160 VOLT BUS A-4
97	EC2151	B-6	480V LOAD CENTER BUS B-6
97	EC2151	K-4B	#2 EDG
97	EC2152	CV-1275	MAKEUP TANK OUTLET
97	EC2152	B-5	480V LOAD CENTER BUS B-5
97	EC2152	B-56	MOTOR CONTROL CENTER
97	EC2152	B-6	480V LOAD CENTER BUS B-6

Table 1 List of SSCs Assumed to be Affected by Tornado-Generated Missiles In Rooms 97, 98, and 129			
Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
97	EC2152	CV-1277	'B' DH LOOP DISCH TO MU PUMP P-36C SUCTION
97	EC2153	C88	ESAS ANALOG SUBSYSTEM NO 1
97	EC2153	C91	ESAS CABINET DIGITAL SUBSYSTEM 2
97	EC2154	C89	ESAS ANALOG SUBSYSTEM NO. 2
97	EC2154	C88	ESAS ANALOG SUBSYSTEM NO 1
97	EC2154	C91	ESAS CABINET DIGITAL SUBSYSTEM 2
97	EC2155	CV-1275	MAKEUP TANK OUTLET
97	EC2155	CV-3811	LOOP 2 SUPPLY TO ICW COOLERS
97	EC2155	CV-3821	DECAY HEAT CLR SERVICE WTR E-35B INLET
97	EC2155	CV-3644	P-4A TO P-4B DISCH CROSSOVER
97	EC2155	K-4B	#2 EDG
97	EC2156	CV-1227	HPI TO P-32B DISCHARGE
97	EC2156	CV-1228	HPI TO P-32A DISCHARGE
97	EC2156	CV-1400	LPI/DECAY HEAT BLOCK
97	EC2156	CV-1408	BWST T-3 OUTLET
97	EC2157	P-36C	PRIMARY MAKEUP PUMP
97	EC2157	CV-1406	RB SUMP LINE B OUTLET
97	EC2157	C88	ESAS ANALOG SUBSYSTEM NO 1
97	EC2157	C91	ESAS CABINET DIGITAL SUBSYSTEM 2
97	EC2158	CV-3642	P-4B TO P-4C DISCH CROSSOVER
97	EC2158	CV-3644	P-4A TO P-4B DISCH CROSSOVER
97	EC2158	P-4C	'C' SERVICE WATER PUMP
97	EC2158	CV-1227	HPI TO P-32B DISCHARGE
97	EC2158	CV-1228	HPI TO P-32A DISCHARGE
97	EC2158	CV-3811	LOOP 2 SUPPLY TO ICW COOLERS
97	EC2158	CV-3821	DECAY HEAT CLR SERVICE WTR E-35B INLET
97	EC2159	P-34B	'B' LOOP DH REMOVAL PUMP
97	EC2159	CV-1406	RB SUMP LINE B OUTLET
97	EC2160	P-34B	'B' LOOP DH REMOVAL PUMP

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Misslles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
97	EC2160	CV-1400	LPI/DECAY HEAT BLOCK
97	EC2160	CV-1408	BWST T-3 OUTLET
97	EC2160	C92	ESAS CABINET DIGITAL SUBSYSTEM 2
97	EC2161	A-4	4160 VOLT BUS A-4
97	EC2161	B-6	480V LOAD CENTER BUS B-6
97	EC2161	K-4B	#2 EDG
97	EC2164	P-34B	'B' LOOP DH REMOVAL PUMP
97	EC2172	CV-3642	P-4B TO P-4C DISCH CROSSOVER
97	EC2172	CV-3644	P-4A TO P-4B DISCH CROSSOVER
97	EC2172	P-4C	'C' SERVICE WATER PUMP
97	EC2172	CV-5611	FIREWATER TO RB OUTSIDE ISOL
97	EC2173	CV-2806	EFW P-7A SUCTION FROM SW
97	EC2173	CV-3851	EFW SERV WTR LOOP II ISOLATION
97	EC2174	CV-2617	EFW PP TURBINE K-3 STEAM FROM SG-B
97	EC2174	CV-2613	EFW PP TURBINE K-3 STEAM ADMISSION VLV
97	EC2174	CV-2615	EFW PUMP TURBINE K3 STEAM ADMISSION VALVE BYPASS
97	EC2175	VEF-24C	#2 EDG exhaust fan
97	EC2175	VEF-24D	#2 EDG exhaust fan
97	EC2175	VUC-1C	AUX BLDG DECAY HT REMOVAL UNIT COOLER
97	EC2175	VUC-1D	AUX BLDG DECAY HT REMOVAL UNIT COOLER
97	EC2175	CV-3807	SERV WTR TO DG2 CLRS
97	EC2179	CV-1410	DH SUCTION ISOL
97	EC2182	C88	ESAS ANALOG SUBSYSTEM NO 1
97	EC2182	C91	ESAS CABINET DIGITAL SUBSYSTEM 2
97	EC2183	CV-1275	MAKEUP TANK OUTLET
97	EC2183	C89	ESAS ANALOG SUBSYSTEM NO. 2
97	EC2183	C91	ESAS CABINET DIGITAL SUBSYSTEM 2
97	EC2183	C92	ESAS CABINET DIGITAL SUBSYSTEM 2
97	EC2184	RS-2	120 VAC DISTRIBUTION PNL RS2

Table 1 List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129			
Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
97	EC2205	VEF-24C	#2 EDG EXHAUST FAN
97	EC2205	VEF-24D	#2 EDG EXHAUST FAN
97	EC2205	VUC-1D	AUX BLDG DECAY HT REMOVAL UNIT COOLER
97	EC2239	K-4B	#2 EDG
97	EC2239	CV-3642	P-4B TO P-4C DISCH CROSSOVER
97	EC2239	CV-3644	P-4A TO P-4B DISCH CROSSOVER
97	EC2239	P-4C	'C' SERVICE WATER PUMP
97	EC2239	P-34B	'B' LOOP DH REMOVAL PUMP
97	EC2239	VEF-24C	#2 EDG EXHAUST FAN
97	EC2239	VEF-24D	#2 EDG EXHAUST FAN
97	EC2239	VUC-1D	AUX BLDG DECAY HT REMOVAL UNIT COOLER
97	EC2240	A-4	4160 VOLT BUS A-4
97	EC2240	B-5	480V LOAD CENTER BUS B-5
97	EC2240	B-56	MOTOR CONTROL CENTER
97	EC2240	B-6	480V LOAD CENTER BUS B-6
97	EC2242	A-4	4160 VOLT BUS A-4
97	EC2242	B-5	480V LOAD CENTER BUS B-5
97	EC2242	B-56	MOTOR CONTROL CENTER
97	EC2242	B-6	480V LOAD CENTER BUS B-6
97	EC2308	VEF-24C	#2 EDG exhaust fan
97	EC2308	VEF-24D	#2 EDG exhaust fan
97	EC2308	VUC-1C	AUX BLDG DECAY HT REMOVAL UNIT COOLER
97	EC2308	VUC-1D	AUX BLDG DECAY HT REMOVAL UNIT COOLER
97	EC2308	CV-3807	SERV WTR TO DG2 CLRS
97	EC2309	P-34B	'B' LOOP DH REMOVAL PUMP
97	EC2309	CV-1227	HPI TO P-32B DISCHARGE
97	EC2309	CV-1228	HPI TO P-32A DISCHARGE
97	EC2309	CV-1400	LPI/DECAY HEAT BLOCK
97	EC2309	CV-1408	BWST T-3 OUTLET

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
97	EC2309	CV-1406	RB SUMP LINE B OUTLET
97	EC2309	CV-3642	P-4B TO P-4C DISCH CROSSOVER
97	EC2322	CV-3642	P-4B TO P-4C DISCH CROSSOVER
97	EC2322	CV-3644	P-4A TO P-4B DISCH CROSSOVER
97	EC2322	P-4C	'C' SERVICE WATER PUMP
97	EC2322	P-36C	PRIMARY MAKEUP PUMP
97	EC2322	CV-3643	ACW LOOP ISOL
97	EC2323	P-36C	PRIMARY MAKEUP PUMP
97	EC2323	CV-3643	ACW LOOP ISOL
97	EC2323	CV-5611	FIREWATER TO RB OUTSIDE ISOL
97	EC2323	CV-1277	'B' DH LOOP DISCH TO MU PUMP P-36C SUCTION
97	EC2329	CV-3642	P-4B TO P-4C DISCH CROSSOVER
97	EC2329	CV-3644	P-4A TO P-4B DISCH CROSSOVER
97	EC2329	P-4C	'C' SERVICE WATER PUMP
97	EC2329	LT-1411	BWST LVL XMTR
97	EC2455	CV-1410	DH SUCTION ISOL
97	EC2496	LT-1411	BWST LVL XMTR
97	EC2498	C88	ESAS ANALOG SUBSYSTEM NO 1
97	EC2498	C91	ESAS CABINET DIGITAL SUBSYSTEM 2
97	EC2700	C486-2	AUXILIARY EQUIPMENT PANEL (GREEN)
97	EC2700	CV-2645	P-7A TO SG-A CONTROL
97	EC2700	CV-2647	P-7A TO SG-B CONTROL
97	EC2758	CV-2806	EFW P-7A SUCTION FROM SW
97	EC2758	CV-3851	EFW SERV WTR LOOP II ISOLATION
97	EC2758	CV-2617	EFW PP TURBINE K-3 STEAM FROM SG-B
97	EC2758	CV-2613	EFW PP TURBINE K-3 STEAM ADMISSION VLV
97	EC2758	CV-2615	EFW PUMP TURBINE K3 STEAM ADMISSION VALVE BYPASS
97	EC2758	SV-0621	MAIN STM ISOL CV-2692 CLOSURE
97	EC2758	SV-0711	MAIN STM ISOL CV-2691 CLOSURE

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles In Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
97	EC2769	C37-2	EFIC CABINET CHANNEL B (GREEN)
97	EC2769	CV-2645	P-7A TO SG-A CONTROL
97	EC2769	CV-2647	P-7A TO SG-B CONTROL
97	EC2769	CV-2613	EFW PP TURBINE K-3 STEAM ADMISSION VLV
97	EC2803	C37-2	EFIC CABINET CHANNEL B (GREEN)
97	EC2804	SV-0621	MAIN STM ISOL CV-2692 CLOSURE
97	EC2804	SV-0711	MAIN STM ISOL CV-2691 CLOSURE
97	EC2825	LT-1411	BWST LVL XMTR
97	EC2826	LT-1411	BWST LVL XMTR
97	EC2837	CV-2617	EFW PP TURBINE K-3 STEAM FROM SG-B
97	EC2837	CV-2613	EFW PP TURBINE K-3 STEAM ADMISSION VLV
97	EC2837	CV-2615	EFW PUMP TURBINE K3 STEAM ADMISSION VALVE BYPASS
97	EC2958	CV-1284	'C' HPI BLOCK VALVE
97	EC2958	CV-1285	HPI TO P-32D DISCH
97	EC3002	C486-3	AUXILIARY EQUIPMENT PANEL (YELLOW)
97	EC3002	RS-3	120 VAC DISTRIBUTION PNL RS3
97	EC3007	RS-3	120 VAC DISTRIBUTION PNL RS3
97	EC3019	C90	ESAS ANALOG SUBSYSTEM NO 3
97	EC3031	C486-3	AUXILIARY EQUIPMENT PANEL (YELLOW)
97	EC4013	C486-4	AUXILIARY EQUIPMENT PANEL (BLUE)
97	EC4013	RS-4	120 VAC DISTRIBUTION PNL RS4
97	EC4021	RS-4	120 VAC DISTRIBUTION PNL RS4
97	EC4034	C486-4	AUXILIARY EQUIPMENT PANEL (BLUE)
97	EC4038	C486-4	AUXILIARY EQUIPMENT PANEL (BLUE)
97	EJ1001	C486-1	AUXILIARY EQUIPMENT PANEL (RED)
97	EJ1001	CV-2646	P-7B TO SG-A CONTROL VALVE
97	EJ1001	CV-2648	P-7B TO SG-B CONTROL VALVE
97	EJ1002	PT-2618A	E24A MAIN STM PRESS-MSLI
97	EJ1002	PT-2667A	E24B MAIN STM PRESS-MSLI

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
97	EJ1002	C486-1	AUXILIARY EQUIPMENT PANEL (RED)
97	EJ1002	CV-2646	P-7B TO SG-A CONTROL VALVE
97	EJ1002	CV-2648	P-7B TO SG-B CONTROL VALVE
97	EJ1002	C37-1	EFIC CABINET CHANNEL A (RED)
97	EJ1003	LT-2618	STM GEN E24A LOW RANGE LEVEL (EFIC)
97	EJ1003	LT-2620	STM GEN E24A UPPER RNG LEVL (EFIC)
97	EJ1003	LT-2667	STM GEN E24B LOW RANGE LEVEL (EFIC)
97	EJ1003	LT-2669	STM GEN E24B UPPER RANGE LEVEL (EFIC)
97	EJ1006	LT-2618	STM GEN E24A LOW RANGE LEVEL (EFIC)
97	EJ1006	LT-2620	STM GEN E24A UPPER RNG LEVL (EFIC)
97	EJ1006	PT-2618A	E24A MAIN STM PRESS-MSLI
97	EJ1006	LT-2667	STM GEN E24B LOW RANGE LEVEL (EFIC)
97	EJ1006	LT-2669	STM GEN E24B UPPER RANGE LEVEL (EFIC)
97	EJ1006	PT-2667A	E24B MAIN STM PRESS-MSLI
97	EJ1006	C37-1	EFIC CABINET CHANNEL A (RED)
97	EJ1010	C37-1	EFIC CABINET CHANNEL A (RED)
97	EJ1010	CV-2646	P-7B TO SG-A CONTROL VALVE
97	EJ1010	CV-2648	P-7B TO SG-B CONTROL VALVE
97	EJ1022	CV-2646	P-7B TO SG-A CONTROL VALVE
97	EJ1022	CV-2648	P-7B TO SG-B CONTROL VALVE
97	EJ2013	C37-2	EFIC CABINET CHANNEL B (GREEN)
97	EJ2013	CV-2645	P-7A TO SG-A CONTROL
97	EJ2013	CV-2647	P-7A TO SG-B CONTROL
97	EJ2024	CV-2645	P-7A TO SG-A CONTROL
97	EJ2024	CV-2647	P-7A TO SG-B CONTROL
97	EJ3002	LT-2668	SG E-24A LOW RANGE LEVEL (EFIC)
97	EJ3002	LT-2670	STM GEN E24A UPPER RANGE LEVEL (EFIC)
97	EJ3002	PT-2668A	E24A MAIN STM PRESS-MSLI
97	EJ3002	LT-2617	STM GEN E24B LOW RANGE LEVEL (EFIC)

Table 1 List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129			
Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
97	EJ3002	LT-2619	STM GEN E24B UPPER RNG LEVEL (EFIC)
97	EJ3002	PT-2617A	E24B MAIN STM PRESS-MSLI
97	EJ3006	LT-2668	SG E-24A LOW RANGE LEVEL (EFIC)
97	EJ3006	LT-2670	STM GEN E24A UPPER RANGE LEVEL (EFIC)
97	EJ3006	PT-2668A	E24A MAIN STM PRESS-MSLI
97	EJ3006	LT-2617	STM GEN E24B LOW RANGE LEVEL (EFIC)
97	EJ3006	LT-2619	STM GEN E24B UPPER RNG LEVEL (EFIC)
97	EJ3006	PT-2617A	E24B MAIN STM PRESS-MSLI
97	ER1001	C37-1	EFIC CABINET CHANNEL A (RED)
97	ER1001	TE-1012	A' LOOP TH TEMP DUAL ELEMENT INCL TE-1014
97	ER1001	PT-1021	A' LOOP RCS PRESS (RPS)
97	ER1001	C88	ESAS ANALOG SUBSYSTEM NO 1
97	ER1001	CV-1050	DH SUCTION ISOL
97	ER1001	PT-1020	A' LOOP RCS PRESS (ESAS #1)
97	ER1001	PT-2405	RB PRESS (ESAS #1)
97	ER1004	C88	ESAS ANALOG SUBSYSTEM NO 1
97	ER1004	CV-1050	DH SUCTION ISOL
97	ER1004	PT-1020	A' LOOP RCS PRESS (ESAS #1)
97	ER1004	PT-2405	RB PRESS (ESAS #1)
97	ER1007	C37-1	EFIC CABINET CHANNEL A (RED)
97	ER1007	TE-1012	A' LOOP TH TEMP DUAL ELEMENT INCL TE-1014
97	ER1007	PT-1021	A' LOOP RCS PRESS (RPS)
97	ER1014	C86	ESAS CABINET DIGITAL SUBSYSTEM 1
97	ER1017	C86	ESAS CABINET DIGITAL SUBSYSTEM 1
97	ER1017	C87	ESAS CABINET DIGITAL SUBSYSTEM 1
97	ER1019	C88	ESAS ANALOG SUBSYSTEM NO 1
97	ER1019	CV-1050	DH SUCTION ISOL
97	ER1019	PT-1020	A' LOOP RCS PRESS (ESAS #1)
97	ER1019	PT-2405	RB PRESS (ESAS #1)

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
97	ER1020	C37-1	EFIC CABINET CHANNEL A (RED)
97	ER1020	TE-1012	A' LOOP TH TEMP DUAL ELEMENT INCL TE-1014
97	ER1020	PT-1021	A' LOOP RCS PRESS (RPS)
97	ER2005	C37-2	EFIC CABINET CHANNEL B (GREEN)
97	ER2005	TE-1013	'A' LOOP TH TEMP
97	ER2005	C89	ESAS ANALOG SUBSYSTEM NO. 2
97	ER2005	PT-1022	A LOOP RCS PRESS (ESAS #2)
97	ER2005	PT-2406	RB PRESS (ESAS #2)
97	ER2009	C37-2	EFIC CABINET CHANNEL B (GREEN)
97	ER2009	TE-1013	'A' LOOP TH TEMP
97	ER2010	C37-2	EFIC CABINET CHANNEL B (GREEN)
97	ER2010	TE-1013	'A' LOOP TH TEMP
97	ER2018	C91	ESAS CABINET DIGITAL SUBSYSTEM 2
97	ER2018	C92	ESAS CABINET DIGITAL SUBSYSTEM 2
97	ER2020	C91	ESAS CABINET DIGITAL SUBSYSTEM 2
97	ER2020	C92	ESAS CABINET DIGITAL SUBSYSTEM 2
97	ER2022	C91	ESAS CABINET DIGITAL SUBSYSTEM 2
97	ER2023	C89	ESAS ANALOG SUBSYSTEM NO. 2
97	ER2023	PT-1022	A LOOP RCS PRESS (ESAS #2)
97	ER2023	PT-2406	RB PRESS (ESAS #2)
97	ER3001	C37-3	EFIC CABINET CHANNEL C (YELLOW)
97	ER3001	TE-1040	B LOOP TH TEMP TO RPS
97	ER3001	PT-1038	B LOOP RCS PRESS C RPS C43
97	ER3002	C90	ESAS ANALOG SUBSYSTEM NO 3
97	ER3002	PT-1040	B' LOOP RCS PRESS (ESAS #3)
97	ER3002	PT-2407	RB PRESS (ESAS #3)
97	ER3004	C37-3	EFIC CABINET CHANNEL C (YELLOW)
97	ER3004	TE-1040	B LOOP TH TEMP TO RPS
97	ER3004	PT-1038	B LOOP RCS PRESS C RPS C43

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
97	ER3007	C90	ESAS ANALOG SUBSYSTEM NO 3
97	ER3007	PT-1040	B' LOOP RCS PRESS (ESAS #3)
97	ER3007	PT-2407	RB PRESS (ESAS #3)
97	ER4017	C37-4	EFIC CABINET CHANNEL D (BLUE)
97	ER4017	TE-1041	'B' LOOP TH TEMP
97	J4064	C47	NNI AUX CONTROL SYS (X-PWR)
97	J4064	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
97	J4064	C48	NNI AUX CONTROL SYS (Y-PWR)
97	J4064	C539A	EFIC SIGNAL CONDITIONING CABINET
97	J4064	C540A	EFIC SIGNAL CONDITIONING CABINET
97	J4087	CV-1207	SEAL INJ CONTROL VALVE
97	J4087	C90	ESAS ANALOG SUBSYSTEM NO 3
97	J4089	C88	ESAS ANALOG SUBSYSTEM NO 1
97	J4169	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
97	J4169	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
97	J4170	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
97	J4170	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
97	J4807	C47	NNI AUX CONTROL SYS (X-PWR)
97	J4807	C498	DIVERSE RX OVERPRESSURE PREVENTION SYS (DROPS) CAB
97	J4807	C48	NNI AUX CONTROL SYS (Y-PWR)
97	JB03	CV-1275	MAKEUP TANK OUTLET
97	JB03	A-4	4160 VOLT BUS A-4
97	JB03	B-6	480V LOAD CENTER BUS B-6
97	JB03	CV-3642	P-4B TO P-4C DISCH CROSSOVER
97	JB03	CV-3644	P-4A TO P-4B DISCH CROSSOVER
97	JB03	P-4C	'C' SERVICE WATER PUMP
97	JB03	P-34B	'B' LOOP DH REMOVAL PUMP
97	JB03	P-36C	PRIMARY MAKEUP PUMP

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
97	JB03	B-5	480V LOAD CENTER BUS B-5
97	JB03	B-56	MOTOR CONTROL CENTER
97	JB03	CV-3643	ACW LOOP ISOL
97	JB03	VEF-24C	#2 EDG EXHAUST FAN
97	JB03	VEF-24D	#2 EDG EXHAUST FAN
97	JB03	VUC-1C	AUX BLDG DECAY HT REMOVAL UNIT COOLER
97	JB03	VUC-1D	AUX BLDG DECAY HT REMOVAL UNIT COOLER
97	JB03	CV-1227	HPI TO P-32B DISCHARGE
97	JB03	CV-1228	HPI TO P-32A DISCHARGE
97	JB03	CV-1400	LPI/DECAY HEAT BLOCK
97	JB03	CV-1408	BWST T-3 OUTLET
97	JB03	CV-1406	RB SUMP LINE B OUTLET
97	JB03	CV-2806	EFW P-7A SUCTION FROM SW
97	JB03	CV-3811	LOOP 2 SUPPLY TO ICW COOLERS
97	JB03	CV-3821	DECAY HEAT CLR SERVICE WTR E-35B INLET
97	JB03	CV-3851	EFW SERV WTR LOOP II ISOLATION
97	JB03	CV-3807	SERV WTR TO DG2 CLRS
97	JB03	CV-2617	EFW PP TURBINE K-3 STEAM FROM SG-B
97	JB03	CV-5611	FIREWATER TO RB OUTSIDE ISOL
97	JB03	CV-1410	DH SUCTION ISOL
97	JB03	CV-1277	'B' DH LOOP DISCH TO MU PUMP P-36C SUCTION
97	JB03	CV-2613	EFW PP TURBINE K-3 STEAM ADMISSION VLV
97	JB03	CV-2615	EFW PUMP TURBINE K3 STEAM ADMISSION VALVE BYPASS
97	JB03	K-4B	#2 EDG
97	JB03	C88	ESAS ANALOG SUBSYSTEM NO 1
97	JB03	C91	ESAS CABINET DIGITAL SUBSYSTEM 2
97	JB04	CV-1275	MAKEUP TANK OUTLET
97	JB04	A-4	4160 VOLT BUS A-4
97	JB04	K-4B	#2 EDG

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
97	JB04	B-6	480V LOAD CENTER BUS B-6
97	JB04	P-4C	'C' SERVICE WATER PUMP
97	JB04	CV-3642	P-4B TO P-4C DISCH CROSSOVER
97	JB04	CV-3644	P-4A TO P-4B DISCH CROSSOVER
97	JB04	P-34B	'B' LOOP DH REMOVAL PUMP
97	JB04	P-36C	PRIMARY MAKEUP PUMP
97	JB04	B-5	480V LOAD CENTER BUS B-5
97	JB04	B-56	MOTOR CONTROL CENTER
97	JB04	CV-3643	ACW LOOP ISOL
97	JB04	VEF-24C	#2 EDG EXHAUST FAN
97	JB04	VEF-24D	#2 EDG EXHAUST FAN
97	JB04	VUC-1C	AUX BLDG DECAY HT REMOVAL UNIT COOLER
97	JB04	VUC-1D	AUX BLDG DECAY HT REMOVAL UNIT COOLER
97	JB04	CV-3807	SERV WTR TO DG2 CLRS
97	JB04	CV-2617	EFW PP TURBINE K-3 STEAM FROM SG-B
97	JB04	CV-1277	'B' DH LOOP DISCH TO MU PUMP P-36C SUCTION
97	JB04	CV-1435	DECAY HEAT P-34B SUCTION FROM RCS
97	JB04	CV-1437	DECAY HEAT P-34B SUCTION FROM BWST
97	JB04	CV-2613	EFW PP TURBINE K-3 STEAM ADMISSION VLV
97	JB04	CV-2615	EFW PUMP TURBINE K3 STEAM ADMISSION VALVE BYPASS
97	JB04	SV-0621	MAIN STM ISOL CV-2692 CLOSURE
97	JB04	SV-0711	MAIN STM ISOL CV-2691 CLOSURE
97	JB04	C88	ESAS ANALOG SUBSYSTEM NO 1
97	JB04	C91	ESAS CABINET DIGITAL SUBSYSTEM 2
97	JB06	C37-2	EFIC CABINET CHANNEL B (GREEN)
97	JB06	TE-1013	'A' LOOP TH TEMP
97	JB06	C89	ESAS ANALOG SUBSYSTEM NO. 2
97	JB06	PT-1022	A LOOP RCS PRESS (ESAS #2)
97	JB06	PT-2406	RB PRESS (ESAS #2)

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles In Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
97	JB193	LT-1421	BWST LVL XMTR
97	JB194	LT-1411	BWST LVL XMTR
97	JB303	P-4A	'A' SERVICE WATER PUMP
97	JB303	CV-3640	'B' DISCH TO LOOP II SW
97	JB303	CV-3646	P-4A TO P-4B DISCH CROSSOVER
97	JB303	P-34A	'A' LOOP DH REMOVAL PUMP
97	JB303	P-36A	PRIMARY MAKEUP PUMP
97	JB303	P-7B	EMERGENCY F W. PUMP
97	JB303	CV-1405	RB SUMP LINE A OUTLET
97	JB303	CV-1401	LPI/DECAY HEAT BLOCK
97	JB303	CV-1220	HPI TO P-32D DISCHARGE
97	JB303	CV-3820	LOOP 1 SUPPLY TO ICW COOLERS
97	JB303	SV-0611	MAIN STM ISOL CV-2691 CLOSURE
97	JB303	SV-0721	MAIN STM ISOL CV-2692 CLOSURE
97	JB304	C88	ESAS ANALOG SUBSYSTEM NO 1
97	JB304	CV-1050	DH SUCTION ISOL
97	JB304	PT-1020	A' LOOP RCS PRESS (ESAS #1)
97	JB304	PT-2405	RB PRESS (ESAS #1)
97	JB304	C86	ESAS CABINET DIGITAL SUBSYSTEM 1
97	JB304	C87	ESAS CABINET DIGITAL SUBSYSTEM 1
97	JB305	K-4A	#1 EDG
97	JB305	VEF-24A	#1 EDG EXHAUST FAN
97	JB305	VEF-24B	#1 EDG EXHAUST FAN
97	JB305	C88	ESAS ANALOG SUBSYSTEM NO 1
97	JB305	CV-2646	P-7B TO SG-A CONTROL VALVE
97	JB305	CV-2648	P-7B TO SG-B CONTROL VALVE
97	JB305	C86	ESAS CABINET DIGITAL SUBSYSTEM 1
97	JB305	C89	ESAS ANALOG SUBSYSTEM NO. 2
97	JB306	C89	ESAS ANALOG SUBSYSTEM NO. 2

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
97	JB306	PT-1022	A LOOP RCS PRESS (ESAS #2)
97	JB306	C486-2	AUXILIARY EQUIPMENT PANEL (GREEN)
97	JB306	CV-2645	P-7A TO SG-A CONTROL
97	JB306	CV-2647	P-7A TO SG-B CONTROL
97	JB306	C88	ESAS ANALOG SUBSYSTEM NO 1
97	JB306	C91	ESAS CABINET DIGITAL SUBSYSTEM 2
97	JB307	C486-3	AUXILIARY EQUIPMENT PANEL (YELLOW)
97	JB307	C90	ESAS ANALOG SUBSYSTEM NO 3
97	JB308	C37-1	EFIC CABINET CHANNEL A (RED)
97	JB308	TE-1012	A' LOOP TH TEMP DUAL ELEMENT INCL TE-1014
97	JB308	PT-1021	A' LOOP RCS PRESS (RPS)
97	JB308	C88	ESAS ANALOG SUBSYSTEM NO 1
97	JB308	CV-1050	DH SUCTION ISOL
97	JB308	PT-1020	A' LOOP RCS PRESS (ESAS #1)
97	JB308	PT-2405	RB PRESS (ESAS #1)
97	JB309	A-3	4160 VOLT BUS A-3
97	JB309	B-5	480V LOAD CENTER BUS B-5
97	JB309	SG-5	SLUICE GATE
97	JB309	SG-3	SLUICE GATE
97	JB309	CV-1050	DH SUCTION ISOL
97	JB309	CV-1434	DECAY HEAT P-34A SUCTION FROM RCS
97	JB309	CV-1436	DECAY HEAT P-34A SUCTION FROM BWST
97	JB309	K-4A	#1 EDG
97	JB309	C539A	EFIC SIGNAL CONDITIONING CABINET
97	JB309	C539B	EFIC SIGNAL CONDITIONING CABINET
97	JB309	LT-1001	PZR LVL
97	JB309	NE-0501	SOURCE RANGE NEUTRON DETECTOR ASSEMBLY
97	JB309	PT-1042	B' LOOP RCS PRESS (WR)
97	JB310	C486-3	AUXILIARY EQUIPMENT PANEL (YELLOW)

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
97	JB310	RS-3	120 VAC DISTRIBUTION PNL RS3
97	JB311	C486-4	AUXILIARY EQUIPMENT PANEL (BLUE)
97	JB311	RS-4	120 VAC DISTRIBUTION PNL RS4
97	JB312	C37-1	EFIC CABINET CHANNEL A (RED)
97	JB312	TE-1012	A' LOOP TH TEMP DUAL ELEMENT INCL TE-1014
97	JB312	PT-1021	A' LOOP RCS PRESS (RPS)
97	JB313	C37-3	EFIC CABINET CHANNEL C (YELLOW)
97	JB313	TE-1040	B LOOP TH TEMP TO RPS
97	JB313	PT-1038	B LOOP RCS PRESS C RPS C43
97	JB314	C37-2	EFIC CABINET CHANNEL B (GREEN)
97	JB314	TE-1013	'A' LOOP TH TEMP
97	JB315	K-4B	#2 EDG
97	JB315	CV-3642	P-4B TO P-4C DISCH CROSSOVER
97	JB315	CV-3644	P-4A TO P-4B DISCH CROSSOVER
97	JB315	P-4C	'C' SERVICE WATER PUMP
97	JB315	P-34B	'B' LOOP DH REMOVAL PUMP
97	JB315	VEF-24C	#2 EDG exhaust fan
97	JB315	VEF-24D	#2 EDG exhaust fan
97	JB315	VUC-1D	AUX BLDG DECAY HT REMOVAL UNIT COOLER
97	JB315	C89	ESAS ANALOG SUBSYSTEM NO. 2
97	JB315	PT-1022	A LOOP RCS PRESS (ESAS #2)
97	JB315	C486-2	AUXILIARY EQUIPMENT PANEL (GREEN)
97	JB315	CV-2645	P-7A TO SG-A CONTROL
97	JB315	CV-2647	P-7A TO SG-B CONTROL
97	JB315	LT-1411	BWST LVL XMTR
97	JB315	RS-2	120 VAC DISTRIBUTION PNL RS2
97	JB316	K-4A	#1 EDG
97	JB316	P-7B	EMERGENCY F.W. PUMP
97	JB316	VEF-24A	#1 EDG EXHAUST FAN

Table 1 List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129			
Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
97	JB316	VEF-24B	#1 EDG EXHAUST FAN
97	JB316	C88	ESAS ANALOG SUBSYSTEM NO 1
97	JB316	CV-2646	P-7B TO SG-A CONTROL VALVE
97	JB316	CV-2648	P-7B TO SG-B CONTROL VALVE
97	JB316	RS-1	120 VAC DISTRIBUTION PNL RS1
97	JB321	C91	ESAS CABINET DIGITAL SUBSYSTEM 2
97	JB321	C92	ESAS CABINET DIGITAL SUBSYSTEM 2
97	JB322	C86	ESAS CABINET DIGITAL SUBSYSTEM 1
97	JB322	C87	ESAS CABINET DIGITAL SUBSYSTEM 1
97	JB323	C91	ESAS CABINET DIGITAL SUBSYSTEM 2
97	JB323	C92	ESAS CABINET DIGITAL SUBSYSTEM 2
97	JB325	CV-1275	MAKEUP TANK OUTLET
97	JB325	CV-3642	P-4B TO P-4C DISCH CROSSOVER
97	JB325	CV-3644	P-4A TO P-4B DISCH CROSSOVER
97	JB325	P-4C	'C' SERVICE WATER PUMP
97	JB325	P-34B	'B' LOOP DH REMOVAL PUMP
97	JB325	P-36C	PRIMARY MAKEUP PUMP
97	JB325	CV-1227	HPI TO P-32B DISCHARGE
97	JB325	CV-1228	HPI TO P-32A DISCHARGE
97	JB325	CV-1400	LPI/DECAY HEAT BLOCK
97	JB325	CV-1408	BWST T-3 OUTLET
97	JB325	CV-1406	RB SUMP LINE B OUTLET
97	JB325	CV-3811	LOOP 2 SUPPLY TO ICW COOLERS
97	JB325	CV-3821	DECAY HEAT CLR SERVICE WTR E-35B INLET
97	JB325	K-4B	#2 EDG
97	JB325	C89	ESAS ANALOG SUBSYSTEM NO. 2
97	JB325	C88	ESAS ANALOG SUBSYSTEM NO 1
97	JB325	C91	ESAS CABINET DIGITAL SUBSYSTEM 2
97	JB325	C90	ESAS ANALOG SUBSYSTEM NO 3

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
97	JB325	C92	ESAS CABINET DIGITAL SUBSYSTEM 2
97	JB326	A-3	4160 VOLT BUS A-3
97	JB326	K-4A	#1 EDG
97	JB326	B-5	480V LOAD CENTER BUS B-5
97	JB326	CV-3640	'B' DISCH TO LOOP II SW
97	JB326	CV-3646	P-4A TO P-4B DISCH CROSSOVER
97	JB326	P-4A	'A' SERVICE WATER PUMP
97	JB326	P-34A	'A' LOOP DH REMOVAL PUMP
97	JB326	P-36A	PRIMARY MAKEUP PUMP
97	JB326	CV-1401	LPI/DECAY HEAT BLOCK
97	JB326	VEF-24A	#1 EDG EXHAUST FAN
97	JB326	VEF-24B	#1 EDG EXHAUST FAN
97	JB326	CV-1407	BWST T-3 OUTLET
97	JB326	CV-3820	LOOP 1 SUPPLY TO ICW COOLERS
97	JB326	CV-3643	ACW LOOP ISOL
97	JB326	C88	ESAS ANALOG SUBSYSTEM NO 1
97	JB326	C86	ESAS CABINET DIGITAL SUBSYSTEM 1
97	JB326	C89	ESAS ANALOG SUBSYSTEM NO. 2
97	JB326	C87	ESAS CABINET DIGITAL SUBSYSTEM 1
97	JB327	P-7B	EMERGENCY F.W. PUMP
97	JB327	CV-1405	RB SUMP LINE A OUTLET
97	JB327	CV-1401	LPI/DECAY HEAT BLOCK
97	JB327	VEF-24A	#1 EDG EXHAUST FAN
97	JB327	VEF-24B	#1 EDG EXHAUST FAN
97	JB327	VUC-1A	AUX BLDG DECAY HT REMOVAL UNIT COOLER
97	JB327	VUC-1B	AUX BLDG DECAY HT REMOVAL UNIT COOLER
97	JB327	CV-1219	HPI TO P-32C DISCHARGE
97	JB327	CV-1220	HPI TO P-32D DISCHARGE
97	JB327	CV-1407	BWST T-3 OUTLET

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles In Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
97	JB327	CV-3820	LOOP 1 SUPPLY TO ICW COOLERS
97	JB327	CV-3822	DECAY HEAT CLR SERVICE WTR E-35A INLET
97	JB327	CV-3806	SERV WTR TO DG1 CLRS
97	JB327	CV-1276	'A' DH LOOP DISCH TO MU PUMP P-36A SUCTION
97	JB328	K-4A	#1 EDG
97	JB328	A-3	4160 VOLT BUS A-3
97	JB328	P-4A	'A' SERVICE WATER PUMP
97	JB328	CV-3640	'B' DISCH TO LOOP II SW
97	JB328	CV-3646	P-4A TO P-4B DISCH CROSSOVER
97	JB328	P-34A	'A' LOOP DH REMOVAL PUMP
97	JB328	P-36A	PRIMARY MAKEUP PUMP
97	JB328	P-7B	EMERGENCY F.W. PUMP
97	JB328	VEF-24A	#1 EDG EXHAUST FAN
97	JB328	VEF-24B	#1 EDG EXHAUST FAN
97	JB328	VUC-1A	AUX BLDG DECAY HT REMOVAL UNIT COOLER
97	JB328	VUC-1B	AUX BLDG DECAY HT REMOVAL UNIT COOLER
97	JB328	CV-3806	SERV WTR TO DG1 CLRS
97	JB328	CV-3643	ACW LOOP ISOL
97	JB328	SV-0611	MAIN STM ISOL CV-2691 CLOSURE
97	JB328	SV-0721	MAIN STM ISOL CV-2692 CLOSURE
97	JB328	C88	ESAS ANALOG SUBSYSTEM NO 1
97	JB328	C86	ESAS CABINET DIGITAL SUBSYSTEM 1
97	JB328	C87	ESAS CABINET DIGITAL SUBSYSTEM 1
97	JB329	C37-4	EFIC CABINET CHANNEL D (BLUE)
97	JB329	TE-1041	'B' LOOP TH TEMP
97	JB333	A-4	4160 VOLT BUS A-4
97	JB333	B-5	480V LOAD CENTER BUS B-5
97	JB333	B-56	MOTOR CONTROL CENTER
97	JB333	B-6	480V LOAD CENTER BUS B-6

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
97	JB375	C90	ESAS ANALOG SUBSYSTEM NO 3
97	JB375	PT-1040	B' LOOP RCS PRESS (ESAS #3)
97	JB375	PT-2407	RB PRESS (ESAS #3)
97	JB710	CV-1401	LPI/DECAY HEAT BLOCK
97	JB712	LT-2668	SG E-24A LOW RANGE LEVEL (EFIC)
97	JB712	LT-2670	STM GEN E24A UPPER RANGE LEVEL (EFIC)
97	JB712	PT-2668A	E24A MAIN STM PRESS-MSLI
97	JB712	LT-2617	STM GEN E24B LOW RANGE LEVEL (EFIC)
97	JB712	LT-2619	STM GEN E24B UPPER RNG LEVEL (EFIC)
97	JB712	PT-2617A	E24B MAIN STM PRESS-MSLI
97	JB722	P-7B	EMERGENCY F.W. PUMP
97	JB722	CV-1401	LPI/DECAY HEAT BLOCK
97	JB722	C511	TRIP INTERFACE EQUIPMENT TIE CHAN A
97	TB155	B-5	480V LOAD CENTER BUS B-5
97	TB419	LT-1421	BWST LVL XMTR
97	VC041	PSV-1000	PZR ERV
97	VC044	PSV-1000	PZR ERV
97	VC045	CV-1275	MAKEUP TANK OUTLET
97	VC045	CV-1000	ERV ISOLATION
97	VC048	CV-2676	ATMOS DUMP 'A' BLOCK VALVE
97	VC048	CV-2619	ATMOS DUMP 'B' BLOCK VALVE
97	VC051	C37-2	EFIC CABINET CHANNEL B (GREEN)
97	VC051	C37-1	EFIC CABINET CHANNEL A (RED)
97	VC051	CV-2646	P-7B TO SG-A CONTROL VALVE
97	VC051	CV-2648	P-7B TO SG-B CONTROL VALVE
97	VC052	CV-2613	EFW PP TURBINE K-3 STEAM ADMISSION VLV
97	VC052	P-7B	EMERGENCY F.W. PUMP
97	VC052	CV-2803	EFW P-7B SUCTION FROM SW
97	VC052	CV-3850	EFW SERV WTR LOOP I ISOLATION

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
97	VC052	CV-2667	EFW PP TURBINE K-3 STEAM FROM SG-A
97	VC053	C37-2	EFIC CABINET CHANNEL B (GREEN)
97	VC053	CV-2645	P-7A TO SG-A CONTROL
97	VC053	CV-2647	P-7A TO SG-B CONTROL
97	VC109	CV-1404	P-34A/B SUCT SUPP FROM RCS
97	VC114	CV-1410	DH Suction Isol
97	VC117	LT-1411	BWST LVL XMTR
97	VC118	CV-1284	'C' HPI BLOCK VALVE
97	VC118	CV-1285	HPI TO P-32D DISCH
97	VC119	CV-3643	ACW LOOP ISOL
97	VC119	CV-5611	FIREWATER TO RB OUTSIDE ISOL
97	VC119	CV-1277	'B' DH LOOP DISCH TO MU PUMP P-36C SUCTION
97	VC122	A-4	4160 VOLT BUS A-4
97	VC124	SV-0621	MAIN STM ISOL CV-2692 CLOSURE
97	VC124	SV-0711	MAIN STM ISOL CV-2691 CLOSURE
97	VC125	PSV-1000	PZR ERV
97	VC129	CV-3822	DECAY HEAT CLR SERVICE WTR E-35A INLET
97	VC129	C539A	EFIC SIGNAL CONDITIONING CABINET
97	VC129	C539B	EFIC SIGNAL CONDITIONING CABINET
97	VC129	LT-1001	PZR LVL
97	VC129	NE-0501	SOURCE RANGE NEUTRON DETECTOR ASSEMBLY
97	VC129	PT-1042	B' LOOP RCS PRESS (WR)
97	VC130	CV-1278	HPI TO P-32A DISCH
97	VC130	CV-1279	HPI TO P-32B DISCH
97	VC131	P-7B	EMERGENCY F.W. PUMP
97	VC132	PSV-1000	PZR ERV
97	VC133	P-7B	EMERGENCY F.W. PUMP
97	VC133	CV-1405	RB SUMP LINE A OUTLET
97	VC133	CV-1401	LPI/DECAY HEAT BLOCK

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
97	VC133	CV-1219	HPI TO P-32C DISCHARGE
97	VC133	CV-1220	HPI TO P-32D DISCHARGE
97	VC133	CV-1407	BWST T-3 OUTLET
97	VC133	CV-1276	'A' DH LOOP DISCH TO MU PUMP P-36A SUCTION
97	VC134	A-3	4160 VOLT BUS A-3
97	VC134	P-4A	'A' SERVICE WATER PUMP
97	VC134	P-34A	'A' LOOP DH REMOVAL PUMP
97	VC134	P-36A	PRIMARY MAKEUP PUMP
97	VC134	CV-3640	'B' DISCH TO LOOP II SW
97	VC134	CV-3646	P-4A TO P-4B DISCH CROSSOVER
97	VC135	CV-3640	'B' DISCH TO LOOP II SW
97	VC135	CV-3646	P-4A TO P-4B DISCH CROSSOVER
97	VC135	P-4A	'A' SERVICE WATER PUMP
97	VC135	P-34A	'A' LOOP DH REMOVAL PUMP
97	VC136	CV-3640	'B' DISCH TO LOOP II SW
97	VC136	CV-3646	P-4A TO P-4B DISCH CROSSOVER
97	VC136	P-4A	'A' SERVICE WATER PUMP
97	VC136	P-7B	EMERGENCY F W. PUMP
97	VC136	CV-3643	ACW LOOP ISOL
97	VC136	SV-0611	MAIN STM ISOL CV-2691 CLOSURE
97	VC136	SV-0721	MAIN STM ISOL CV-2692 CLOSURE
97	VC190	CV-3640	'B' DISCH TO LOOP II SW
97	VC190	CV-3646	P-4A TO P-4B DISCH CROSSOVER
97	VC190	P-4A	'A' SERVICE WATER PUMP
97	VC190	CV-3820	LOOP 1 SUPPLY TO ICW COOLERS
97	VC190	C86	ESAS CABINET DIGITAL SUBSYSTEM 1
97	VC191	P-4A	'A' SERVICE WATER PUMP
97	VC191	P-36A	PRIMARY MAKEUP PUMP
97	VC191	CV-1407	BWST T-3 OUTLET

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
97	VC191	K-4A	#1 EDG
97	VC191	C86	ESAS CABINET DIGITAL SUBSYSTEM 1
97	VC191	C89	ESAS ANALOG SUBSYSTEM NO 2
97	VC191	C88	ESAS ANALOG SUBSYSTEM NO 1
97	VC192	P-34A	'A' LOOP DH REMOVAL PUMP
97	VC192	CV-1401	LPI/DECAY HEAT BLOCK
97	VC192	CV-1407	BWST T-3 OUTLET
97	VC192	C87	ESAS CABINET DIGITAL SUBSYSTEM 1
97	VC194	C88	ESAS ANALOG SUBSYSTEM NO 1
97	VC194	C86	ESAS CABINET DIGITAL SUBSYSTEM 1
97	VC196	C89	ESAS ANALOG SUBSYSTEM NO. 2
97	VC196	PT-1022	A LOOP RCS PRESS (ESAS #2)
97	VC196	C91	ESAS CABINET DIGITAL SUBSYSTEM 2
97	VC198	C90	ESAS ANALOG SUBSYSTEM NO 3
97	VC199	C90	ESAS ANALOG SUBSYSTEM NO 3
97	VC199	C91	ESAS CABINET DIGITAL SUBSYSTEM 2
97	VC200	CV-3642	P-4B TO P-4C DISCH CROSSOVER
97	VC200	CV-3644	P-4A TO P-4B DISCH CROSSOVER
97	VC200	P-4C	'C' SERVICE WATER PUMP
97	VC200	CV-1408	BWST T-3 OUTLET
97	VC200	CV-3811	LOOP 2 SUPPLY TO ICW COOLERS
97	VC200	K-4B	#2 EDG
97	VC200	C88	ESAS ANALOG SUBSYSTEM NO 1
97	VC200	C91	ESAS CABINET DIGITAL SUBSYSTEM 2
97	VC200	C89	ESAS ANALOG SUBSYSTEM NO. 2
97	VC200	C90	ESAS ANALOG SUBSYSTEM NO 3
97	VC201	P-36C	PRIMARY MAKEUP PUMP
97	VC201	C88	ESAS ANALOG SUBSYSTEM NO 1
97	VC201	C91	ESAS CABINET DIGITAL SUBSYSTEM 2

Table 1

List of SSCs Assumed to be Affected by Tornado-Generated Missiles in Rooms 97, 98, and 129

Room	Impacted SSC	Equipment Affected by Impacted SSC	Description of Affected SSC
97	VC201	C90	ESAS ANALOG SUBSYSTEM NO 3
97	VC205	C90	ESAS ANALOG SUBSYSTEM NO 3
97	VJ015	CV-2645	P-7A TO SG-A CONTROL
97	VJ015	CV-2647	P-7A TO SG-B CONTROL
97	VJ015	C37-2	EFIC CABINET CHANNEL B (GREEN)
97	VJ015	SV-0611	MAIN STM ISOL CV-2691 CLOSURE
97	VJ015	SV-0721	MAIN STM ISOL CV-2692 CLOSURE
97	VJ033	SG-5	SLUICE GATE
97	VJ033	SG-3	SLUICE GATE
97	VJ062	C88	ESAS ANALOG SUBSYSTEM NO 1
97	VJ065	C92	ESAS CABINET DIGITAL SUBSYSTEM 2

TABLE 2 – SOURCES OF UNCERTAINTY FOR ANO-1 TMRE				
Source of Uncertainty	**Discussion of Issue**	**Impact on Model**	**TMRE Impact Assessment**	**TMRE Impact?**
		ANO Specific Sources of Uncertainty		
Pump Alignment for Initiating Event Fault Trees	The quantification results show that support system initiating events result in different frequencies based on pump alignments.	Support system initiating event fault tree is affected by this source of uncertainty. The nominal pump configuration is used in the baseline quantification.	The TMRE methodology assumes that a LOOP occurs as a result of the tornado. Therefore, any uncertainty with regards to support system initiating event frequencies does not affect the TMRE results.	No
Screening of Components and/or Failure Modes	The system models exclude some components and failure modes based on low frequency of occurrence. The components and/or failure modes are simply assumed to have negligible probability.	The system failure probabilities would be slightly higher if including all potential component failures and failure modes. However, when following the screening criteria, the impact of the screening process has a negligible impact on the results.	The screening criteria used in development of the ANO-1 PRA model follows the guidelines in the PRA ASME standard. These guidelines ensure that screened components and failure modes have a negligible impact on PRA results. Additionally, the TMRE evaluations located all piping and cables that could be impacted by tornado missiles and the potential failures were explicitly evaluated. Therefore, there would be no impact on the TMRE evaluations from excluding low-probability failure from the base PRA model.	No
Flow Diversion	The system models exclude some flow diversion pathways based on an arbitrary line size	The system failure probabilities may be slightly higher some flow diversion paths not considered actually would cause system failure.	The non-conforming conditions for ANO-1 do not include flow diversion pathways. Therefore, the use of an arbitrary line size to screen flow diversion would contribute to both the compliant and degraded cases.	No
4kV Breaker Recovery Actions	The recovery actions for the DC breaker for the 4160 bus was applied according to procedure OP-1107.001. This recovery rule is only applied in cutsets for sequences TBX, RBX, and SX.	Assuming that operator actions may recover hardware failures may not be practical	The TMRE evaluations take no credit for recovering AC power if the EDGs fail. Therefore, this source of uncertainty does not affect the results of the TMRE analysis.	No

TABLE 2 – SOURCES OF UNCERTAINTY FOR ANO-1 TMRE				
Source of Uncertainty	**Discussion of Issue**	**Impact on Model**	**TMRE Impact Assessment**	**TMRE Impact?**
Generic Sources of Uncertainty				
Grid Stability	The LOOP frequency is a function of several factors including switchyard design, the number and independence of offsite power feeds, the local power production and consumption environment and the degree of plant control of the local grid and grid maintenance Three different aspects relate to this issue: 1a. LOOP initiating event frequency values and recovery probabilities.	The generic industry frequencies for the four LOOP event categories developed in NUREG/CR-6890 are applicable to the ANO site. The generic industry frequencies are appropriate to use as priors to develop a plant-specific LOOP frequency. The plant-specific data is sufficient for the Bayesian update. The four LOOP event categories are merged into a single LOOP frequency event Merging the LOOP events into a single category may affect recovery probability.	The TMRE analysis assumes that a LOOP occurs as a result of the tornado, and that OSP cannot be recovered. Therefore, the initiating event frequency and recovery values do not impact the TMRE analysis.	No
Conditional LOOP Probability	The possibility that offsite power is lost as a result of the reactor/ turbine trip is modeled.	The generic industry data for consequential LOOP developed in NUREG/CR-6890 is applicable to the ANO site. The frequency for consequential LOOP is calculated for an ECCS signal and general plant trips	The TMRE analysis assumes that a LOOP occurs as a result of the tornado, and that OSP cannot be recovered. Therefore, the conditional LOOP probability does not impact the TMRE analysis	No

TABLE 2 – SOURCES OF UNCERTAINTY FOR ANO-1 TMRE				
Source of Uncertainty	**Discussion of Issue**	**Impact on Model**	**TMRE Impact Assessment**	**TMRE Impact?**
Containment Sump/Strainer Performance	All PWRs are improving ECCS sump management practices including installation of new sump strainers at most plants. The PRA models the potential for containment sump blockage depending on the size of the LOCA.	Plugging of the containment sump was modeled using the guidance provided in WCAP-16882-NP. The strainer failure probabilities are affected by the method used to determine strainer performance.	The TMRE analysis does not assume that a coincident LOCA occurs during the tornado event. Therefore, this source of uncertainty does not impact the TMRE analysis	No
Basis for HEPs	There is not a consistent method for the treatment of pre-initiator and post-initiator human errors. However, human failures events are typically significant contributors to CDF and LERF.	Detailed analyses are only performed for the risk significant, post-initiator HFEs. No significant assumptions HRA employs industry-accepted methodologies. Standard sensitivity case for HFEs are performed as part of the quantification in order to determine the impact of assumptions.	Operator actions are evaluated explicitly as part of the TMRE process to ensure that they are unaffected by the tornado. All other HFEs are evaluated as part of the quantification to ensure that their uncertainty does not impact the PRA results. Therefore, this source of uncertainty does not impact the TMRE application.	No
Thermally-Induced Failure of Hot Leg/SG Tubes - PWRs	NRC analytical models and research findings continue to show that a thermally-induced steam generator tube rupture (TI-SGTR) is more probable than predicted by the industry. There is a need to come to agreement with NRC on the thermal hydraulics modeling of TI SGTR.	The results of the generic event tree quantification reported in WCAP-16341 are applicable to ANO-1. Plant specific parameters is used throughout the model. TI-SGTR can have a large impact on LERF due to immediate containment bypass.	The potential for plant and operator response to impact TI-SGTR and affect LERF was evaluated in the internal events PRA. The change in LERF due to TI-SGTR would impact both the compliant case and the degraded case for TMRE. As a result, there would be some negating of the effects for the change in risk. However, the overall conclusions of the TMRE would not change. Therefore, this source of uncertainty does not affect the results of the TMRE analysis.	No

TABLE 2 – SOURCES OF UNCERTAINTY FOR ANO-1 TMRE				
Source of Uncertainty	**Discussion of Issue**	**Impact on Model**	**TMRE Impact Assessment**	**TMRE Impact?**
ISLOCA Initiating Event Frequency	ISLOCA is often a significant contributor to LERF. One key input to the ISLOCA analysis are the assumptions related to common cause failure of isolation valves between the RCS/RPV and low-pressure piping. There is no consensus approach to the data or treatment of this issue. Additionally, given an overpressure condition in low pressure piping, there is uncertainty surrounding the failure mode of the piping.	Industry-accepted approach utilized to address common cause failures No significant assumptions made. Failure of the low-pressure pipe upon exposure to RCS pressure is assumed to be 1.0.	The TMRE analysis assumes that a LOOP initiating event occurs. There is no potential for a tornado missile to cause an ISLOCA. Therefore, this item does not impact the TMRE results.	No
Intra-System Common Cause Events	Common cause failures have been shown to be important contributors in PRAs. As limited plant-specific data is available, generic common cause factors are commonly used. Sometimes, plant-specific evidence can indicate that the generic values are inappropriate.	Standard sensitivity case for CCFs are performed as part of the quantification in order to determine the impact of assumptions.	The TMRE application considers that all conditions are nominal. The application does not involve consideration of specific common cause failures.	No

TABLE 3 – SOURCES OF UNCERTAINTY FOR ANO-2 TMRE				
Source of Uncertainty	**Discussion of Issue**	**Impact on Model**	**TMRE Impact Assessment**	**TMRE Impact?**
ANO Specific Sources of Uncertainty				
Loss of DC Initiating Event	Loss of either bud 2D01 or 2D002 is assumed to result in a reactor trip.	Actual plant configuration requires that additional failures occur before a reactor trip would be expected	The TMRE methodology assumes that a LOOP occurs as a result of the tornado. Therefore, any uncertainty with regards to support system initiating event frequencies does not affect the TMRE results.	No
Pump Alignment for Initiating Event Fault Trees	The quantification results show that support system initiating events result in different frequencies based on pump alignment.	Support system initiating event fault tree is affected by this source of uncertainty The nominal pump configuration is used in the baseline quantification.	The TMRE methodology assumes that a LOOP occurs as a result of the tornado. Therefore, any uncertainty with regards to support system initiating event frequencies does not affect the TMRE results.	No
Offsite Power Recovery	Several assumptions relate to calculating the probability of recovering offsite power following a LOOP	The combined impact of these events is to affect the probability of recovering LOOP.	The TMRE analysis assumes that a LOOP occurs as a result of the tornado, and that OSP cannot be recovered Therefore, the LOOP recovery probability does not impact the TMRE analysis	No

TABLE 3 – SOURCES OF UNCERTAINTY FOR ANO-2 TMRE				
Source of Uncertainty	**Discussion of Issue**	**Impact on Model**	**TMRE Impact Assessment**	**TMRE Impact?**
Grid Stability and Affecting Factors	There are several assumptions with respect to the effect of severe weather and other factors on LOOP frequency is not considered in the base PRA model	The generic industry frequencies for the four LOOP event categories developed in NUREG/CR-6890 are applicable to the ANO site. The generic industry frequencies are appropriate to use as priors to develop a plant-specific LOOP frequency. The plant-specific data is sufficient for the Bayesian update. The four LOOP event categories are merged into a single LOOP frequency event. Merging the LOOP events into a single category may affect recovery probability.	The TMRE analysis assumes that a LOOP occurs as a result of the tornado, and that OSP cannot be recovered. Therefore, the initiating event frequency and recovery values do not impact the TMRE analysis.	No
Conditional LOOP Probability	The possibility that offsite power is lost as a result of the reactor/ turbine trip is modeled.	The generic industry data for consequential LOOP developed in NUREG/CR-6890 is applicable to the ANO site The frequency for consequential LOOP is calculated for an ECCS signal and general plant trips	The TMRE analysis assumes that a LOOP occurs as a result of the tornado, and that OSP cannot be recovered: Therefore, the conditional LOOP probability does not impact the TMRE analysis	No

TABLE 3 – SOURCES OF UNCERTAINTY FOR ANO-2 TMRE				
Source of Uncertainty	**Discussion of Issue**	**Impact on Model**	**TMRE Impact Assessment**	**TMRE Impact?**
RCP Seal LOCA Flow	There are several instances where it is mentioned that multiple RCP seal LOCAs (regardless of count) are assumed to be a SBLOCA. In addition, although RCP seal failures divert some of the HPSI injection flow from reaching the core, these failures are assumed to be small enough to allow sufficient flow to the core to satisfy core cooling requirements using SBLOCA success criteria.	This assumption is considered to be reasonable for the base model. However, for some applications, a higher flow rate or consideration that flow from a seal leak on multiple seals could affect the success criteria.	Because a TMRE will cause a loss of offsite power and the RCPs will stop, the random failure probability of an RCP seal failure is small and would be an insignificant contributor to overall risk. Furthermore, the success criteria for a medium LOCA is similar to a small LOCA so no significant change in risk is expected.	No
Containment Performance	Containment Temperature and Pressure Control, is assumed to be maintained via the Long Term RCS Inventory Control and Heat Removal function.	This is a reasonable assumption for sequences where no core damage occurs. Should core damage occur, then the results of specific accident sequences could be affected. As a result, this is a potential source of uncertainty.	The TMRE model shows similar plant response to the base LOOP model There are no unique core damage sequences in the TMRE model that would be affected by this assumption	No

TABLE 3 – SOURCES OF UNCERTAINTY FOR ANO-2 TMRE				
Source of Uncertainty	**Discussion of Issue**	**Impact on Model**	**TMRE Impact Assessment**	**TMRE Impact?**
PTS	Pressurized thermal shock (PTS) is assumed not to be a significant contributor to core damage and, thus, was not modeled as a consequential event in the PRA.	Neglecting this potential failure mode may affect the results of sequences where over cooling could occur, e.g , large steam line breaks. For small steam line break, the potential for overcooling is minimal or non-existant. Therefore, this is considered a source of uncertainty for accident scenarios that involve overcooling potential.	The TMRE methodology assumes that a LOOP occurs as a result of the tornado. Therefore, any uncertainty with regards to steam line breaks does not affect the TMRE results.	No
LOCA Location	All LOCAs are conservatively assumed to happen on the cold leg, and Medium and Large LOCAs also require hot leg recirculation.	This assumption is reasonable and consistent with standard PRA practice. However, this assumption could affect specific applications involving injection pathways.	The TMRE methodology assumes that a LOOP occurs as a result of the tornado. Therefore, any uncertainty with regards to LOCA location does not affect the TMRE results	No
Failure to Trip after a LOCA	It is assumed that a LOCA followed by failure of the reactor trip system is a low risk contributor and was not considered further	This assumption is considered a source of uncertainty since there are no evaluations showing success criteria for failure to scram after a LOCA.	The TMRE methodology assumes that a LOOP occurs as a result of the tornado. Therefore, any uncertainty with regards to LOCA initiating events does not affect the TMRE results.	No

TABLE 3 – SOURCES OF UNCERTAINTY FOR ANO-2 TMRE				
Source of Uncertainty	**Discussion of Issue**	**Impact on Model**	**TMRE Impact Assessment**	**TMRE Impact?**
Post-Accident Equipment Operation	For accident sequences assessed in the PRA, certain equipment may be credited for operation in conditions that are beyond their design basis pressures, temperatures and /or radiation. This may present a challenge to the ability of the equipment to complete its mission assumed in the PRA This equipment may include instrumentation for operator actions assumed in the PRA. The operability of equipment in beyond design basis conditions should be limited to equipment inside the containment or, for high energy line breaks outside containment and interfacing system LOCAs, equipment located in the auxiliary or turbine buildings in the proximity of the line break.	This assumption should be reviewed for equipment credited in sequences where environmental conditions exceed design values. This is a potential source of uncertainty.	The TMRE model shows similar plant response to the base LOOP model. There are no unique core damage sequences in the TMRE model that would be affected by this assumption	No

TABLE 3 – SOURCES OF UNCERTAINTY FOR ANO-2 TMRE				
Source of Uncertainty	**Discussion of Issue**	**Impact on Model**	**TMRE Impact Assessment**	**TMRE Impact?**
Use of Raw Water Systems	In some instances, the PRA model assumes that raw water systems can be used as a back up to a primary system that normally uses high quality water. In this case, there is the potential for equipment failures in portions of the primary system that are still in use due to effects of the poor water quality of the raw water source. For example, the service water (SW) system, which typically uses river, lake or ocean water, sometimes serves, and is modeled in the PRA, as a backup to the emergency feedwater (EFW) system in providing a heat sink for post-accident decay heat removal.	This assumption is reasonable for the base model and consistent plant design For specific applications, however, a high-debris condition could change risk results.	The TMRE application assumes that LOOP occurs as a result of a tornado. These conditions are considered in the design basis which credits service water for use as an EFW supply source There are no unique effects expected after a tornado.	No

TABLE 3 – SOURCES OF UNCERTAINTY FOR ANO-2 TMRE				
Source of Uncertainty	**Discussion of Issue**	**Impact on Model**	**TMRE Impact Assessment**	**TMRE Impact?**
Steam and Air Binding	The PRA model typically does not consider that design errors and/or maintenance errors could result in conditions wherein air or steam binding could occur in pumps assumed to operate in the PRA model. The design of plant systems should assure that the suction lines for pumps are full under all possible conditions under which they are assumed to be operable. WCAP-16779-P recommends that no failures of systems due to air and steam binding need to be modeled in the PRA for the base model. However, air binding should be identified as an uncertainty in the PRA models. However, based on the low frequency of occurrence of these events, no sensitivity analysis is needed to quantify the impact of the uncertainty.	Conservative assumptions can result in uncertainties	The accident sequences considered in the TMRE evaluations do not create any unique characteristics that would affect the potential for steam or air binding	No

TABLE 3 – SOURCES OF UNCERTAINTY FOR ANO-2 TMRE				
Source of Uncertainty	**Discussion of Issue**	**Impact on Model**	**TMRE Impact Assessment**	**TMRE Impact?**
Recirculation Flow	The model assumes that pump mini-flow recirc is not needed for LPSI success. Since the Large LOCA will cause RCS depressurization to the LPSI shutoff head or below (PSA-ANO2-01-IE, Table 2), only the smallest Large LOCA, which caused depressurization just to the LPSI shutoff head, would give an RCS pressure high enough to cause pump deadheading without mini-flow recirc; but in this case, the HPSI flow would be more than adequate, as shown by medium LOCA analysis, for which the RCS depressurizes to approximately the LPSI shutoff head within the first hour. A LOCA size any larger than this limiting case would result in a lower RCS pressure than the LPSI shutoff head and consequently a much larger LPSI flow, much greater than the required flow for LPSI operation without mini-flow recirc - which can be taken to be < 100 gpm, the mini-flow recirc flow. (Section 5.18)	Operation of the LPSI pumps following automatic actuation for events other than Large LOCAs may require mini-flow recirculation. Omission of this failure mode could provide different results. Therefore, this is considered a potential source of uncertainty.	The TMRE methodology assumes that a LOOP occurs as a result of the tornado. Therefore, any uncertainty with regards to effects unique to LOCA initiating events does not affect the TMRE results.	No

TABLE 3 – SOURCES OF UNCERTAINTY FOR ANO-2 TMRE				
Source of Uncertainty	**Discussion of Issue**	**Impact on Model**	**TMRE Impact Assessment**	**TMRE Impact?**
RPS Success Modelling	Associated with the 2-out-of-4 logic for each RPS signal is a logic matrix This matrix is made up of relays that de-energize for signal actuation. Failure of 4 or more of these relays is required for signal failure. Therefore, the probability of failure is negligible, and these relays have been excluded from the model.	This assumption is reasonable for the base model and consistent plant design. For specific applications involving RPS components this assumption could change risk results.	The TMRE application assumes that LOOP occurs as a result of a tornado As a result, the rod control system will de-energize causing a scram regardless of ROPS logic	No
Post-Trip MFW Operation	After a reactor trip it is assumed that the MFW and Feedwater Control System (FWCS) "... will automatically control the Steam Generator water level between 0 and 100% power ...". After a reactor trip, Steam Generator (SG) level will be maintained via a MFW pump feeding the Feedwater Bypass Regulating valves It is assumed that MFW will continue to operate for at least 24 hours during a SBLOCA or Event Q failure that may cause driving steam pressure to decrease below normal levels.	This assumption is considered to be reasonable for the base model. However, for some applications, the assumption may be invalid.	The TMRE methodology assumes that a LOOP occurs as a result of the tornado Therefore, MFW is lost.	No

TABLE 3 – SOURCES OF UNCERTAINTY FOR ANO-2 TMRE

Source of Uncertainty	Discussion of Issue	Impact on Model	TMRE Impact Assessment	TMRE Impact?
SLOCA Success Criteria	All cases assume a total loss of feedwater at the SBLOCA accident initiation The time between core uncovery and core damage for a Small LOCA case is assumed to be at least 20 minutes.	This assumption is considered to be reasonable for the base model. However, for some applications, an explicit evaluation of timing and condition could result in different results.	The TMRE methodology assumes that a LOOP occurs as a result of the tornado. Therefore, any uncertainty with regards to effects unique to LOCA initiating events does not affect the TMRE results.	No
Room Cooling	Room cooling is assumed not required for most rooms.	This assumption is considered a source of uncertainty because there is no explicit consideration of system and component failure modes	Recent evaluations performed for the PRA update confirmed the areas for which room cooling is or is not needed.	No
Common Cause Failures	There are several assumptions regarding the grouping of components for consideration of common cause failures	This assumption is reasonable for the base model but could be overly conservative for applications involving consideration of specific common cause failures.	The TMRE application considers that all conditions are nominal. The application does not involve consideration of specific common cause failures.	No
Flow Diversion	The system models exclude some flow diversion pathways based on an arbitrary line size.	The system failure probabilities may be slightly higher some flow diversion paths not considered actually would cause system failure.	The non-conforming conditions for ANO-2 do not include flow diversion pathways. Therefore, the use of an arbitrary line size to screen flow diversion would contribute to both the compliant and degraded cases.	No

TABLE 3 – SOURCES OF UNCERTAINTY FOR ANO-2 TMRE				
Source of Uncertainty	**Discussion of Issue**	**Impact on Model**	**TMRE Impact Assessment**	**TMRE Impact?**
Load Shedding	Following a 2A3 or 2A4 undervoltage event, if more than two major loads are not shed or are concurrently resequenced to 2A3 or 2A4, the DG is assumed to fail due to overloading. Major loads were assumed to include 2P4A, 2P35A, 2P60A, 2P89A, and 2P7B on 2A3; and 2P4C, 2P35B, 2P60B, and 2P89B on 2A4. Only SW pumps 2P60A and B are assumed to contribute to load shed failures, since these pumps are assumed to be the only normally-operating large loads on 2A3 and 2A4. Any combination of three major loads is assumed to contribute to load sequencing failures.	This assumption could affect events with off-normal alignments and some applications.	The TMRE application considers that all conditions are nominal Off-normal alignments are not applicable.	No
DC Support Requirements	Prior and mission failures of a station battery were eliminated as contributors to the failure to transfer to off-site power.	This assumption is a source of uncertainty because DC power is needed to energize the trip coil and open the breaker using the charging springs.	The TMRE methodology assumes that a LOOP occurs as a result of the tornado. Therefore, transfer to offsite power is not applicable	No
Modelling of Feedwater Isolation	Failure of Feed Water isolation during Feed Water Line or Main Steam Line breaks inside containment (containment over-pressurization scenario) is beyond current ANO-2 PRA scope.	This assumption is reasonable for the base model but could be significant for some applications.	The TMRE methodology assumes that a LOOP occurs as a result of the tornado. Therefore, any uncertainty with regards to HELB events does not affect the TMRE results.	No

TABLE 3 – SOURCES OF UNCERTAINTY FOR ANO-2 TMRE				
Source of Uncertainty	**Discussion of Issue**	**Impact on Model**	**TMRE Impact Assessment**	**TMRE Impact?**
Instrument Air Modelling	The probability of the relief valves failing to reclose when combined with the failure of the relief valves transferring open is negligible. (Section 10.2.2)	There is no basis for this assumption and it could be assumed that system failure caused by a relief valve transferring open cannot be recovered,	The TMRE methodology assumes that a LOOP occurs as a result of the tornado As a result, instrument air is lost.	No
LPSI Modelling	No credible failures exist in the control to flow control valve 2CV-5091 during the LPSI injection that will cause a failure of the LPSI system. This is due to the fact that administrative controls require 2SV-5091 to be locked open (vent to atmosphere) when the LPSI system is required to be operational. Also, 2SV-5091 fails open on loss of power that causes 2CV-5091 to open.	Omission of transfer failure modes could underestimate risk.	The TMRE methodology assumes that a LOOP occurs as a result of the tornado. Therefore, any uncertainty with regards to LOCA initiating events does not affect the TMRE results.	No

TABLE 3 – SOURCES OF UNCERTAINTY FOR ANO-2 TMRE				
Source of Uncertainty	**Discussion of Issue**	**Impact on Model**	**TMRE Impact Assessment**	**TMRE Impact?**
SDC Room Cooler Modelling	Shutdown heat exchanger room cooler failure modes include only fan failures and cooling (service) water valve failures Heat exchanger plugging, tube rupture, and cooling capability failures are not considered. Tube rupture events are not expected to diminish the cooling function and are therefore not a failure mode. The plugging failure mode is effectively contained in the heat exchanger cooling capability failure mode. The contribution of the cooling capability failure mode to the overall heat exchanger failure probability is considered negligible. Therefore, the cooling capability failure mode is not considered.	Omission of these failure modes is not consistent with failure data available and may affect overall results for some applications.	The overall failure model for room coolers uses generic data. Therefore, this assumption is not applicable to the TMRE analysis.	No.

TABLE 3 – SOURCES OF UNCERTAINTY FOR ANO-2 TMRE				
Source of Uncertainty	**Discussion of Issue**	**Impact on Model**	**TMRE Impact Assessment**	**TMRE Impact?**
SGTR System Response Models	MSS2XHE-FO-MSSVG - "Conditional Probability of MSSV(s) challenge given a SGTR" phenomena event quantification uses following assumption. It is assumed that MSSVs are not going to be challenged during initial Main Steam System overpressure transient neither due to Turbine Stop Valves closure nor due to SGTR (leak size based on definition of SGTR initiating event) The basic event MSS2XHEFO-MSSVG represents following complex of phenomenological and personnel failure events that lead to MSSV challenge: a) Operator fails to follow procedure (EOPs on SGTR guide an operator to initiate cooldown to 535 °F, to depressurize unit bellow S/G safety valves opening setpoint include control of HPSI and isolate MSIV of the ruptured SG) this implies that procedure is written in a way to avoid S/G safety valve challenge. b) After MSIV is isolated, pressure in the primary circuit may be increased due to either temporary misbalance in Core Decay Heat and heat removal into secondary circuit or due to HPSI - if operator fails to mitigate this transient and keep parameters bellow S/G set points c) Event may additionally account for non-proceduralized action ("failure to gag the MSSV"). Currently it does not	This assumption may not adequately consider all failure modes and their effects on the plant and response to events.	The TMRE methodology assumes that a LOOP occurs as a result of the tornado. Therefore, any uncertainty with regards to LOCA location does not affect the TMRE results.	No

TABLE 3 – SOURCES OF UNCERTAINTY FOR ANO-2 TMRE				
Source of Uncertainty	**Discussion of Issue**	**Impact on Model**	**TMRE Impact Assessment**	**TMRE Impact?**
SW Modelling	The baseline PSA assumes that there is a normal amount of debris in the SW bays rather than a high amount of debris.	This assumption is reasonable for the base model and consistent plant design. For specific applications, however, a high-debris condition could change risk results.	The TMRE application considers that all conditions are nominal. Off-normal conditions are not applicable.	No
HRA	There are several assumptions regarding modelling operator actions to recover failed equipment.	Assuming that an operator action can recover hardware failures can be considered a repair and may not be practical.	The actions are associated with recovering breakers associates with recovery of offsite power. The TMRE application does not credit recovery of offsite power	No
4kV Breaker Recovery Actions	The recovery actions for the DC breaker for the 4160 bus was applied according to procedure OP-1107.001. This recovery rule is only applied in cutsets for sequences TBX, RBX, and SX.	Assuming that operator actions may recover hardware failures may not be practical	The TMRE evaluations take no credit for recovering AC power if the EDGs fail. Therefore, this source of uncertainty does not affect the results of the TMRE analysis.	No

TABLE 3 – SOURCES OF UNCERTAINTY FOR ANO-2 TMRE				
Source of Uncertainty	**Discussion of Issue**	**Impact on Model**	**TMRE Impact Assessment**	**TMRE Impact?**
Generic Sources of Uncertainty				
Common Cause Failures	The ANO-2 PRA models include consideration of initiating events that result from multiple failures if the equipment failures result from a common cause or from system alignments resulting from preventive and corrective maintenance. However, loss of multiple non-safeguards buses is not modeled however, based on expected low frequency and low CCDP, as described in Table 3 of Ref. x**Error! Reference source not found.** This screening of potential IEs due to bus CCF is a potential source of uncertainty.	Support system initiating event frequency and effects could change.	The TMRE methodology assumes that a LOOP occurs as a result of the tornado. Therefore, any uncertainty with regards to support system initiating event frequencies does not affect the TMRE results.	No

TABLE 3 – SOURCES OF UNCERTAINTY FOR ANO-2 TMRE				
Source of Uncertainty	**Discussion of Issue**	**Impact on Model**	**TMRE Impact Assessment**	**TMRE Impact?**
Post-Accident Equipment Operation	For accident sequences assessed in the PRA, certain equipment may be credited for operation in conditions that are beyond their design basis pressures, temperatures and /or radiation. This may present a challenge to the ability of the equipment to complete its mission assumed in the PRA. This equipment may include instrumentation for operator actions assumed in the PRA. The operability of equipment in beyond design basis conditions should be limited to equipment inside the containment or, for high energy line breaks outside containment and interfacing system LOCAs, equipment located in the auxiliary or turbine buildings in the proximity of the line break	This assumption should be reviewed for equipment credited in sequences where environmental conditions exceed design values. This is a potential source of uncertainty.	The TMRE model shows similar plant response to the base LOOP model. There are no unique core damage sequences in the TMRE model that would be affected by this assumption	No

TABLE 3 – SOURCES OF UNCERTAINTY FOR ANO-2 TMRE				
Source of Uncertainty	**Discussion of Issue**	**Impact on Model**	**TMRE Impact Assessment**	**TMRE Impact?**
Battery Life Calculations	Operating at full capacity, the station batteries will provide DC power for five hours. These estimates are conservative since all loads on the batteries are assumed to be operating at full capacity with no credit for load shedding. The assumption is made that power cannot be recovered after batteries are depleted. No credit for equipment operation after battery depletion may represent a slight conservative treatment.	No credit for equipment operation after battery depletion may represent a slight conservative treatment.	The TMRE analysis assumes that a LOOP occurs as a result of the tornado, and that OSP cannot be recovered. Therefore, battery chargers are needed for success and battery life is not a factor.	No
Containment Sump/Strainer Performance	All PWRs are improving ECCS sump management practices including installation of new sump strainers at most plants. The PRA models the potential for containment sump blockage depending on the size of the LOCA.	Plugging of the containment sump was modeled using the guidance provided in WCAP-16882-NP. The strainer failure probabilities are affected by the method used to determine strainer performance.	The TMRE analysis does not assume that a coincident LOCA occurs during the tornado event. Therefore, this source of uncertainty does not impact the TMRE analysis.	No

TABLE 3 – SOURCES OF UNCERTAINTY FOR ANO-2 TMRE				
Source of Uncertainty	**Discussion of Issue**	**Impact on Model**	**TMRE Impact Assessment**	**TMRE Impact?**
Grid Stability	The LOOP frequency is a function of several factors including switchyard design, the number and independence of offsite power feeds, the local power production and consumption environment and the degree of plant control of the local grid and grid maintenance. Three different aspects relate to this issue: 1a. LOOP initiating event frequency values and recovery probabilities.	The generic industry frequencies for the four LOOP event categories developed in NUREG/CR-6890 are applicable to the ANO site. The generic industry frequencies are appropriate to use as priors to develop a plant-specific LOOP frequency. The plant-specific data is sufficient for the Bayesian update. The four LOOP event categories are merged into a single LOOP frequency event. Merging the LOOP events into a single category may affect recovery probability	The TMRE analysis assumes that a LOOP occurs as a result of the tornado, and that OSP cannot be recovered. Therefore, the initiating event frequency and recovery values do not impact the TMRE analysis	No
Fission Product Scrubbing	The NUREG/CR-6595 sed for ANO-2 LERF methodology does not explicitly use source terms or decontamination factors as is done in a full scope Level 2 analysis. However, phenomena give conservative results of large, early release.	This could result in conservative estimates of LERF.	LERF calculated for the TMRE models is very small so any reduction would not be significant.	No

Enclosure Attachment 2 to

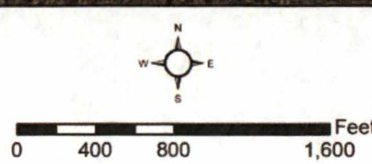
0CAN111901

Supporting Figures

FIGURE 1 – TMRE MISSILE WALKDOWN AREA

Legend

- ★ Approximate Centerpoint
- 1500-ft Radius
- 2500-ft Radius
- Missile Zone



Note: Numbers (1 through 36) identify the missile zones.

FIGURE 2

PENETRATIONS RESULTING IN VULNERABLE SSCs IN ROOM 129

(Control Room – Looking South)

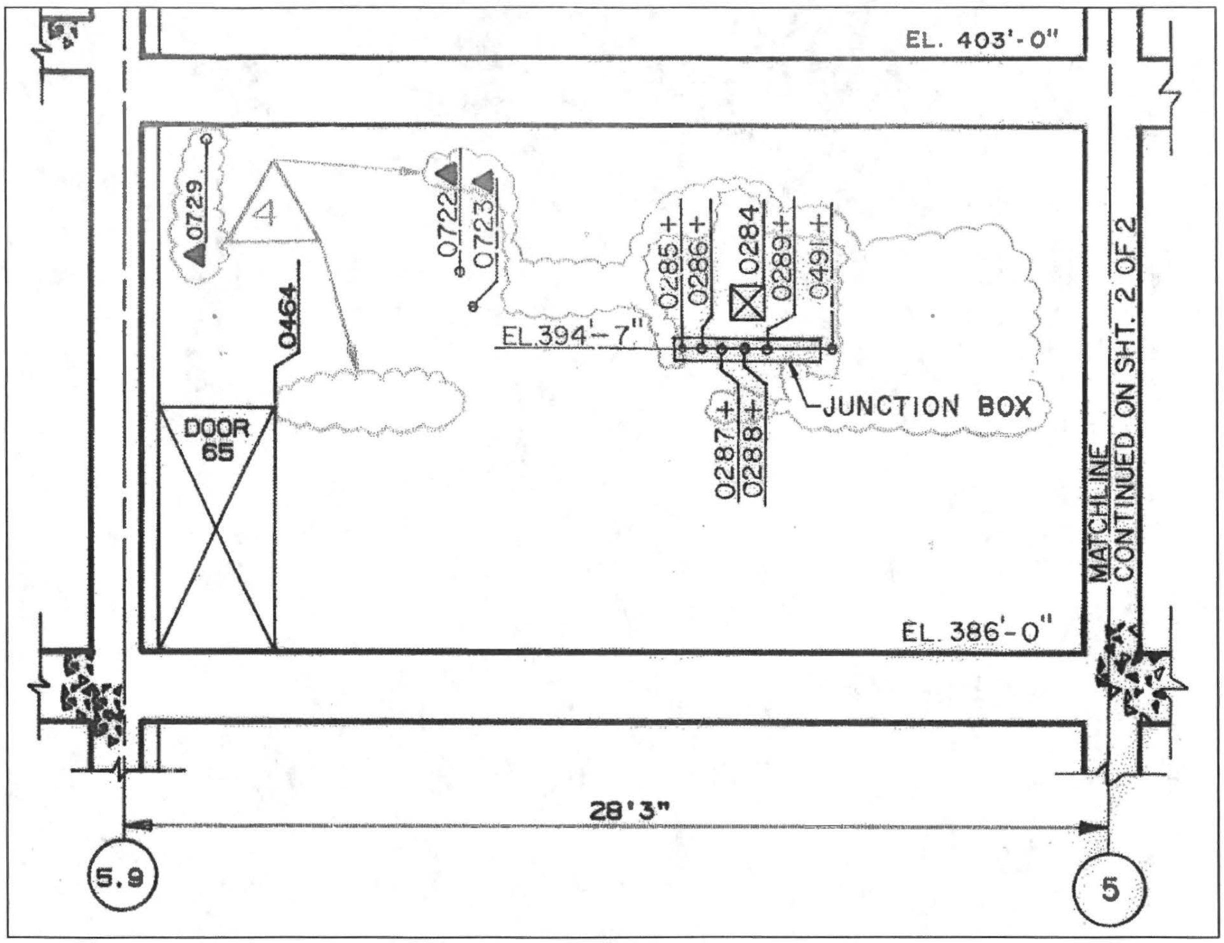


FIGURE 3

LINE-OF-SIGHT FROM DOOR 65 TO CONTROL ROOM

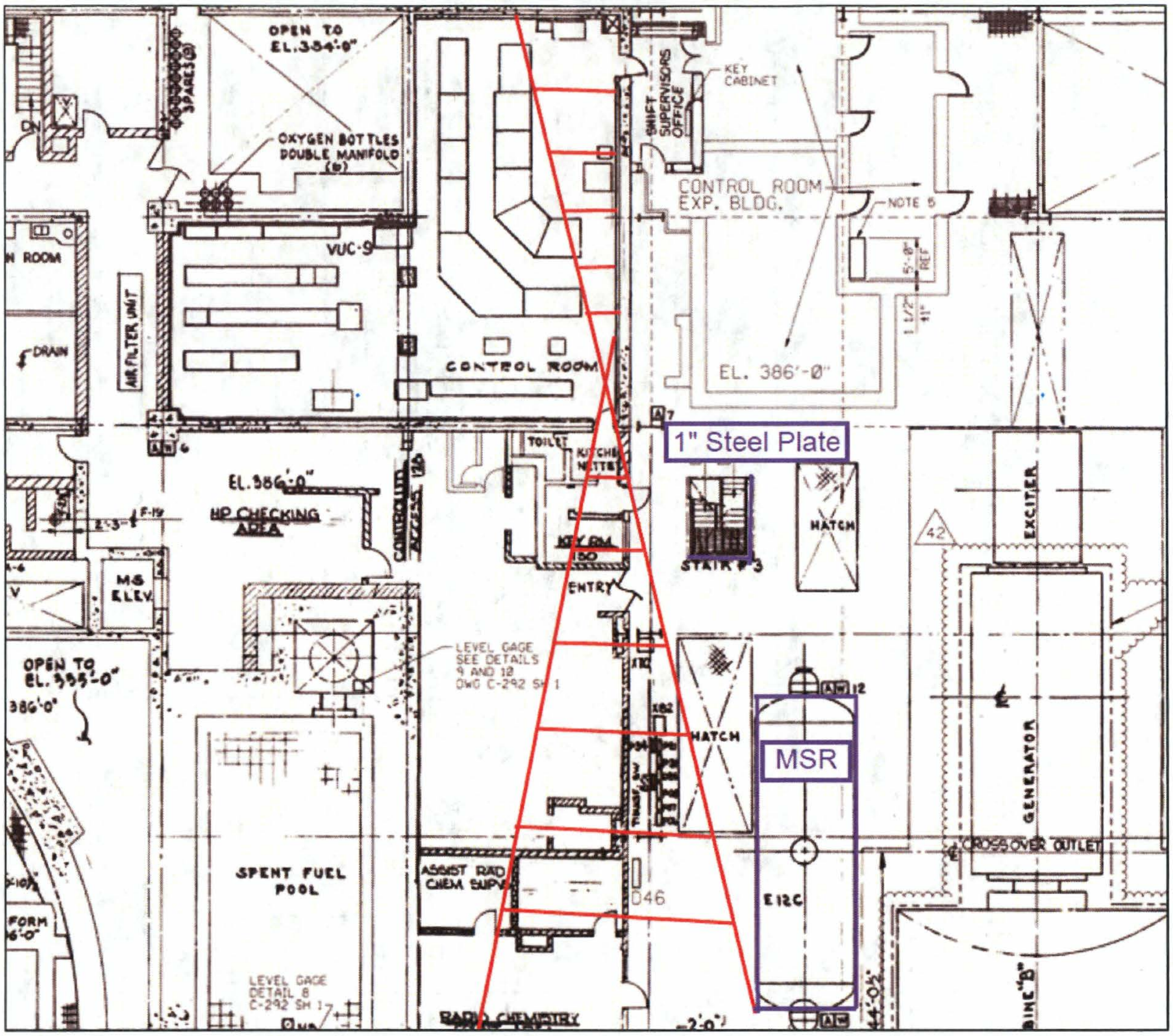


FIGURE 4

POTENTIAL MISSILE TRAJECTORIES IN CONTROL ROOM