

NORTHEAST UTILITIES



THE CONNECTICUT LIGHT AND POWER COMPANY
THE HARTFORD ELECTRIC LIGHT COMPANY
WESTERN MASSACHUSETTS ELECTRIC COMPANY
HOLYOKE WATER POWER COMPANY
NORTHEAST UTILITIES SERVICE COMPANY
NORTHEAST NUCLEAR ENERGY COMPANY

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July 16, 1980

Docket No. 50-336
B10036

Mr. Boyce H. Grier, Director
Region I
Office of Inspection and Enforcement
U. S. Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, PA 19406

- References:
- (1) B. H. Grier letter to W. G. Council dated July 2, 1979, forwarding I&E Bulletin No. 79-14.
 - (2) B. H. Grier letter to W. G. Council dated August 15, 1979, forwarding I&E Bulletin No. 79-14, Supplement.
 - (3) B. H. Grier letter to W. G. Council dated November 8, 1979, forwarding I&E Bulletin No. 79-02, Revision 2.
 - (4) W. G. Council letter to B. H. Grier dated December 10, 1979.
 - (5) W. G. Council letter to B. H. Grier dated December 14, 1979.

Gentlemen:

Millstone Nuclear Power Station, Unit No. 2
I&E Bulletin No. 79-14
I&E Bulletin No. 79-02

Reference (1), as supplemented by Reference (2), requested Northeast Nuclear Energy Company (NNECO) to initiate a program to verify the accuracy of input information for seismic analysis of safety-related piping. In Reference (3), the NRC Staff requested that NNECO provide information regarding pipe support base plate designs using concrete expansion anchor bolts on Category I systems.

This submittal is intended to provide an update of the project work which is presently underway at Millstone Unit No. 2 pursuant to the requirements of I&E Bulletin Nos. 79-14 and 79-02.

In Reference (4), NNECO reported to the Staff, efforts which had been expended to walk down concrete block walls to determine the extent to which seismic Category I supports were located on concrete block walls. The block walls originally reported in Reference (4) were located and subsequently verified from plant lay-out and piping drawings. NNECO has since determined that these drawings did not fully delineate all potential support locations and certain high radiation areas were not walked down. During the course of verifying piping supports pursuant to the requirements of I&E Bulletin No. 79-14, additional supports utilizing concrete expansion anchor bolts located on block walls were identified. The entire plant was physically walked-down, and

Attachment 1 lists the supports located on block walls utilizing concrete expansion anchor bolts at Millstone Unit No. 2. The updated response to Item 5 of Reference (3) requires a substantial amount of input and will be provided to the Staff on or about August 1, 1980.

Recent developments at Millstone Unit No. 2 during the review of pipe supports required by I&E Bulletin No. 79-14 have required NNECO to alter the approach by which I&E Bulletin Nos. 79-14 and 79-02 will be dispositioned. These developments and the revised course of action are outlined below.

During routine checks made to ensure that the support loadings used from the seismic analysis were correctly transmitted to the hanger designers, an error was discovered. Apparently, Operating Basis Earthquake (OBE) loads were tabulated in the support load summary sheets in the four stress problems noted in Attachment 2.

It was the architect engineering firm's practice at that time to use Design Basis Earthquake (DBE) loads in these tables and the designers incorrectly interpreted the OBE loads as DBE loads and applied them to the support structures. A review of all 244 remaining stress problems revealed that these were the only incidences of this type of error.

Since the stress problems relating to the main steam and safety injection systems (Problem Nos. 13, 26, 48) were being reanalyzed due to I&E Bulletin No. 79-14 concerns, this analysis was accelerated. The loads from the service water problem, since they were available, were immediately applied in the correct manner to the applicable hanger structure.

It was further determined that in some instances, the base plates/anchor bolts had factors of safety (FS) less than two. No other major deficiency was found in any of the structural members evaluated.

At this time, the service water system was declared inoperable and the plant was shutdown in accordance with Technical Specifications.

Attachment 3 presents a list of the supports which were modified due to the OBE vs. DBE discrepancy. All supports which required repairs now have a FS of four or more on the anchor bolts per the requirements of I&E Bulletin No. 79-02.

Concurrently, a conservative screening test of base plates was completed. Minimum bolt embedments, worst-case loading combinations, minimum concrete strengths, and similar conservatisms were considered in the screening test. It was originally anticipated that the results would indicate a large percentage of hangers with FS greater than four.

The screening test identified 237 hangers with FS less than two.

After eliminating the hangers which were repaired because of the OBE vs. DBE discrepancy, the number of hangers with FS less than 2 was reduced to 168. Since system operability could not be supported without substantial analysis,

it was deemed necessary to complete detailed evaluations and hanger modifications as needed prior to plant startup.

Included in Attachment 3 are the details of the results of the support reviews and the subsequent actions taken. All support modifications have been completed and all modified supports in this category (FS less than two) now have a FS greater than four in accordance with Bulletin requirements, with the exception of one. Support Number 301080 was modified, but due to local interferences and extreme analytical difficulty, the FS could only be raised to between two and four. A redesign of this support will be accomplished and the support will be upgraded to achieve a FS greater than four during the upcoming summer refueling outage.

All nonconformances resulting from the testing and inspections to date have been dispositioned. Any hanger identified with a FS less than two has been modified to increase the FS to a value above four, with the exception of Support Number 301080 which was discussed previously.

All inspections required by I&E Bulletin No. 79-14 have been completed, as previously reported in Reference (5). All walk-downs and testing required by I&E Bulletin No. 79-02 will be completed by the end of the 1980 refueling outage.

Due to the large number of hangers identified in the preliminary screening tests with a FS between two and four and manpower availability at our supporting architect engineering firm, NNECO has revised the plan of action by which I&E Bulletin Nos. 79-14 and 79-02 will be dispositioned. It is not feasible or practical to complete all design and construction work prior to the end of the 1980 refueling outage.

Accordingly, manpower is being allocated to address those hangers with FS between two and four consistent with this reanalysis effort. The prioritization of systems and work locations are as follows.

Supports in containment on safe shutdown systems (SSS) will be of highest priority, followed by supports outside of containment on SSS. This addresses systems which are most critical to plant reliability and permits the maximum construction activity by spreading work crews throughout the physical plant. Remaining supports in containment will be reviewed next, with all other seismic Category I hangers taking the lowest priority.

It is expected that approximately one hundred support modifications will be made during the upcoming outage. The remaining analytical work and hanger modifications will be made prior to and/or during the subsequent refueling outage scheduled for the fall of 1981. At that time, it is expected that all activities required by I&E Bulletin Nos. 79-14 and 79-02 will be complete. Following the 1980 refueling outage, NNECO intends to submit a report summarizing the design and construction efforts completed at that time. In addition, NNECO will outline the remaining work required to disposition the concerns of I&E Bulletin Nos. 79-14 and 79-02.

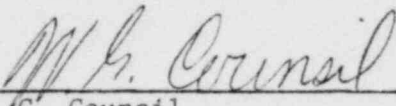
NNECO has determined this to be the most prudent course of action available to expeditiously accomplish the large amount of analytical and construction work remaining in accordance with the requirements of I&E Bulletin Nos. 79-14 and 79-02. This approach will address a major portion of the safe shutdown systems and consequently the ability of the plant to shutdown during a seismic event will not be compromised.

In response to a commitment to the resident inspector, NNECO hereby provides Attachment 4, the analytical justification allowing credit to be taken for less than full-thread engagement of anchor bolts.

We trust you find this information satisfactory to concur in the above-outlined approach.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY



W. G. Council
Senior Vice President

Attachments

ATTACHMENT 1

MILLSTONE NUCLEAR POWER STATION, UNIT NO. 2

I&E BULLETIN NO. 79-02

I&E BULLETIN NO. 79-14

ATTACHMENT 2

MILLSTONE NUCLEAR POWER STATION, UNIT NO. 2

I&E BULLETIN NO. 79-02

I&E BULLETIN NO. 79-14

ATTACHMENT II

OBE VS. DBE EVALUATIONS

| <u>Stress Problem No.</u> | <u>System</u> |
|---------------------------|------------------|
| 13 | Main Steam |
| 26 | Main Steam |
| 114 | Service Water |
| 48 | Safety Injection |

ATTACHMENT 3

MILLSTONE NUCLEAR POWER STATION, UNIT NO. 2

I&E BULLETIN NO. 79-02

I&E BULLETIN NO. 79-14

ATTACHMENT III
 NRC IE BULLETIN 79-02
 SUMMARY OF HANGER STATUS
 FOR

MILLSTONE UNIT I
 June 30, 1980

SERVICE WATER, MAINSTEAM, HIGH PRESSURE SAFETY INJECTION SYSTEMS
 AND HANGER BASEPLATES/EXPANSION ANCHORS WITH SAFETY FACTOR LESS THAN 2

| <u>HANGER NO.</u> | <u>PROBLEM NO.</u> | <u>AREA</u> | <u>STATUS</u> |
|-------------------|--------------------|-------------|-------------------------|
| 1. | 301080 | AUX. | Repair issued 6/6/80 |
| 2. | 301109 | AUX. | Repair issued 5/26/80 |
| 3. | 301111 | AUX. | Factor of Safety > 4 |
| 4. | 302080 | AUX. | Factor of Safety 2 to 4 |
| 5. | 302102 | AUX. | Factor of Safety 2 to 4 |
| 6. | 303119 | AUX. | Factor of Safety 2 to 4 |
| 7. | 303295 | AUX. | Repair issued 6/6/80 |
| 8. | 305258 | AUX | Factor of Safety 2 to 4 |
| 9. | 305561 | AUX. | Repair issued 6/5/80 |
| 10. | 305661 | AUX. | Factor of Safety 2 to 4 |
| 11. | 305672 | CTMT. | Factor of Safety 2 to 4 |
| 12. | 305733 | CTMT. | Factor of Safety 2 to 4 |
| 13. | 305818 | CTMT. | Factor of Safety 2 to 4 |
| 14. | 305924 | AUX. | Factor of Safety 2 to 4 |
| 15. | 305968 | YD. | Factor of Safety 2 to 4 |
| 16. | 305972 | YD. | Factor of Safety 2 to 4 |
| 17. | 305974 | YD. | Factor of Safety 2 to 4 |
| 18. | 305992 | YD. | Factor of Safety > 4 |
| 19. | 306009 | AUX. | Factor of Safety 2 to 4 |
| 20. | 306010 | AUX. | Factor of Safety 2 to 4 |
| 21. | 306064 | AUX. | Factor of Safety 2 to 4 |
| 22. | 306207 | YD. | Factor of Safety > 4 |
| 23. | 312017 | CTMT. | Factor of Safety 2 to 4 |
| 24. | 312018 | CTMT. | Factor of Safety 2 to 4 |
| 25. | 312019 | CTMT. | Factor of Safety 2 to 4 |
| 26. | 313074 | AUX. | Factor of Safety 2 to 4 |
| 27. | 313107 | AUX. | Repair Issued 6/07/80 |
| 28. | 327002 | AUX. W.H. | Factor of Safety 2 to 4 |
| 29. | 327076 | 20 | Repair issued 5/10/80 |
| 30. | 327138 | AUX. | Factor of Safety 2 to 4 |
| 31. | 327147 | AUX. | Factor of Safety > 4 |
| 32. | 327149 | AUX. | VOID (No Base Plate) |
| 33. | 350112 | AUX. | Factor of Safety 2 to 4 |

| | <u>Hanger No.</u> | <u>Problem No.</u> | <u>Area</u> | <u>Status</u> |
|-----|-------------------|--------------------|-------------|-------------------------------------|
| 34. | 413031 | M.S. 13 | AUX | Factor of Safety 2 to 4 |
| 35. | 413011 | 13 | AUX | Factor of Safety >4 |
| 36. | 412016 | 13 | AUX | Field Issued 6/1/80 |
| 37. | 327075 | 114 | 20 | Repair Issued 5/9/80 |
| 38. | 327077 | 114 | 20 | Repair Issued 5/9/80 |
| 39. | 327078 | 114 | 20 | Repair Issued 5/9/80 |
| 40. | 327087 | 114 | 20 | Repair Issued 5/8/80 |
| 41. | 427039 | 114 | 20 | Factor of Safety 2 to 4 (Old Loads) |
| 42. | 427042 | 114 | 20 | Factor of Safety 2 to 4 (Old Loads) |
| 43. | 427047 | 114 | 20 | Repair Issued 5/10/80 |
| 44. | 527029 | 114 | 20 | Factor of Safety >4 (Old Loads) |
| 45. | 527020 | 114 | 20 | Factor of Safety >4 (Old Loads) |
| 46. | 527044 | 114 | 20 | Factor of Safety 2 to 4 (Old Loads) |
| 47. | 527045 | 114 | 20 | Factor of Safety 2 to 4 (Old Loads) |
| 48. | 527065 | 114 | 20 | Factor of Safety 2 to 4 (Old Loads) |
| 49. | 527066 | S.W. 114 | 20 | Factor of Safety >4 (Old Loads) |
| 50. | 527067 | 114 | 20 | Factor of Safety 2 to 4 (Old Loads) |
| 51. | 527039 | 114 | 20 | See repair 327087 |
| 52. | 410091 | TMR-005 | CTMT | Repair issued 6/6/80 |
| 53. | 414011 | E-1475-7 | TURB | Repair issued 6/6/80 |
| 54. | 505287 | 174 | CTMT | Repair issued 6/14/80 |
| 55. | 305744 | 174 & 155 | CTMT | Repair issued 6/5/80 |
| 56. | 401031 | 48 | AUX | Repair issued 5/28/80 |
| 57. | 302081 | 42 | AUX | Repair issued 5/28/80 |
| 58. | 401004 | 47 | AUX | Repair issued 5/28/80 |
| 59. | 503012 | 48 | AUX | Repair issued 5/31/80 |
| 60. | 527043 | 122 | AUX | Repair issued 6/2/80 |
| 61. | 401030 | 48 | AUX | Repair issued 5/30/80 |
| 62. | 402012 | 47 | AUX | Factor of Safety > 4 |
| 63. | 402013 | 47 | AUX | Factor of Safety > 4 |
| 64. | 402014 | 47 | AUX | Block Wall |
| 65. | 402016 | 47 | AUX | Factor of Safety > 4 |
| 66. | 402032 | 47 | AUX | Factor of Safety > 4 |
| 67. | 402035 | 47 | AUX | Factor of Safety > 4 |
| 68. | 302081 | 42 | AUX | Repair issued 5/28/80 |

| <u>Hanger No.</u> | <u>Problem No.</u> | <u>AREA</u> | <u>Status</u> |
|-------------------|--------------------|-------------|-------------------------|
| 69. 380003 | 47 | AUX. | Repair issued 5/29/80 |
| 70. 393371 | 54 | AUX. | w/w 307009 |
| 71. 402010 | 48 | AUX. | Factor of Safety > 4 |
| 72. 402065 | 43 | AUX. | Factor of Safety 2 to 4 |
| 73. 402074 | 41 | AUX. | Factor of Safety 2 to 4 |
| 74. 402113 | 11 | CTMT. | Factor of Safety > 4 |
| 75. 402116 | TMR 014, 015 | CTMT. | Factor of Safety 2 to 4 |
| 76. 403081 | 49B, 60 | AUX. | Repair issued 6/6/80 |
| 77. 404003 | 52 | AUX. | Factor of Safety > 4 |
| 78. 404004 | 52 | AUX. | Factor of Safety > 4 |
| 79. 405036 | 67 | AUX. | Repair issued 6/18/80 |
| 80. 405062 | 79 | AUX. | Factor of Safety 2 to 4 |
| 81. 405063 | 79 | AUX. | Repair Issued 6/05/80 |
| 82. 405103 | 80 | AUX. | Repair issued 5/30/80 |
| 83. 405127 | 80 | AUX. | Factor of Safety 2 to 4 |
| 84. 405204 | 77 | AUX. | Repair Issued 6/05/80 |
| 85. 405269 | 110 | YD. | Factor of Safety 2 to 4 |
| 86. 405283 | 110 | YD. | Factor of Safety 2 to 4 |
| 87. 405286 | 110 | YD. | Factor of Safety 2 to 4 |
| 88. 405344 | 35 | TURB. | Factor of Safety 2 to 4 |
| 89. 405345 | 35 | TURB. | Factor of Safety 2 to 4 |
| 90. 405351 | 35 | TURB. | Repair Issued 6/4/80 |
| 91. 405409 | 85 | TURB. | Factor of Safety > 4 |
| 92. 405425 | 169 | TURB. | Factor of Safety 2 to 4 |
| 93. 405432 | 169 | TURB. | Factor of Safety > 4 |
| 94. 405436 | 169 | TURB. | Factor of Safety 2 to 4 |
| 95. 405701 | 72 | TURB. | Factor of Safety > 4 |
| 96. 410014 | TMR 009 | CTMT. | Repair issued 6/6/80 |
| 97. 410015 | TMR 009 | CTMT. | Repair issued 6/6/80 |
| 98. 410018 | TMR 009 | CTMT. | Repair issued 5/31/80 |
| 99. 410029 | TMR 011 | CTMT. | Factor of Safety > 4 |
| 100. 410032 | TMR 011 | CTMT. | Factor of Safety > 2 |
| 101. 410060 | TMR 014, 015 | CTMT. | Repair issued 6/6/80 |

| <u>Hanger No.</u> | <u>Problem No.</u> | <u>AREA</u> | <u>Status</u> |
|-------------------|--------------------|-------------|-------------------------|
| 102. | TMR 014, 015 | CTMT. | Factor of Safety 2 to 4 |
| 103. | TMR 013 | AUX. | Factor of Safety 2 to 4 |
| 104. | TMR 022 | CTMT. | Factor of Safety 2 to 4 |
| 105. | 2 | CTMT. | Factor of Safety 2 to 4 |
| 106. | 13 | AUX. | Factor of Safety 2 to 4 |
| 107. | 22 | CTMT. | Factor of Safety > 4 |
| 108. | 21 | CTMT. | Factor of Safety 2 to 4 |
| 109. | 22 | AUX. | Factor of Safety < 4 |
| 110. | 13 | AUX. | Repair issued 5/21/80 |
| 111. | 13 | AUX. | Factor of Safety < 4 |
| 112. | 13 | AUX. | Factor of Safety 2 to 4 |
| 113. | 13 | AUX. | Factor of Safety 2 to 4 |
| 114. | 25 | TURB. | Factor of Safety 2 to 4 |
| 115. | 25 | TURB. | Factor of Safety 2 to 4 |
| 116. | 25 | TURB. | Factor of Safety 2 to 4 |
| 117. | 25 | TURB. | Factor of Safety 2 to 4 |
| 118. | 101 | TURB. | Factor of Safety 2 to 4 |
| 119. | 100 | AUX. | Factor of Safety 2 to 4 |
| 120. | 24 | CTMT. | Factor of Safety 2 to 4 |
| 121. | 25 | AUX. | Factor of Safety 2 to 4 |
| 122. | 101 | TURB. | Factor of Safety 2 to 4 |
| 123. | 101 | AUX. | Repair Issued 6/6/80 |
| 124. | 197 B | CTMT. | Re: Issued 6/1/80 |
| 125. | 114 | 20 | Repair Issued 5/9/80 |
| 126. | 114 | 20 | Repair Issued 5/9/80 |
| 127. | 118 | AUX. | Factor of Safety > 4 |
| 128. | 114 | 20 | Repair Issued 5/1/80 |
| 129. | 136 | CTMT. | Factor of Safety 2 to 4 |
| 130. | 13 | TURB. | Repair Issued 5/20/80 |
| 131. | 13 | TURB. | Repair Issued 5/20/80 |
| 132. | 13 | TURB. | Repair Issued 5/22/80 |
| 133. | 43 | AUX. | Factor of Safety 2 to 4 |
| 134. | 43 | AUX. | Repair issued 6/6/80 |
| 135. | 41 | AUX. | Factor of Safety 2 to 4 |
| 136. | 164 | AUX. | Repair issued 6/6/80 |
| 137. | 164 | AUX. | Repair issued 6/5/80 |

| <u>Hanger No.</u> | <u>Problem No.</u> | <u>AREA</u> | <u>Status</u> |
|-------------------|--------------------|-------------|-------------------------|
| 138. 505006 | 75 | AUX. | Factor of Safety 2 to 4 |
| 139. 505017 | 70 | AUX. W.H. | Repair issued 6/6/80 |
| 140. 505021 | 156 | CTMT. | Factor of Safety 2 to 4 |
| 141. 505034 | 33 | TURB. | Factor of Safety 2 to 4 |
| 142. 505035 | 88 | AUX. W.H. | Factor of Safety 2 to 4 |
| 143. 505048 | 32 A & B | AUX. | Repair Issued 6/6/80 |
| 144. 505061 | 110 | TURB. | Repair Issued 6/06/80 |
| 145. 505070 | 110 | TURB. | Factor of Safety <4 |
| 146. 505084 | 72 | AUX. | Factor of Safety 2 to 4 |
| 147. 505098 | 169 | AUX. | Repair issued 6/15/80 |
| 148. 505106 | 75 | AUX. | Repair Issued 6/07/80 |
| 149. 505111 | 66 | AUX. | Factor of Safety 2 to 4 |
| 150. 505137 | 74 | AUX. | Factor of Safety <4 |
| 151. 505139 | 74 | AUX. | Factor of Safety <4 |
| 152. 505150 | 74 | AUX. | Repair issued 6/6/80 |
| 153. 505171 | 73 | AUX. | Factor of Safety 2 to 4 |
| 154. 505181 | 78 | AUX. | Repair Issued 6/07/80 |
| 155. 505196 | 73 | AUX. | Repair issued 6/19/80 |
| 156. 505259 | 35 | TURB. | Repair issued 6/4/80 |
| 157. 505261 | 132 | CTMT. | Repair issued 6/5/80 |
| 158. 505262 | 110 | TURB. | Factor of Safety >4 |
| 159. 505324 | 28 | AUX. | Repair Issued 6/6/80 |
| 160. 505325 | 26 | AUX. | Factor of Safety 2 to 4 |
| 161. 506001 | 38 | AUX. | Factor of Safety 2 to 4 |
| 162. 506006 | 58 | AUX. | Factor of Safety 2 to 4 |
| 163. 507001 | 54 | AUX. | Repair issued 6/6/80 |
| 164. 507002 | TMR 009 | CTMT. | Factor of Safety 2 to 4 |
| 165. 507003 | TMR 009 | CTMT. | Factor of Safety 2 to 4 |
| 166. 510016 | TMR 001 | CTMT. | Factor of Safety 2 to 4 |
| 167. 510018 | TMR 001 | CTMT. | Factor of Safety 2 to 4 |
| 168. 510020 | TMR 006, 007 | CTMT. | Factor of Safety 2 to 4 |
| 169. 510022 | TMR 022, 031 | CTMT. | Factor of Safety 2 to 4 |

Millstone Unit II
June 30, 1980

| <u>Hanger No.</u> | <u>Problem No.</u> | <u>AREA</u> | <u>Status</u> |
|-------------------|--------------------|-------------|-------------------------|
| 170. 513018 | 100 | AUX. | Factor of Safety 2 to 4 |
| 171. 517001 | 196 | AUX. | Factor of Safety > 4 |
| 172. 525051 | 421 | AUX. | Voided |
| 173. 527040 | 114 | 20 | Repair w/w 427105 |
| 174. 527043 | 122 | AUX. | Factor of Safety 2 to 4 |
| 175. 13HDP008 | 022, 023 | CTMT. | Factor of Safety 2 to 4 |
| 176. 305672 | 157 | CTMT. | Factor of Safety 2 to 4 |
| 177. 312009 | 2 | CTMT. | Factor of Safety 2 to 4 |
| 178. 410089 | 001 | CTMT. | Repair issued 6/6/80 |
| 179. 302083 | 46 | AUX. | Encased in Concrete |
| 180. 329001 | C-1 | TURB. | Factor of Safety < 4 |
| 181. 329002 | C-1 | TURB. | Repair issued 5/20/80 |
| 182. 329003 | C-1 | TURB. | Factor of Safety < 4 |
| 183. 329004 | C-1 | TURB. | Factor of Safety < 4 |
| 184. 329005 | C-1 | TURB. | Factor of Safety < 4 |
| 185. 329006 | C-1 | TURB. | Repair issued 5/16/80 |
| 186. 329007 | C-1 | TURB. | Repair issued 5/16/80 |
| 187. 329008 | C-1 | TURB. | Factor of Safety < 4 |
| 188. 329009 | C-1 | TURB. | Factor of Safety < 4 |
| 189. 329010 | C-1 | TURB. | Factor of Safety < 4 |
| 190. 329012 | C-1 | TURB. | Factor of Safety 2 to 4 |
| 191. 329013 | C-1 | TURB. | Factor of Safety < 4 |
| 192. 329014 | C-1 | TURB. | Factor of Safety < 4 |
| 193. 329015 | C-1 | TURB. | Factor of Safety < 4 |
| 194. 329016 | C-1 | TURB. | Factor of Safety < 4 |
| 195. 329017 | C-1 | TURB. | Factor of Safety 2 to 4 |
| 196. 329018 | C-1 | TURB. | Factor of Safety < 4 |
| 197. 329019 | C-1 | TURB. | Factor of Safety 2 to 4 |
| 198. 329020 | C-1 | TURB. | Factor of Safety > 4 |
| 199. 329021 | C-1 | AUX. W.H. | Factor of Safety 2 to 4 |
| 200. 329022 | C-1 | AUX. W.H. | Factor of Safety < 4 |
| 201. 329023 | C-1 | AUX. W.H. | Factor of Safety 2 to 4 |
| 202. 329024 | C-1 | AUX. W.H. | Factor of Safety < 4 |
| 203. 329025 | C-1 | AUX. W.H. | Factor of Safety < 4 |

| <u>Hanger No.</u> | <u>Problem No.</u> | <u>Area</u> | <u>Status</u> |
|-------------------|--------------------|-------------|-------------------------|
| 204. | 401013 | AUX | Factor of Safety > 4 |
| 205. | 401014 | AUX | Factor of Safety > 4 |
| 206. | 401016 | AUX | Factor of Safety > 4 |
| 207. | 401018 | AUX | Factor of Safety > 4 |
| 208. | 401019 | AUX | Factor of Safety > 4 |
| 209. | 401020 | AUX | Factor of Safety > 4 |
| 210. | 401021 | AUX | Factor of Safety 2 to 4 |
| 211. | 401027 | AUX | Factor of Safety > 4 |
| 212. | 401029 | AUX | Factor of Safety > 4 |
| 213. | 402010 | AUX | Factor of Safety > 4 |
| 214. | 402018 | AUX | Factor of Safety > 4 |
| 215. | 402033 | AUX | Factor of Safety > 4 |
| 216. | 402095 | AUX | Factor of Safety > 4 |
| 217. | 403080 | AUX | Factor of Safety > 4 |
| 218. | 502017 | AUX | Factor of Safety > 4 |
| 219. | 502020 | AUX | Factor of Safety > 4 |
| 220. | 502021 | AUX | Factor of Safety > 4 |
| 221. | 502022 | AUX | Factor of Safety > 4 |

| <u>Hanger No.</u> | <u>Problem No.</u> | <u>Area</u> | <u>Status</u> |
|-------------------|--------------------|-------------|-------------------------|
| 222. | 301081 | AUX | Factor of Safety >4 |
| 223. | 305560 | AUX. | Factor of Safety 2 to 4 |
| 224. | 305658 | AUX. | Repair Issued 6/10/80 |
| 225. | 305730 | CTMT. | Repair Issued 6/11/80 |
| 226. | 305774 | CTMT. | Repair issued 6/5/80 |
| 227. | 305925 | TURB. | Factor of Safety > 4 |
| 228. | 401078 | AUX. | Factor of Safety >4 |
| 229. | 402099 | CTMT. | Repair Issued 6/3/80 |
| 230. | 402112 | CTMT. | Factor of Safety 2 to 4 |
| 231. | 403074 | AUX. | Factor of Safety 2 to 4 |
| 232. | 404022 | AUX. | Factor of Safety 2 to 4 |
| 233. | 405622 | AUX. | Factor of Safety < 4 |
| 234. | 405683 | CTMT. | Factor of Safety 2 to 4 |
| 235. | 405724 | CTMT. | Factor of Safety 2 to 4 |
| 236. | 406115 | AUX. | Factor of Safety > 4 |
| 237. | 407007 | CTMT. | Factor of Safety > 4 |
| 238. | 412003 | AUX. | Factor of Safety 2 to 4 |
| 239. | 413029 | AUX. | Factor of Safety 2 to 4 |
| 240. | 413030 | AUX. | Factor of Safety 2 to 4 |
| 241. | 413071 | TURB. | Factor of Safety 2 to 4 |
| 242. | 413169 | AUX. | Repair Issued 6/08/80 |
| 243. | 413184 | AUX. | Factor of Safety 2 to 4 |
| 244. | 413192 | AUX. | Factor of Safety 2 to 4 |
| 245. | 413198 | AUX. | Factor of Safety 2 to 4 |
| 246. | 427092 | AUX. | Factor of Safety >4 |
| 247. | 427099 | AUX. | Factor of Safety >4 |
| 248. | 427113 | AUX. | Factor of Safety >4 |
| 249. | 505170 | AUX. | Repair Issued 6/11/80 |
| 250. | 505195 | AUX. | Factor of Safety >2 |
| 251. | 505300 | AUX. | Repair issued 6/9/80 |
| 252. | 513019 | AUX. | Factor of Safety > 4 |
| 253. | 525042 | AUX. | Repair Issued 6/11/80 |
| 254. | 525043 | AUX. | Repair Issued 6/11/80 |
| 255. | 527063 | 20 | Repair Issued 5/9/80 |
| 256. | 527064 | 20 | Repair Issued 5/9/80 |

SUPPLEMENT 2
WORK/WITH HANGERS

Millstone Unit II
June 30, 1980

| <u>WORK/WITH</u> | <u>STATUS 1 HANGER</u> | <u>PROBLEM NO.</u> | <u>AREA</u> | <u>STATUS</u> |
|------------------|------------------------|--------------------|-------------|-------------------------------|
| 257. | 301110 | 301109 | 47 | AUX. Repair Issued 5/26/80 |
| 258. | 399773 | 302102 | 55 | AUX. Factor of Safety 2 to 4 |
| 259. | 399494 | 305661 | 87 | AUX. Factor of Safety 2 to 4 |
| 260. | 399617 | 305924 | 75 | AUX. Factor of Safety 2 to 4 |
| 261. | 305983 | 305968 | 33 | YD. Factor of Safety 2 to 4 |
| 262. | 315152 | 305968 | 110 | YD. Factor of Safety 2 to 4 |
| 263. | 350019 | 305968 | 110 | YD. Factor of Safety 2 to 4 |
| 264. | 505076 | 305972 | 33 | YD. Factor of Safety 2 to 4 |
| 265. | 305987 | 305972 | 110 | YD. Factor of Safety 2 to 4 |
| 266. | 505073 | 305974 | 33 | YD. Factor of Safety 2 to 4 |
| 267. | 305989 | 305974 | 110 | YD. Factor of Safety 2 to 4 |
| 268. | 350010 | 305974 | 110 | YD. Factor of Safety 2 to 4 |
| 269. | 312012 | 312017 | 1 | CTMT. Factor of Safety 2 to 4 |
| 270. | 412007 | 312018 | 2 | CTMT. Factor of Safety 2 to 4 |
| 271. | 327148 | 327147 | 118 | AUX. VOID |
| 272. | 327150 | 327149 | 118 | AUX. Factor of Safety > 4 |
| 273. | 403079 | 380003 | 49 | AUX. No Bolts |
| 274. | 380011 | 380003 | 49 | AUX. No Bolts |
| 275. | 403050 | 380003 | 60 | AUX. No Bolts |
| 276. | 307009 | 399371 | 54 | AUX. Repair issued 6/6/80 |
| 277. | 502013 | 402065 | 55 | AUX. Repair issued 6/6/80 |
| 278. | 403094 | 402065 | 43 | AUX. No Bolts |
| 279. | 401076 | 405127 | 80 | AUX. Factor of Safety 2 to 4 |
| 280. | 405270 | 405269 | 33 | YD. Factor of Safety 2 to 4 |
| 281. | 405284 | 405283 | 33 | YD. Factor of Safety 2 to 4 |
| 282. | 405287 | 405286 | 33 | YD. Factor of Safety 2 to 4 |
| 283. | 405410 | 405409 | 85 | AUX. Factor of Safety >4 |
| 284. | 410028 | 410029 | TMR- 011 | CTMT. w/w 410032 (NUSCO) |
| 285. | 305310 | 450166 | 131 | CTMT. Factor of Safety 2 to 4 |
| 286. | 505307 | 450166 | 132 | CTMT. Factor of Safety 2 to 4 |
| 287. | 505308 | 450166 | 131 | CTMT. Factor of Safety 2 to 4 |

ATTACHMENT 4

MILLSTONE NUCLEAR POWER STATION, UNIT NO. 2

I&E BULLETIN NO. 79-02

I&E BULLETIN NO. 79-14

ATTACHMENT IV

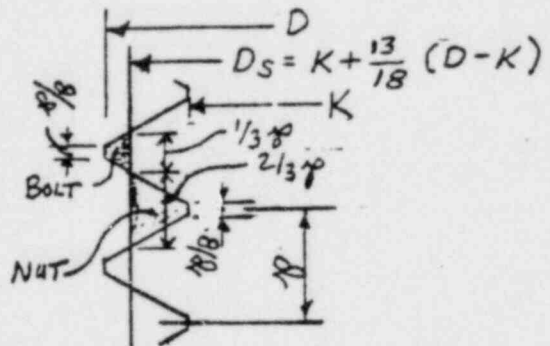
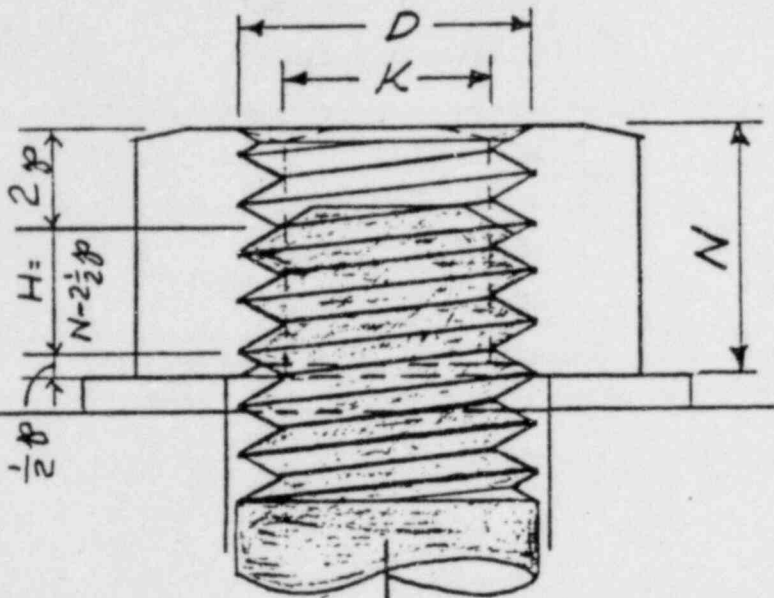
TENSILE CAPACITY OF HILTI QUIK BOLTS 2 THREADS SHORT OF FULL THREAD ENGAGEMENT:

REF: AISC MANUAL,
Pg. 4-121, 4-125

ALLOWABLE SHEAR STRESS OF HILTI BOLT \cong 2X ALLOWABLE SHEAR STRESS OF NUT:

HILTI BOLT: $F_{SB} \cong 20$ KSI

A307 NUT: $F_{SN} \cong 10$ KSI



ANNULAR PLANE OF EQUAL SHEAR CAPACITY OF BOLT THREADS AND NUT THREADS.

$$P_T = A_{SB} F_{SB} = A_{SN} F_{SN}$$

$$A_{SB} F_{SB} = \pi D_s \left(\frac{1}{3}H\right) (20) = A_{SN} F_{SN} = \pi D_s \left(\frac{2}{3}H\right) (10)$$

$$f_c = 3000 \text{ psi}$$

| D = BOLT SIZE (IN.) | K = ROOT DIAMETER (IN.) | $D_s = K + \frac{13}{18}(D-K)$ (IN.) | $\frac{1}{p}$ = THREADS PER INCH | N = NUT HEIGHT (IN.) | H = $N - 2.5p$ (IN.) | $P_T = 20.94 D_s H$ (K) | EMBEDMENT (IN.) | ALLOW. TENSION (K) |
|---------------------|-------------------------|--------------------------------------|----------------------------------|----------------------|----------------------|-------------------------|-----------------|--------------------|
| 3/8 | .294 | .352 | 16 | 5/16 | .1563 | 1.15 | 4 1/2 | 1.05 |
| 1/2 | .400 | .472 | 13 | 7/16 | .2452 | 2.42 | 4 1/2 | 2.31 |
| 5/8 | .507 | .592 | 11 | 9/16 | .3352 | 4.16 | 7 1/2 | 3.25 |
| 3/4 | .620 | .714 | 10 | 11/16 | .4375 | 6.54 | 9. | 4.94 |
| 1 | .838 | .955 | 8 | 7/8 | .5625 | 11.25 | 10. | 5.71 |
| 1 1/4 | 1.064 | 1.198 | 7 | 1 1/16 | .7054 | 17.70 | 10 1/2 | 8.46 |

•• BOLT TWO THREADS SHORT CAN RESIST ALLOW. TENSILE LOADS AT EMBEDMENTS NOTED.