



Northeast
Nuclear Energy

Rope Ferry Rd. (Route 156), Waterford, CT 06385

Millstone Nuclear Power Station
Northeast Nuclear Energy Company
P.O. Box 128
Waterford, CT 06385-0128
(860) 447-1791
Fax (860) 444-4277

The Northeast Utilities System

FEB 26 1998

Docket No. 50-423
B17021

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

Millstone Nuclear Power Station, Unit No. 3
NRC Request for Additional Information Regarding the Millstone Unit 3
Emergency Diesel Generator Exhaust Stack (TAC No. M97508)

On September 15, 1997, Nuclear Regulatory Commission (NRC) forwarded two questions to Northeast Nuclear Energy Company (NNECO) relating to the "Tornado Missile Risk Analysis of Millstone Unit 3 Emergency Generator Enclosure Openings," dated March 1985. This analysis had been provided to the NRC to address Significant Items List, Item No. 75. NNECO provided a response to NRC Question 1 in a letter dated January 21, 1998. Attachment 1 to this letter responds to NRC Question 2 and completes NNECO's response to the NRC on this matter. Attachment 2 contains a listing of any NNECO commitments made in this response.

Should you have any questions regarding this matter, please contact Mr. David A. Smith at (860) 437-5840.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

Martin L. Bowling, Jr.
Millstone Unit No. 2 - Recovery Officer

cc: H. J. Miller, Region I Administrator
J. W. Andersen, NRC Project Manager, Millstone Unit No. 3
A. C. Cerne, Senior Resident Inspector, Millstone Unit No. 3
W. D. Travers, Ph.D., Director, Special Projects Office

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Docket No. 50-423
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Attachment 1

Millstone Nuclear Power Station, Unit No. 3

NRC Request for Additional Information Regarding the Millstone Unit 3
Emergency Diesel Generator Exhaust Stack (TAC No. M97508)

February 1998

**Request for Additional Information
Concerning Emergency Diesel Generator Exhaust Stacks
TAC NO. M97508**

NRC Question

2. Your risk assessment for protection against tornado generated missiles only addresses the acceptance criteria for a single vulnerability, i.e., the EDG exhaust system. In order to rely on probabilistic arguments that tornado missile protection is not required, the risk assessment must also show that the overall risk from tornado generated missiles has not been increased (by not providing protection for the EDG exhaust system) beyond the acceptance criteria discussed in the guidance of Standard Review Plan (SRP) Section 2.2.3, which deals with identification of design basis events using probabilistic methods. Therefore, the analysis should also consider all other Structures, Systems, or Components (SSCs) not protected from tornado generated missiles that are required to prevent a release of radioactivity in excess of 10 CFR Part 100 that are not protected from tornado generated missiles. This guidance states that an expected rate of occurrence of potential exposures in excess of the 10 CFR Part 100 guidelines of approximately 10^{-6} per year is acceptable if, when combined with reasonable qualitative arguments, the risk can be expected to be lower. This request for additional information need not be addressed if all other safety-related SSCs (other than the EDG exhaust system) are adequately protected (by existing barriers/structures) from the effects of tornado generated missiles.

NNECO Response

A Tornado event Probabilistic Risk Assessment (PRA) addressing all unprotected structures, systems and components required to prevent a release of radioactivity has not been prepared for Millstone Unit 3. NNECO's decision to evaluate the damage probability associated with a potential Tornado missile impact to the Emergency Diesel Generator (EDG) exhaust stacks was based on a review of the Millstone Unit No. 3 licensing basis requirements transmitted in NUREG-1031, "Safety Evaluation Report related to the operation of Millstone Nuclear Power Station, Unit No. 3," Supplement No. 1, dated March 1985. In Section 3.5.2 of Supplement No. 1 of the Safety Evaluation Report (SER), the NRC identified several options available to NNECO for resolving the open issue relating to Tornado missile protection of the EDG exhaust stacks, including the development of a limited PRA. It is NNECO's belief that the options identified in Section 3.5.2 of SER Supplement 1 continue to represent acceptable analysis approaches under the Millstone Unit No. 3 licensing basis.

In its January 21, 1998 letter, NNECO stated that other unprotected targets had been identified and that an evaluation of safe shutdown capability assuming loss of the individual targets was underway. Enclosure 1 (8 pages) to this letter provides the results of NNECO's evaluation. As discussed in Enclosure 1, all but one of the targets identified are either not required for safe shutdown, have been previously reviewed and accepted under the Millstone Unit No. 3 licensing basis, or have been shown through analysis to be able to support safe shutdown with degraded capability. The evaluation is based on the ability of available systems, structures and components to remove decay heat in support of achieving safe shutdown following a Tornado event with consequential Loss Of Offsite Power (LOOP) and coincident single failure and with no additional design basis events occurring simultaneously with the Tornado. This latter provision is consistent with the guidance provided in NRC Regulatory Guide 1.117, "Tornado Design Classification."

The single new target of concern is discussed in Item 52 of Enclosure 1. Line 3-FWA-006-81-4 is a recirculation heating loop for the Demineralized Water Storage Tank. The DWST is missile protected and provides the suction source for the Auxiliary Feedwater System. The line is automatically isolated on a loss of power condition. However, if power remains available throughout the event, failure of this line due to a missile impact would result in a loss of DWST inventory. While this scenario is considered unlikely, corrective action will be taken to eliminate the potential failure mode prior to entry into Mode 2. It is expected that administrative controls can be effectively implemented to require that the line be isolated upon receipt of a Tornado Warning.

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Enclosure 1

Millstone Nuclear Power Station, Unit No. 3

NRC Request for Additional Information Regarding the Millstone Unit 3
Emergency Diesel Generator Exhaust Stack (TAG No. M97508)

February 1998



Attachment 4 Engineering Record Correspondence

DATE: 02/19/98

25212-ER-98-0051

Rev. 0

TO: D. Dodson

FROM:

J.D. Dakers

J.D. Dakers 2/19/98

INDEPENDENT
REVIEWER

M. Urick

M. Urick 2/19/98

APPROVED

R.A. Andren

R.A. Andren

2/20/98

SUBJECT:

MP3 Tornado Missile Vulnerabilities

REFERENCES:

Walkdown Results MP3-WLKDWN-98-097

BACKGROUND

Attachment A of this ERC, is a letter which was received from the NRC requesting additional information on items which are not protected from tornado missiles. Question 1 has previously been responded to, and this ERC will form the foundation for a response to question 2. Question 2 requests information on any additional potential tornado missile targets, specifically whether probabilistic methods have been used as the basis for not protecting certain safety related items. There are no other known locations, which Millstone 3 has specifically used probabilistic methods to address targets unprotected from tornado missiles, but there are other potential targets which could contribute to risk during a tornado event. To provide an adequate response to the NRC question, it was decided a walkdown should be conducted to identify any potential targets which may be vulnerable to tornado missiles. Walkdown MP3-WLKDWN-98-097 was performed and documented. This walkdown identified 12 items which require formal review in preparation for the response to the NRC. The specific items are included in the scope section of this ERC. The identified items are reviewed and an assessment of the significance on plant shutdown capability made, which then can be used as input in response to the NRC request. It is expected that the PRA group will also review these items to address their significance from a probabilistic point of view.

SCOPE

The scope of this ERC covers the following items:

Item No.	Photo No.	Description
16	5	MSV Bldg Roof: 4 sets of ten main steam safety valve exhaust stacks.
17	6	MSV Bldg Roof: Typical of 4 main steam bypass valve exhaust y-stacks.
18	7	MSV Bldg Roof: Typical of 4 main steam atmospheric dump stacks
19	8	MSV Bldg Roof: Unidentified candelabra shaped vent.
20	9	MSV Bldg Roof: Doorways on southwest and northwest corners of high roof have safety-related items inside...3HVV*JB50B2, 3HVV*AOD50B2
23	15	MSV Bldg South Outer Wall: Safety-related conduit and junction box 3JB*9834 inside security door 371S at ground level.
25	18	ESF Bldg Roof: Y type vent to Terry Turbine.
26	19	ESF Bldg Roof: Elbow type vent to Terry Turbine.
32	22	Auxiliary Bldg Roof: Unidentified ductwork.
49	-	Large 10'x10' Duct (Overhead) Between TB and Secondary Containment: Unprotected.
52	14,9	DWST: One overflow line, two backflow prevent lines and one unidentified line with a heat tracing wire all located on the outside.
61	-	Fill Pipe (Ground Level) Outside Southeast Corner EGE: Unprotected.

REFERENCES

1. MP3 FSAR Sections 3.8, 9.4.3, 9.5.4.2 and 10.3.3
2. Walkdown Report MP3-WLKDWN-98-097
3. Westinghouse Letter NS-OPLS-OPL-I-91-171, dated March 27, 1991, Millstone 3 Better Estimate Loss of Normal Feedwater / Station Blackout Analysis. (Presently being revised)
4. Regulatory Guide 1.117 Revision 1, April 1978
5. NRC Letter from J.W. Anderson to N.S. Carns, Request for Additional Information Regarding the Millstone Unit 3 Emergency Diesel Generator Exhaust Stack. (Attachment A)
6. Drawing EM-117A (25212-26917 sh. 1) revision 16 P&ID Emergency Generator Fuel Oil System
7. Drawing EM-123A (25212-26923 sh. 1), revision 30 P&ID Main Steam and Reheat
8. Drawing EM-123D (25212-26923 sh. 4), revision 10 P&ID Main Steam and Reheat
9. Drawing EM-123E (25212-26923 sh. 5), revision 17 P&ID Main Steam and Reheat
10. Drawing EM-130B (25212-26930 sh. 4), revision 31 Feedwater System
11. Drawing EM-152B (25212-26925 sh. 2), revision 11 ESF and MSV Buildings Ventilation
12. Proto Power Calculation 96-067 Revision 0, up to Change 3

BODY

The above list was developed after screening the items identified from the plant walkdown, considering safety related items which are exposed to tornado missiles, or non safety related items which have the possibility of affecting the performance of safety related items. Accordingly this list conservatively presents potential targets, since as noted in Regulatory Guide 1.117 " It is not necessary to maintain the functional capability of all seismic Category I structures, systems and components because the probability of the joint occurrence of low-probability events (loss-of-coolant accident with DBT or smaller tornado, or earthquake with DBT or smaller tornado) is sufficiently small. However, equipment used to provide long-term core cooling following a LOCA should be protected." Considering this logic the specifics of each of above items is further reviewed and an assessment of the significance on plant shutdown capability.

Item 16

Mainsteam Safety relief valves 3MSS*RV22A-D, 23A-D, 24A-D, 25A-D and 26A-D are protected from tornado missiles, but the exhaust stacks from these valves protrude through the roof of the Mainsteam Valve Building and are not protected from potential tornado missiles. The Mainsteam Safety relief valve exhaust stacks although safety related are not required for safe shutdown of the plant. Cooldown by release of secondary side steam can be accomplished by the pressure relieving or pressure relieving bypass valves.

Item 17

The pressure relieving bypass valves 3MSS*MOV74A-D are protected from tornado missiles, but the exhaust stacks from these valves extend through the roof of the Mainsteam Valve Building. The pressure relieving bypass valves are not the primary path for secondary side cooldown of the plant. As discussed in item 18 below, FSAR Section 10.3.3 discusses possible tornado damage to the steam relief system. Based on this licensed position adequate redundancy is provided to ensure plant shutdown capability.

Item 18

The pressure relieving valves 3MSS*PV20A-D are protected from tornado missiles, but the exhaust stacks from these valves extend through the roof of the Mainsteam Valve Building. FSAR Section 10.3.3 indicates "Four main steam pressure relieving bypass valves are provided to ensure a secure path around the main steam pressure relieving valves in the event that the primary path is no longer available due to tornado missile or seismic damage to the discharge silencers, or loss of power or air to the main steam pressure relieving valves." Due to the redundancy provided by the pressure relieving bypass valves, no specific quantitative probabilistic arguments have been used to ensure that the safe shutdown of the plant can still be accomplished after a tornado event. Based on this licensed position adequate redundancy is provided to ensure plant shutdown capability.

Item 19

This item is an atmospheric vent off line 3-MSS-006-210-4 from the Mainsteam System, on the roof of the Mainsteam Valve Building. This line relieves steam off the mainsteam isolation valves solenoids, is not safety related, and is not required for safe shutdown of the plant.

Item 20

On the roof of the Mainsteam Valve Building inside of the Containment Enclosure are 3HVV*AOD50A2 and 3HVV*AOD50B2 which are fully protected from potential tornado missiles. Conduits 3CC987OK7 and 3CC987PT feeding these AOD's are exposed to tornado missiles. These AOD's are for isolation of the Mainsteam Valve Building HVAC system for SLCRS purposes. The integrity of the Containment Enclosure Building is not maintained during a tornado as indicated in FSAR Section 3.8. Since the SLCRS function is lost there is no consequence to the failure of these dampers.

Item 23

Junction box 3JB*9836 and associated ductline 3DC986P09 as well as junction box 3JB*9834 and associated conduit 3CC986PR are inside of the Mainsteam Valve Building, but could be exposed to potential tornado missiles through an adjacent doorway. Junction box 3JB*9836 and associated ductline 3DC986P09 contain no cable, accordingly there is no tornado vulnerability. Junction box 3JB*9834 and associated conduit 3CC986PR service 3HVV*TS27A, which is used to prevent overcooling of the Mainsteam Valve Building. This component is not required for safe shutdown of the plant under tornado conditions.

Item 25 and 26

These items are associated with the steam driven auxiliary feedwater pump. One of the items is the primary steam exhaust path from the turbine via line 3-MSS-012-160-3, and the other is vent line 3-MSS-003-111-4. Obviously with the lines exposed, the possibility of impact from a tornado missile cannot be precluded. The possibility that a missile would damage this line such that operation of the turbine driven pump would be affected is highly unlikely, but if an analogy similar to that of the diesel exhaust pipe is used, it could lead to the failure of the steam driven pump. The unit specific Better Estimate Loss of Normal Feedwater/Station Blackout Analysis of the auxiliary feedwater system, from nominal full power conditions, shows the required decay heat can be removed by a minimum flow of 330 gpm delivered to two intact steam generators. This can be accomplished utilizing a single motor driven auxiliary feedwater pump, (assuming a single failure disables the other motor driven auxiliary feedwater pump), as documented in Reference 12. Reference 12 shows a single motor driven pump can deliver 354 gpm to 2 intact steam generators. Accordingly, safe shutdown of the plant can be achieved without the use of the steam driven auxiliary feedwater pump, from nominal full power conditions. In the unlikely event of a loss of all feedwater EOP 35FR-H.1 would then be entered to mitigate the consequences of the loss of feedwater.

Item 32

The identified duct on the roof of the Auxiliary Building is an exhaust duct from the Auxiliary Building Ventilation System (ABVS) and SLCRS system. As noted in FSAR Section 9.4.3, only certain portions of the ABVS are safety related. As noted in FSAR Section 3.8 the Containment Enclosure Building siding is lost during a tornado which eliminates the SLCRS system during tornado events. In addition any tornado missile damage to the ductwork would not result in a loss of the ability to exhaust from the safety related portions of the HVAC system, due to the light gage of the material which would easily be penetrated by the tornado missiles. Collapse of the ductwork to preclude the ability to exhaust is not a credible failure mode for this system.

Item 49

The 10 foot by 10 foot duct on the roof of the Auxiliary Building is an exhaust duct from the Auxiliary Building Ventilation System (ABVS) and SLCRS system. As noted in FSAR Section 9.4.3, only certain portions of the ABVS are safety related. As noted in FSAR Section 3.8 the containment enclosure building siding is lost during a tornado which eliminates the SLCRS system during tornado events. In addition any tornado missile damage to the ductwork would not result in a loss of the ability to exhaust from the safety related portions of the HVAC system, due to the light gage of the material which would easily be penetrated by the tornado missiles. Collapse of the ductwork to prevent exhaust is not a credible failure mode for this system.

Item 52

The lines identified entering missile protected DWST enclosure are non safety related 3-FWA-002-129-4 for tank heat, 3-FWA-006-81-4 for overflow, 3-SGF-500-27-4 for chemical addition, and 3-FWA-002-145-4 for water treating. None of these lines are required for safe shutdown of the plant during a tornado event. 3-FWA-006-81-4, 3-SGF-500-27-4 and 3-FWA-002-145-4 enter the tank at the top of the tank, accordingly a failure of these lines would not lead to draining the tank. Line 3-FWA-006-81-4 is part of a loop which recirculates from the bottom of the tank to the top of the tank, through the DWST heater and associated pump. This line is isolated on a Loss of Power, which is the most probable case during a tornado. A failure in this line prior to the Loss of Power could lead to some loss of tank inventory due to the pump continuing to run, or due the line draining. Condition Report MS-98-0955 has been initiated to identify the corrective actions to preclude the potential loss of inventory from the DWST.

Item 61

The oil fill vent pipes 3-EGF-003-53-4 and 3-EGF-003-54-4 for the diesel generator fuel oil tanks protrude through the roof of the fuel oil vault. This line has previously been addressed by NRC Question 430.70. An update to FSAR Section 9.5.4.2, as a result of this question, indicates "Should the fill lines become damaged, the fuel oil storage tanks also can be filled from within their enclosure through a manhole on the top of the tanks." Based on this, the fill lines are not an issue during a tornado event.

CONCLUSION

The affect of damage to potential targets not protected from tornado missiles has been assessed in the ERC. The specifics for each target are addressed in the body of this ERC. This assessment provides the foundation for a response to the NRC addressing the request in reference 5.

Mr. Neil S. Carns
Senior Vice President
and Chief Nuclear Officer
Northeast Nuclear Energy Company
c/o Ms. Patricia A. Loftus
Director - Regulatory Affairs
P.O. Box 128
Waterford, CT 06385

25212-ER-98-0051
ATTACHMENT A
PAGE 1 OF 2

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION REGARDING THE MILLSTONE UNIT 3 EMERGENCY DIESEL
GENERATOR EXHAUST STACK (TAC NO. M97508)

Dear Mr. Carns:

By letter dated July 24, 1997, the staff provided you an update of the NRC's Millstone Restart Assessment Plan (Plan). Enclosure 3 to the Plan contained the Significant Items List (SIL) for Millstone Unit 3. SIL #75 for Millstone Unit 3 addressed two inspector follow-up items; one concerning the emergency diesel generator exhaust stack. The NRC staff has reviewed the closure package for this item and in order to support further NRC evaluation, you are requested to provide the NRC with answers to the enclosed questions. Please respond to this request for additional information expeditiously in order for the staff to complete its review in a timely manner.

Sincerely,

James W. Andersen, Project Manager
Special Projects Office - Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-423

Enclosure: As stated

cc w/encl: See next page

REQUEST FOR ADDITIONAL INFORMATION
CONCERNING EMERGENCY DIESEL GENERATOR EXHAUST STACKS

25212-ER-98-0051
ATTACHMENT A
PAGE 2 OF 2

MILSTONE NUCLEAR POWER STATION, UNIT 3

TAC NO. M97508

1. Based on a probabilistic risk assessment (PRA) described in the final summary report, "Tornado Missile Risk Analysis of Millstone Unit 3 Emergency Generator Enclosure Openings," dated March 1985, Northeast Nuclear Energy Company (NNECO) concluded that the probability of significant damage to an emergency diesel generator (EDG) exhaust piping from tornado generated missiles is less than 1×10^{-6} per year. Accordingly, a change was implemented in the last amendment (dated March 1996) to the Final Safety Analysis Report (FSAR) to delete the licensing commitment, which required NNECO to open the EDG exhaust piping access hatches during a tornado alert. The staff finds that the above cited PRA was only performed to demonstrate the risk of tornado generated missiles, which could enter any of the openings in the exhaust plenums to cause damage to the EDG exhaust system. It does not address the probability of the EDG exhaust stacks located outside the building being hit by tornado generated missiles. Therefore, provide a PRA to demonstrate the risk of tornado generated missiles, which could cause damage to any portion of the EDG exhaust stacks. This PRA should consider all potential modes of tornado missile damage to the exhaust stacks, not just the probability that missiles will enter one of the openings of the exhaust plenum.
2. Your risk assessment for protection against tornado generated missiles only addresses the acceptance criteria for a single vulnerability, i.e., the EDG exhaust system. In order to rely on probabilistic arguments that tornado missile protection is not required, the risk assessment must also show that the overall risk from tornado generated missiles has not been increased (by not providing protection for the EDG exhaust system) beyond the acceptance criteria discussed in the guidance of Standard Review Plan (SRP) Section 2.2.3, which deals with identification of design basis events using probabilistic methods. Therefore, the analysis should also consider all other structures, systems, or components (SSCs) not protected from tornado generated missiles that are required to prevent a release of radioactivity in excess of 10 CFR Part 100 that are not protected from tornado generated missiles. This guidance states that an expected rate of occurrence of potential exposures in excess of the 10 CFR Part 100 guidelines of approximately 10^{-6} per year is acceptable if, when combined with reasonable qualitative arguments, the risk can be expected to be lower. This request for additional information need not be addressed if all other safety-related SSCs (other than the EDG exhaust system) are adequately protected (by existing barriers/structures) from the effects of tornado generated missiles.

Attachment 2

Millstone Nuclear Power Station, Unit No. 3

NRC Request for Additional Information Regarding the Millstone Unit 3
Emergency Diesel Generator Exhaust Stack (TAC No. M97508)

Commitments

February 1990

List of Regulatory Commitments

The following table identifies those actions committed to by NNECO in this document. Please notify the Manager - Regulatory Compliance at the Millstone Nuclear Power Station, Unit No. 3 of any questions regarding this document or any associated regulatory commitments.

Commitment	Committed Date
Implement corrective actions to eliminate potential loss of DWST inventory due to a tornado missile impact to line 3-FWA-006-81-4 (Ref:M3-98-0955).	Prior to entry into Mode 2