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Administration

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Analysis of Historical Non-Destructive Evaluation Probability of Detection Data for Railroad Tank Cars: Appendices A Through I

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Appendix A.
Traditional Statistics POD Summary Graphs – Fillet Welds

This appendix presents the summary of the number of observations, hits, misses and false calls for each crack interval for fillet welds (FW) for all operators and for each nondestructive evaluation (NDE) method applied. The probability of hits (POHs) are also calculated and displayed on top of the median number of hits for each crack distribution. Note that there is a crack size interval of 0-inches that corresponds to the locations in the panels where there were no cracks or flaws. This means that false calls will only appear in the zero-crack size interval for the FW as shown by the yellow bar.

Visual Testing (VT)

Figure 1 is the distribution of the frequency of number of observations, median number of hits and misses, and median of false calls for the VT method and a crack size interval of 0.5-inches. In addition, researchers presented the POH based on the relative frequency of hits per crack size interval. From the figure, note that the number of false calls is only shown in the 0-inch crack size interval and the 0.5- to 1-inch interval presents the highest number of misses and it is the only case where this number exceeds the number of hits.

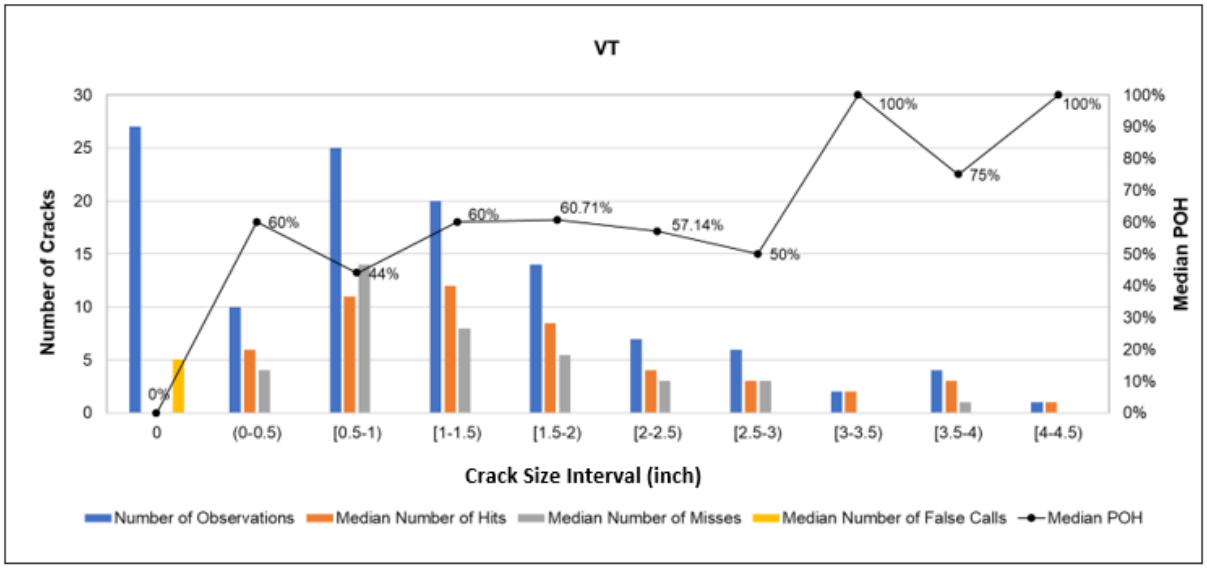

Figure 1. VT Summary for FW Panels

Figure 2 is the box plot for the frequency of the number of cracks, hits, misses and false calls per crack size interval. The figure shows that 0.5- to 1-inch and 1- to 1.5-inch crack size intervals show the highest variability in the data.

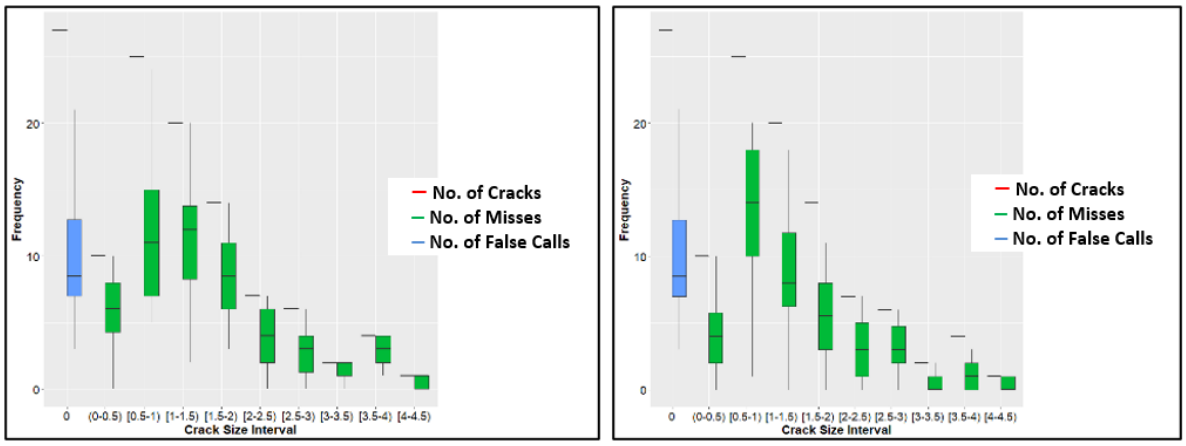

Figure 2. VT Box Plot Summary for FW Panels

Penetrant Testing (PT)

Figure 3 is the distribution of the frequency of number of observations, median number of hits and misses, and median of false calls for PT method and a crack size interval of 0.5 inches. Researchers presented the POH based on the relative frequency of hits per crack size interval. From the figure, note that the number of false calls is only shown in the 0-inch crack size interval and the 0.5- to 1-inch interval presents the highest number of hits and misses, and in all intervals the number of hits was greater than the number of misses.

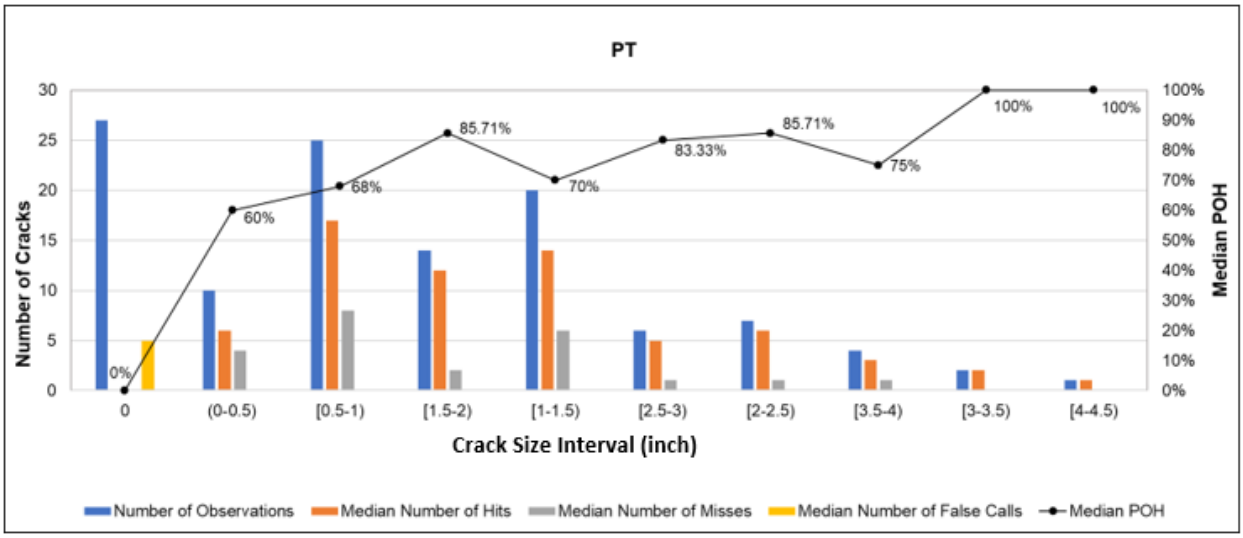

Figure 3. PT Summary for FW Panels

Figure 4 is the box plot for the frequency of the number of cracks, hits, misses, and false calls per crack size interval. The figure shows that 0.5- to 1-inch and 1- to 1.5-inch crack size intervals show the highest variability in the data.

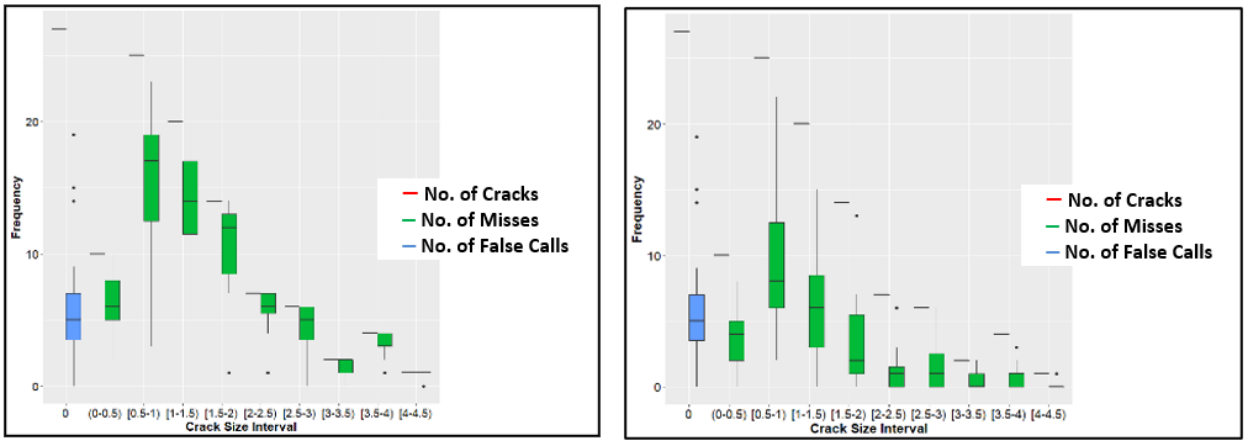

Figure 4. PT Box Plot Summary for FW Panels

Magnetic Particle Testing (MT) with Contrast

Figure 5 is the distribution of the frequency of number of observations, median number of hits and misses, and median of false calls for MT with contrast method and a crack size interval of 0.5-inches. In addition, researchers presented the POH based on the relative frequency of hits per crack size interval. From the figure, note that the number of false calls is only shown in the 0-inch crack size interval and it has a higher number of false calls compared to the previous two inspection methods. Additionally, the 0.5- to 1-inch interval presents the highest number of hits and misses and this method has a lower probability of misses compared to the previous two methods.

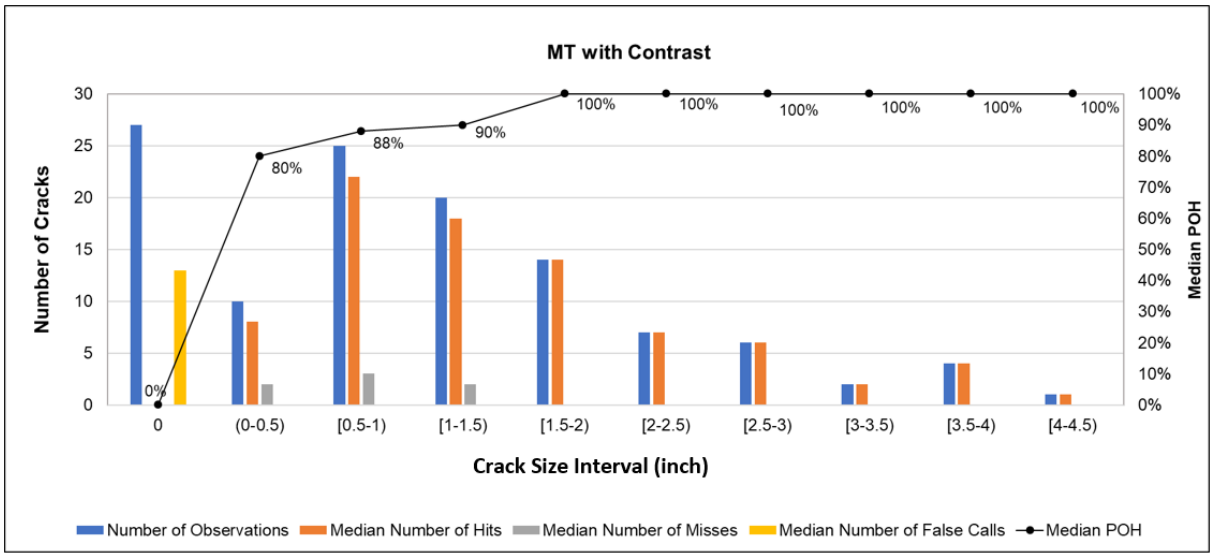

Figure 5. MT with Contrast Summary for FW Panels

Figure 6 is the box plot for the frequency of the number of cracks, hits, misses and false calls per crack size interval. The figure shows that 0.5- to 1-inch crack size interval show the highest variability in the data. In addition, there are outstanding data points outside the lower and upper whiskers for hits and misses respectively. These outstanding data points might be interpreted as an indication of potential outliers in the frequency of hits and misses for this inspection method.

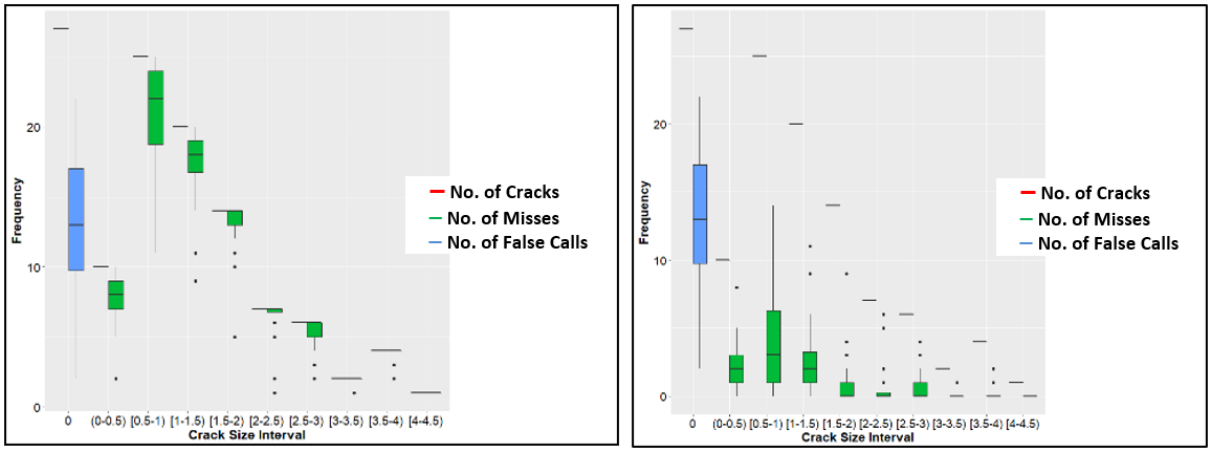

Figure 6. MT with Contrast Box Plot Summary for FW Panels

Magnetic Particle Testing Without Contrast

Figure 7 is the distribution of the frequency of number of observations, median number of hits and misses, and median of false calls for MT without contrast method and a crack size interval of 0.5-inches. In addition, researchers presented the POH based on the relative frequency of hits per crack size interval. From the figure, note that the number of false calls is only shown in the 0-inch crack size interval and it has a higher number of false calls compared to the previous two inspection methods. Additionally, the 0.5- to 1-inch interval presents the highest number of hits and misses and this method has lower probability of misses compared to the previous two methods. There were no misses reported in crack size intervals greater than or equal to 1.5-inches.

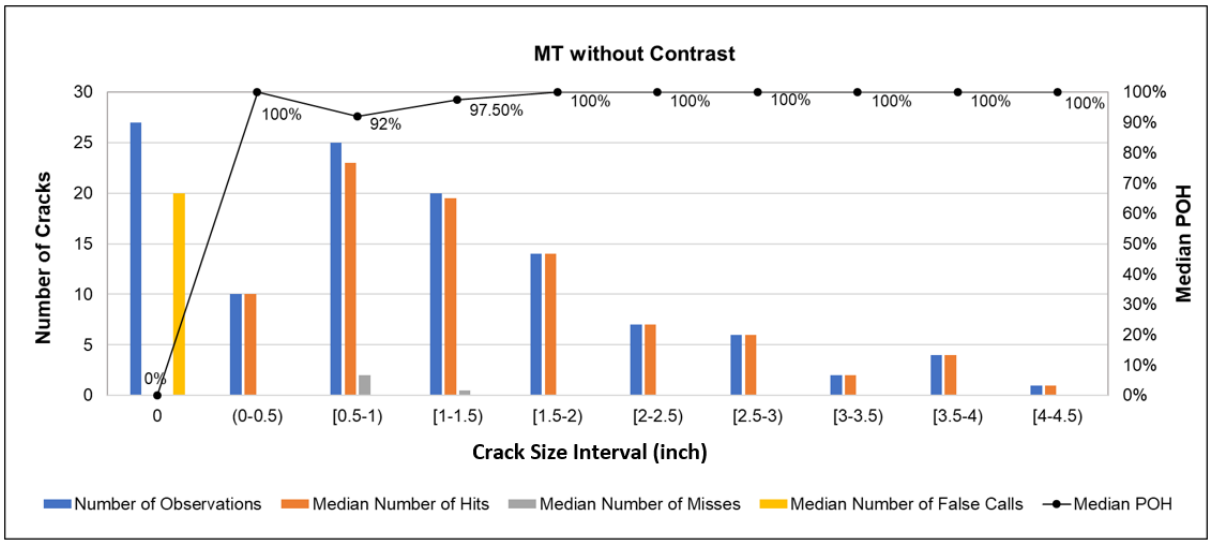

Figure 7. MT without Contrast Summary for FW Panels

Figure 8 is the box plot for the frequency of the number of cracks, hits, misses and false calls per crack size interval. The figure shows that 0.5- to 1-inch crack size interval shows the highest variability in the data. In addition, there are outstanding data points outside the lower and upper whiskers for hits and misses respectively. These outstanding data points might be interpreted as an indication of potential outliers in the frequency of hits and misses for this inspection method.

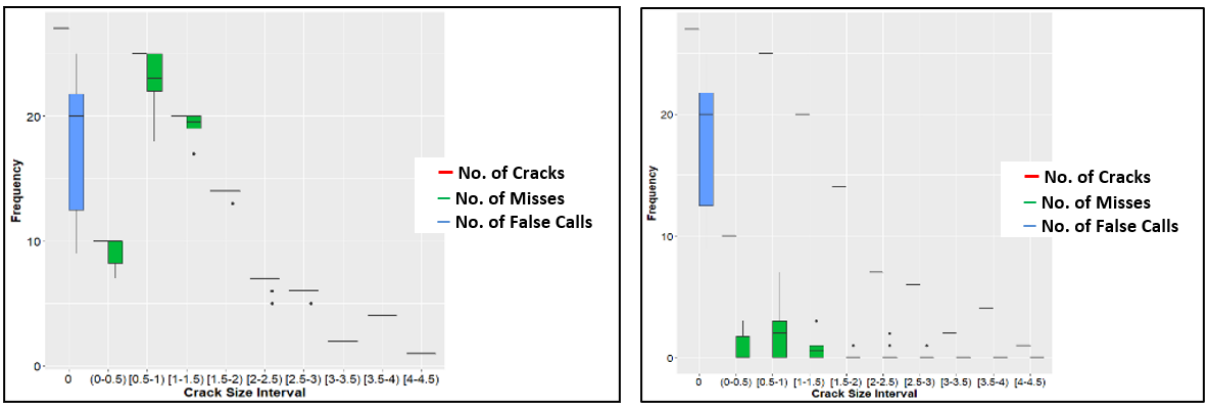

Figure 8. MT without Contrast Box Plot Summary for FW Panels

Ultrasonic Testing (UT)

Figure 9 is the distribution of the frequency of number of observations, median number of hits and misses, and median of false calls for the UT method and a crack size interval of 0.5-inches. Researchers presented the POH based on the relative frequency of hits per crack size interval. From the figure, note that the number of false calls is only shown in the 0-inch crack size interval. Additionally, the 0.5- to 1-inch interval presents the highest number of hits compared to the other crack size intervals.

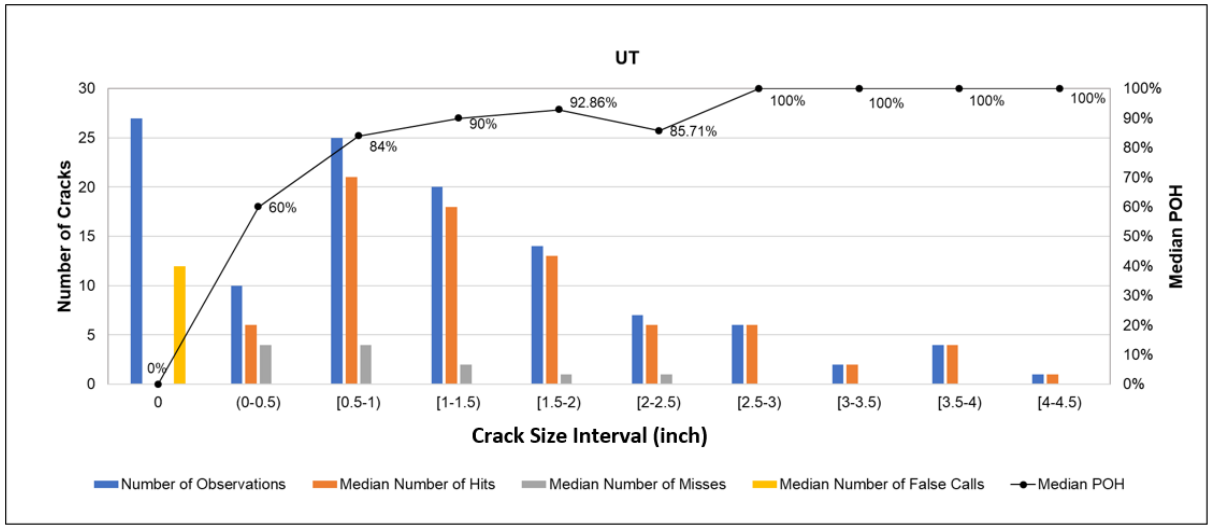

Figure 9. UT Summary for FW Panels

Figure 10 is the box plot for the frequency of the number of cracks, hits, misses and false calls per crack size interval. The figure shows that the 0.5- to 1-inch crack size interval shows the highest variability in the data. However, the variability in the data is smaller compared to the previous inspection methods.

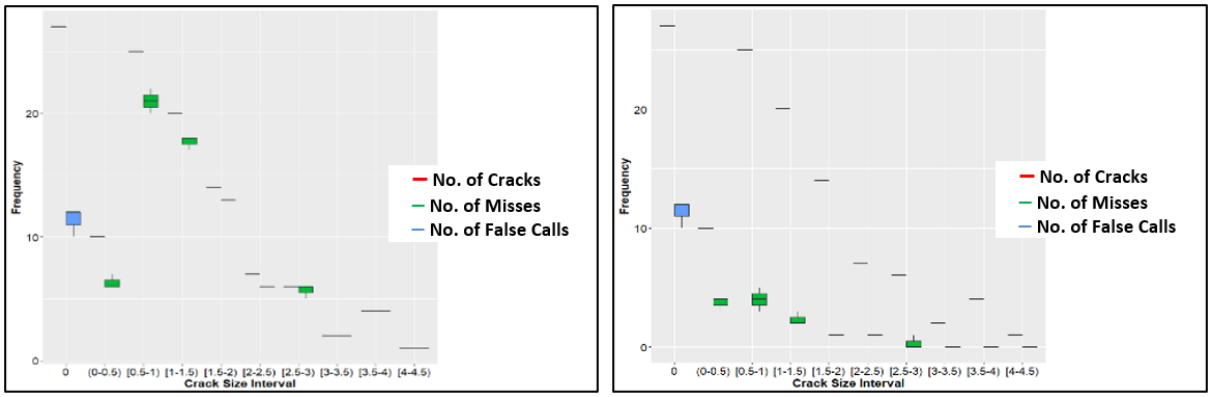

Figure 10. UT Box Plot Summary for FW Panels

Appendix B.
Traditional Statistics POD Summary Graphs – Butt Welds

This appendix presents the summary of the median frequency of hits and misses for the distribution of cracks in butt welds (BW) for all operators and for each NDE method applied. An estimation of POH are also calculated and displayed on top of the median number of hits for each crack distribution.

Again, another way to visualize the same traditional statistics data for BW is using box plots. The box plot is a graphical method that allows data visualization by using various summary numbers: first quartile (or 25th percentile), median, third quartile (or 75th percentile), and minimum, maximum (based on the interquartile range). Depending on the data, potential outliers (data points outside the minimum and maximum) can be visualized. In this case, the box plot showed the frequency of hits and misses in separate plots with the total number of cracks and the false calls. From the plots, crack size intervals of 0.5- to 1-inches and 1- to 1.5-inches have the largest frequency of cracks as well as the largest variability in the data as shown in the box plots.

Visual Testing (VT)

Figure 11 is the distribution of the frequency of number of observations, median number of hits and misses, and the VT method with a crack size interval of 0.5-inches. Researchers presented the POH based on the relative frequency of hits per crack size interval. From the figure, note that the number of hits for a crack size interval less than 1-inch was less than the number of misses.

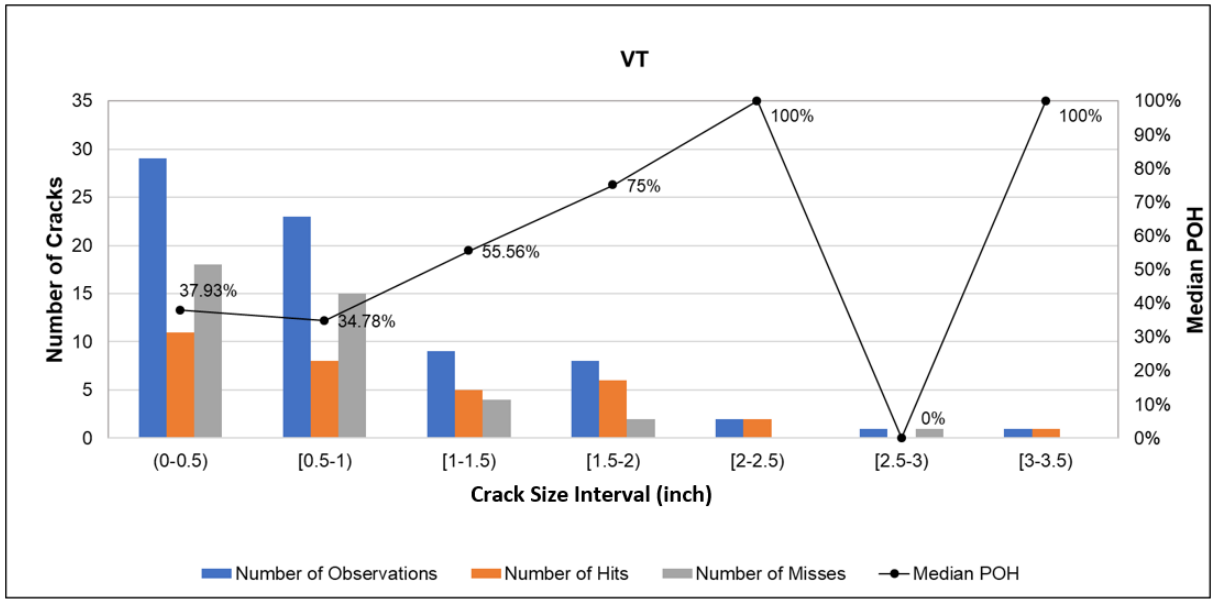

Figure 11. VT Summary for BW Panels

Figure 12 is the box plot for the frequency of the number of cracks, hits and misses per crack size interval, and the median number of false calls. The figure shows that the 0 to 0.5-inch crack size interval shows the highest variability in the data. In addition, there are outstanding data points outside the lower and upper whiskers in the 3- to 3.5-inch interval for hits and misses,

respectively. These outstanding data points might be interpreted as an indication of potential outliers in the frequency of hits and misses for this inspection method.

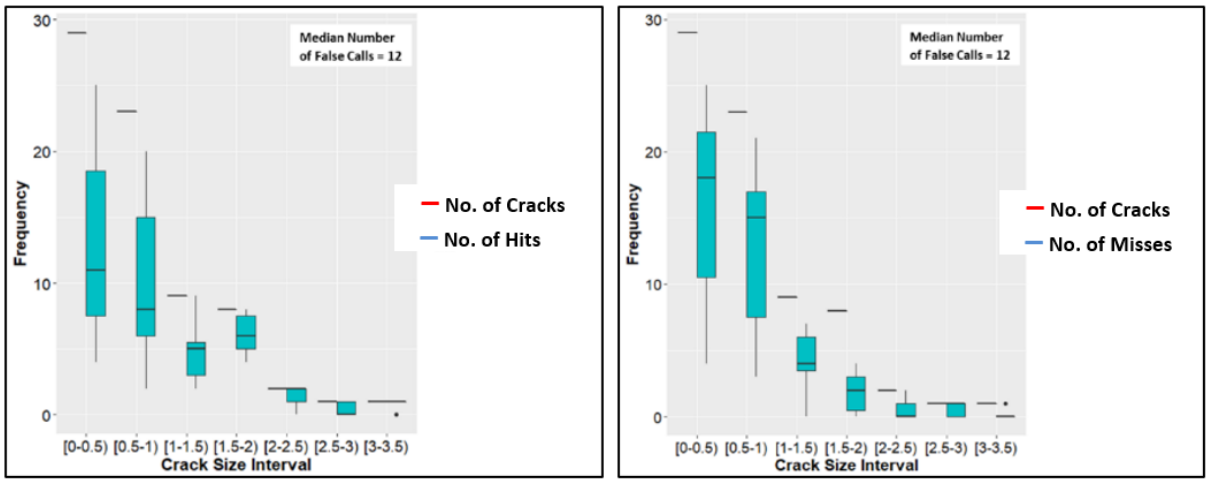

Figure 12. VT Box Plot Summary for BW Panels

Penetrant Testing (PT)

Figure 13 is the distribution of the frequency of number of observations, median number of hits and misses, and the VT method with a crack size interval of 0.5-inches. Researchers presented the POH based on the relative frequency of hits per crack size interval. From the figure, note that the number of hits for crack size interval less than 0.5-inches was less than the number of misses. There were no misses found for crack size intervals of 2- to 2.5-inches and 3- to 3.5-inches.

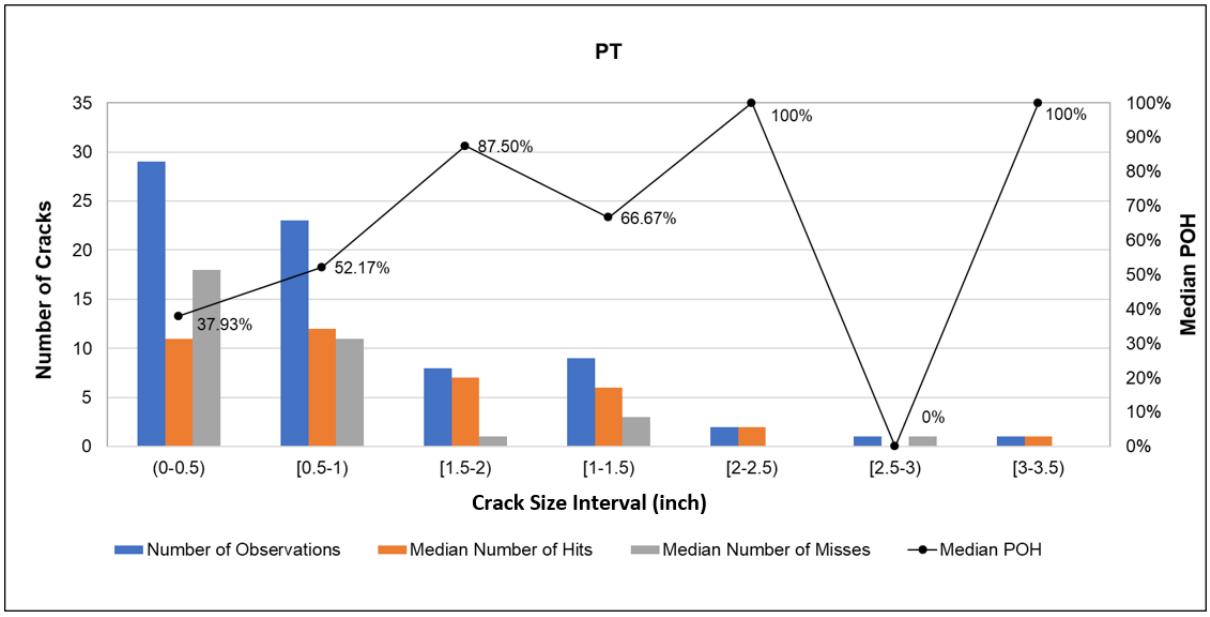

Figure 13. PT Summary for BW Panels

Figure 14 is the box plot for the frequency of the number of cracks, hits and misses per crack size interval, and the median number of false calls. The figure shows that the 0.5- to 1-inch crack

size interval shows the highest variability in the data. In addition, there are outstanding data points outside the lower and upper whiskers for hits and misses, respectively. These outstanding data points might be interpreted as indication of potential outliers in the frequency of hits and misses for this inspection method.

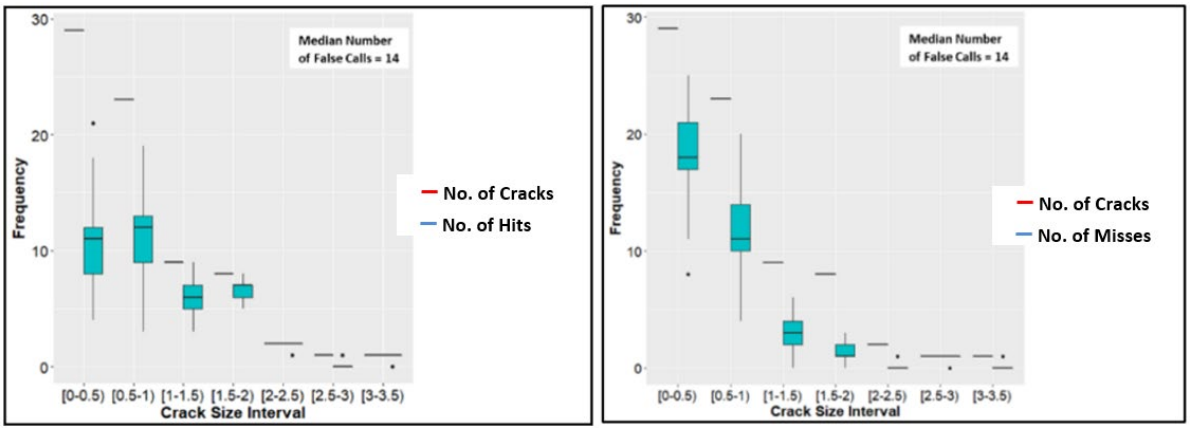

Figure 14. PT Box Plot Summary for BW Panels

Magnetic Particle Testing (MT) with Contrast

Figure 15 is the distribution of the frequency of number of observations, median number of hits and misses, and MT with contrast method with a crack size interval of 0.5-inch. Researchers presented the POH based on the relative frequency of hits per crack size interval. From the figure, note that the crack size interval of 0 to 0.5-inches has the highest number of hits and misses. There were not misses found for crack sizes greater than or equal to 2 inches.

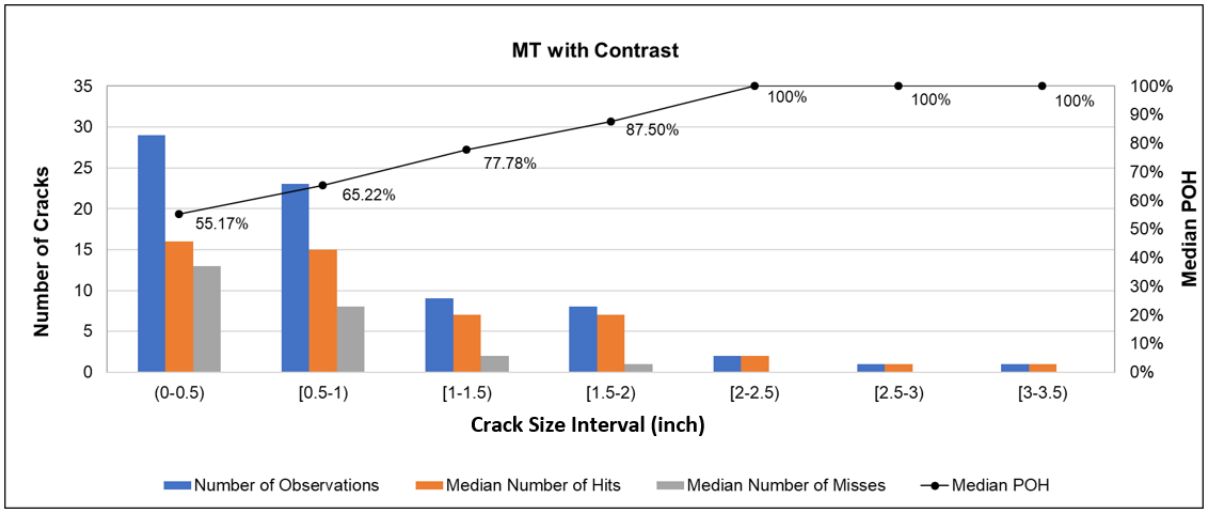

Figure 15. MT with Contrast Summary for BW Panels

Figure 16 is the box plot for the frequency of the number of cracks, hits and misses per crack size interval, and the median number of false calls. The figure shows that 0 to 0.5-inch crack size interval shows the highest variability in the data. In addition, there are outstanding data points outside the lower and upper whiskers for hits and misses, respectively. These outstanding data points might be interpreted as indication of potential outliers in the frequency of hits and misses for this inspection method.

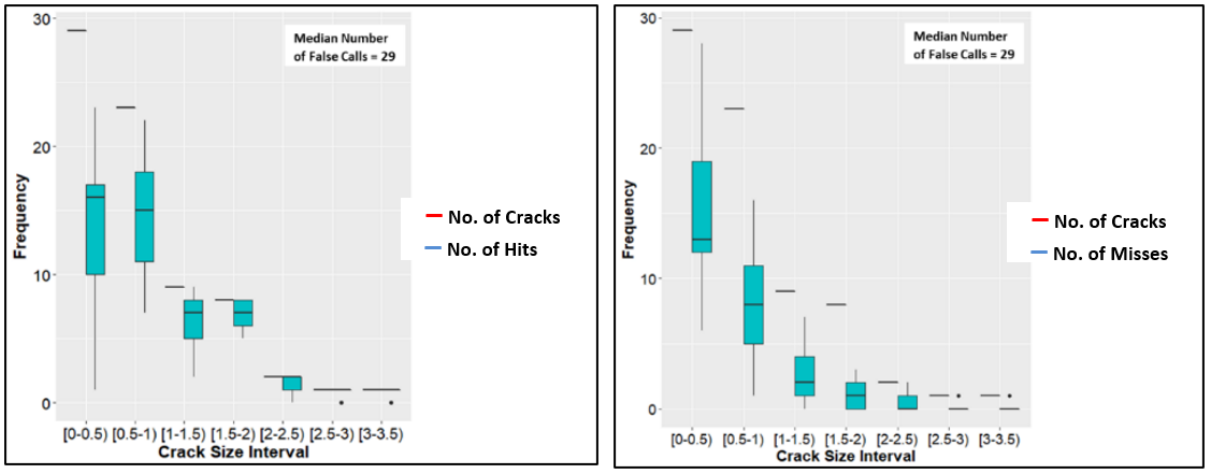

Figure 16. MT with Contrast Box Plot Summary for BW Panels

Magnetic Particle Testing (MT) Without Contrast

Figure 17 is the distribution of the frequency of number of observations, median number of hits and misses, and the MT without contrast method with a crack size interval of 0.5-inches. Researchers presented the POH based on the relative frequency of hits per crack size interval. From the figure, note that the crack size interval of 0 to 0.5-inch has the highest number of hits and misses. There were no misses found for crack sizes greater than or equal to 1.5-inches.

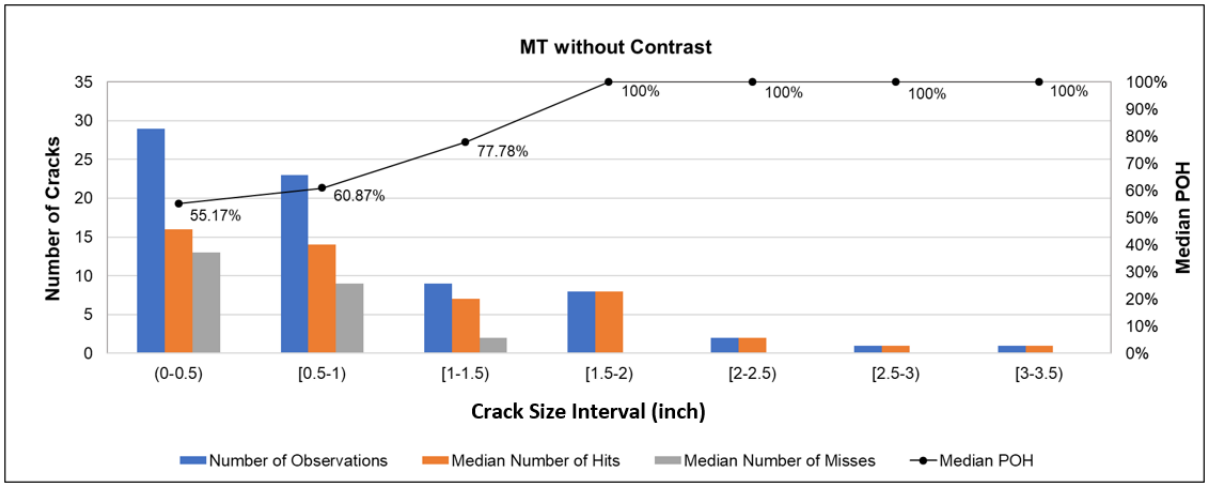

Figure 17. MT Without Contrast Summary for BW Panels

Figure 18 is the box plot for the frequency of the number of cracks, hits and misses per crack size interval, and the median number of false calls. The figure shows that the 0 to 0.5-inch crack size interval shows the highest variability in the data. In addition, there are outstanding data points outside the lower and upper whiskers for hits and misses, respectively. These outstanding data points might be interpreted as indication of potential outliers in the frequency of hits and misses for this inspection method.

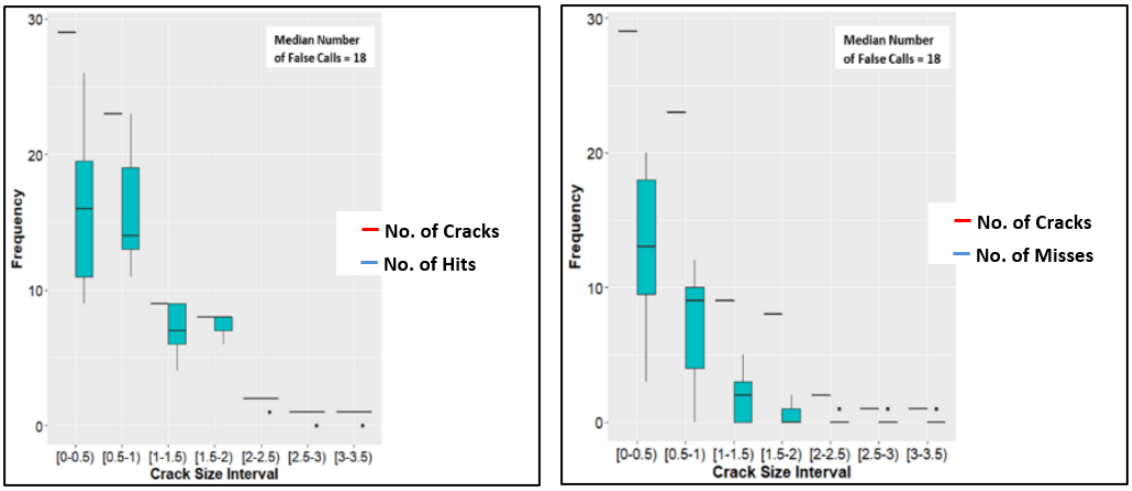

Figure 18. MT Without Contrast Box Plot Summary for BW Panels

Ultrasonic Testing (UT)

Figure 19 is the distribution of the frequency of number of observations, median number of hits and median number of misses for the UT method and a crack size interval of 0.5-inches. Researchers presented the POH based on the relative frequency of hits per crack size interval. From the figure, note that the crack size interval of 0 to 0.5-inches has the largest number of misses and the interval of 0.5 to 1-inches has the highest number of hits. There were no misses found for crack sizes greater than or equal to 2 inches.

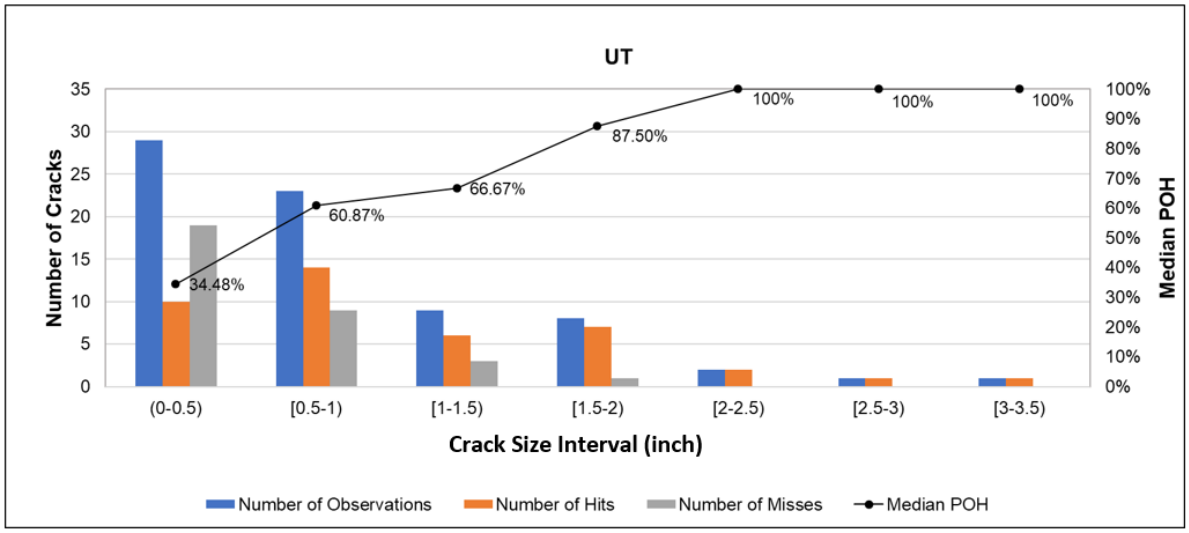

Figure 19. UT Summary for BW Panels

Figure 20 is the box plot for the frequency of number of cracks, hits, and misses per crack size interval, and the median number of false calls. The figure shows that a 0 to 0.5-inch crack size interval shows the highest variability in the data. In addition, there are outstanding data points outside the lower and upper whiskers for hits and misses, respectively. These outstanding data points might be interpreted as an indication of potential outliers in the frequency of hits and misses for this inspection method.

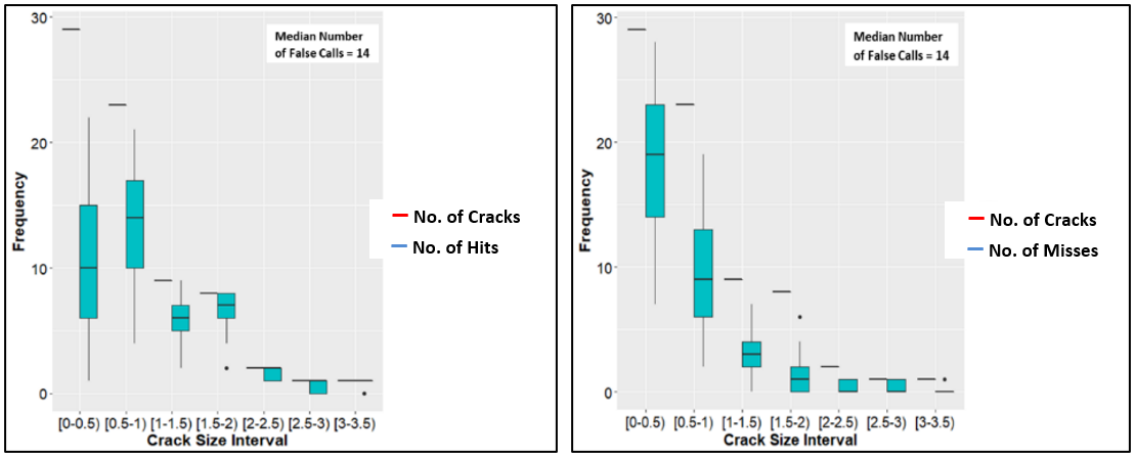

Figure 20. UT Box Plot Summary for BW Panels

Phased-Array Ultrasonic Testing (PAUT)

Figure 21 is the distribution of the frequency of number of observations, median number of hits and misses for the PAUT method and a crack size interval of 0.5-inches. Researchers presented the POH based on the relative frequency of hits per crack size interval. From the figure, note that the crack size interval of 0 to 0.5-inches has the highest number of misses and the interval of 0.5- to 1-inches has the highest number of hits. There were no misses found for crack sizes greater than or equal to 1.5-inch.

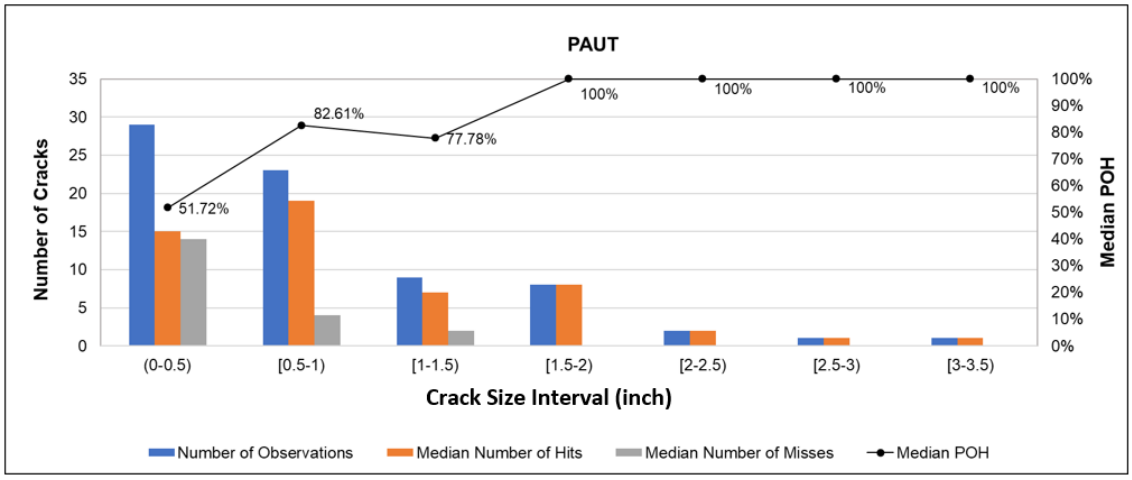

Figure 21. PAUT Summary for BW Panels

Figure 22 is the box plot for the frequency of the number of cracks, hits, and misses per crack size interval, and the median number of false calls. The figure shows that 0- to 0.5-inch and 0.5- to 1-inch crack size intervals show the highest variability in the data. In addition, there are outstanding data points outside the lower and upper whiskers for hits and misses, respectively. These outstanding data points might be interpreted as an indication of potential outliers in the frequency of hits and misses for this inspection method.

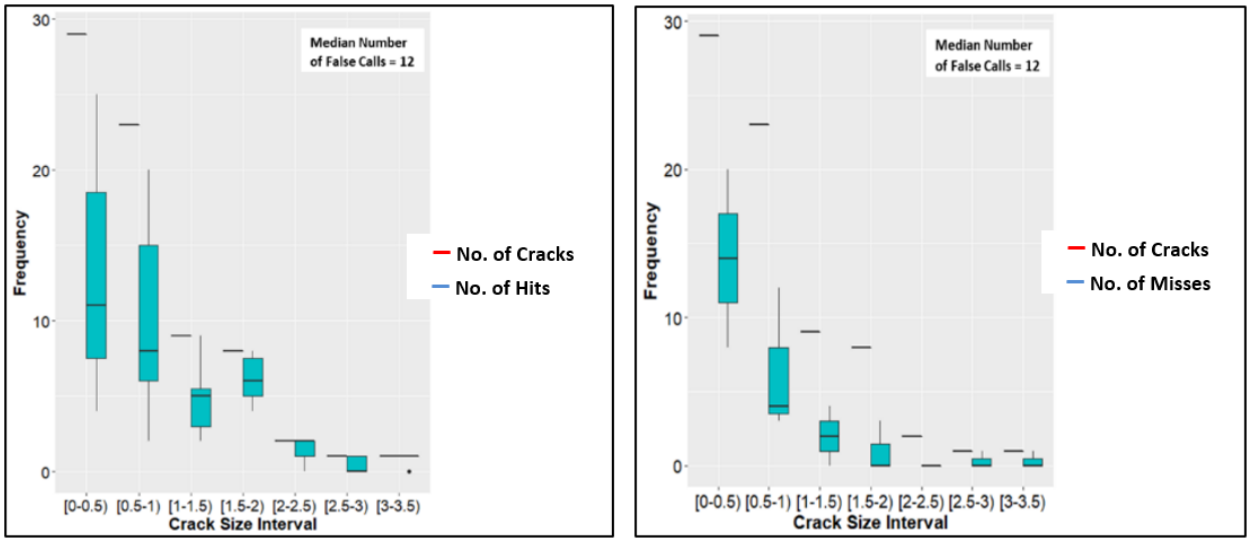

Figure 22. PAUT Box Plot Summary for BW Panels

Appendix C.
Traditional Statistics POD Graphs for Individual Operator – Fillet Welds

This appendix shows statistical POD graphs for individual operator-fillet welds in Figure 23 through Figure 112.

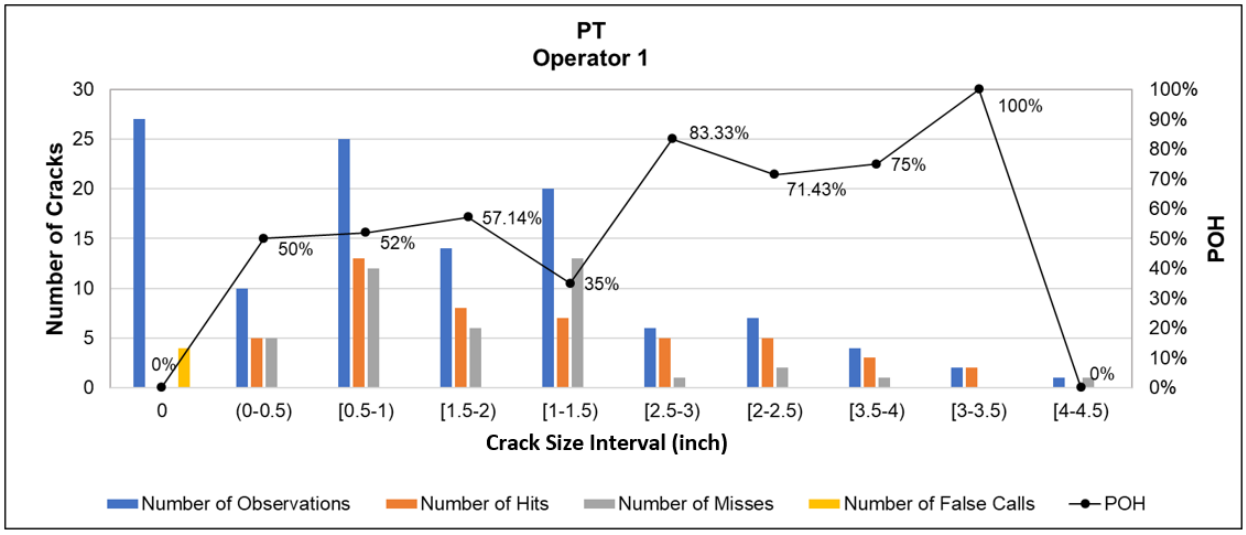

Figure 23. FW PT Distribution of Hits – Operator 1

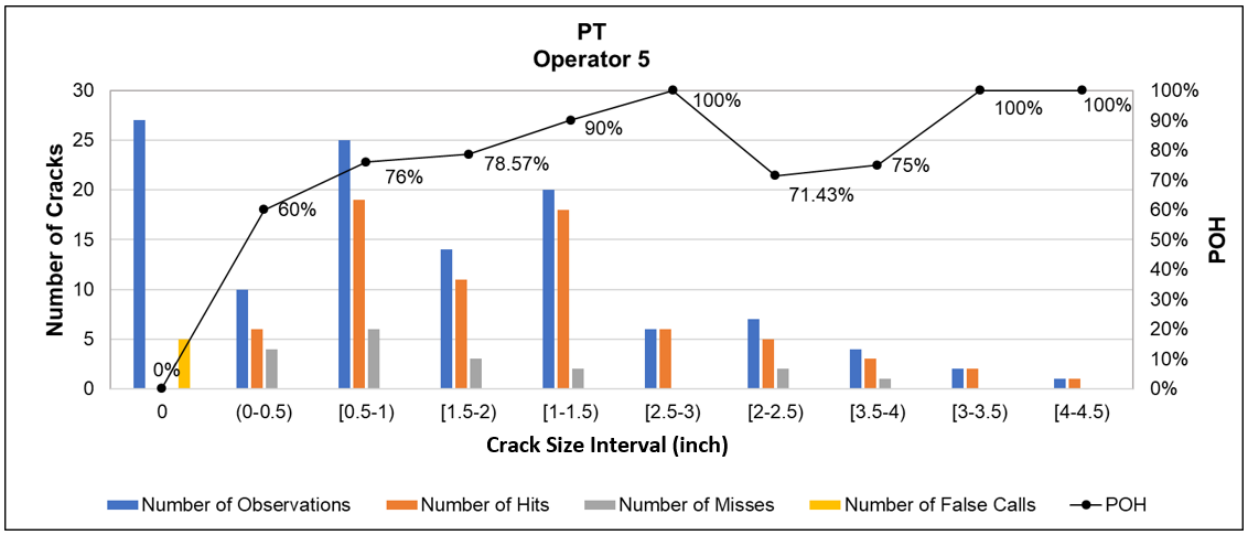

Figure 24. FW PT Distribution of Hits – Operator 5

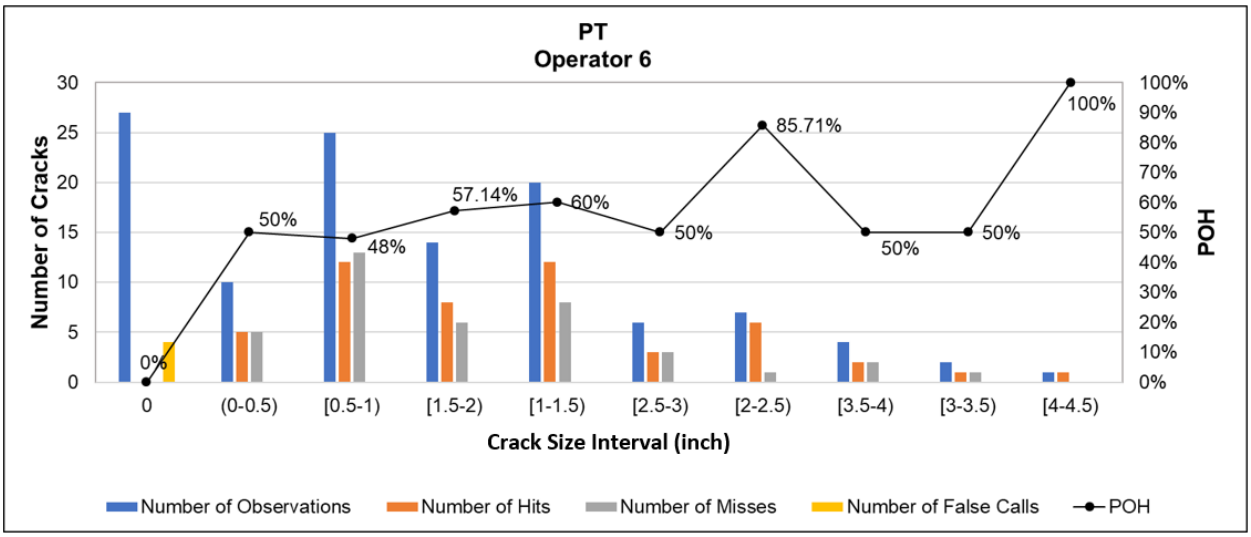

Figure 25. FW PT Distribution of Hits – Operator 6

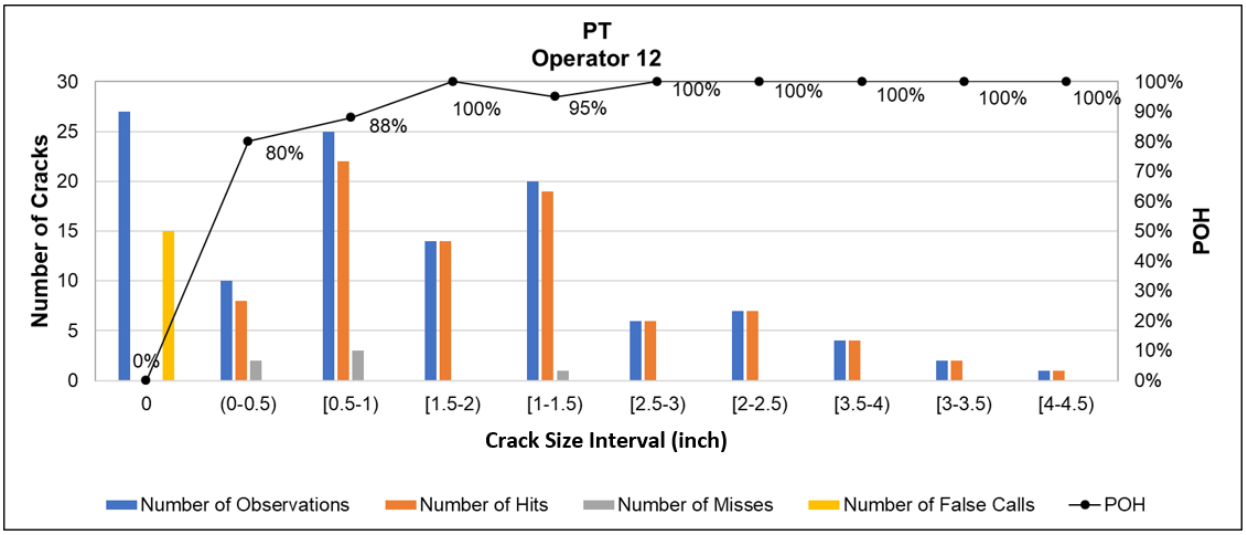

Figure 26. FW PT Distribution of Hits – Operator 12

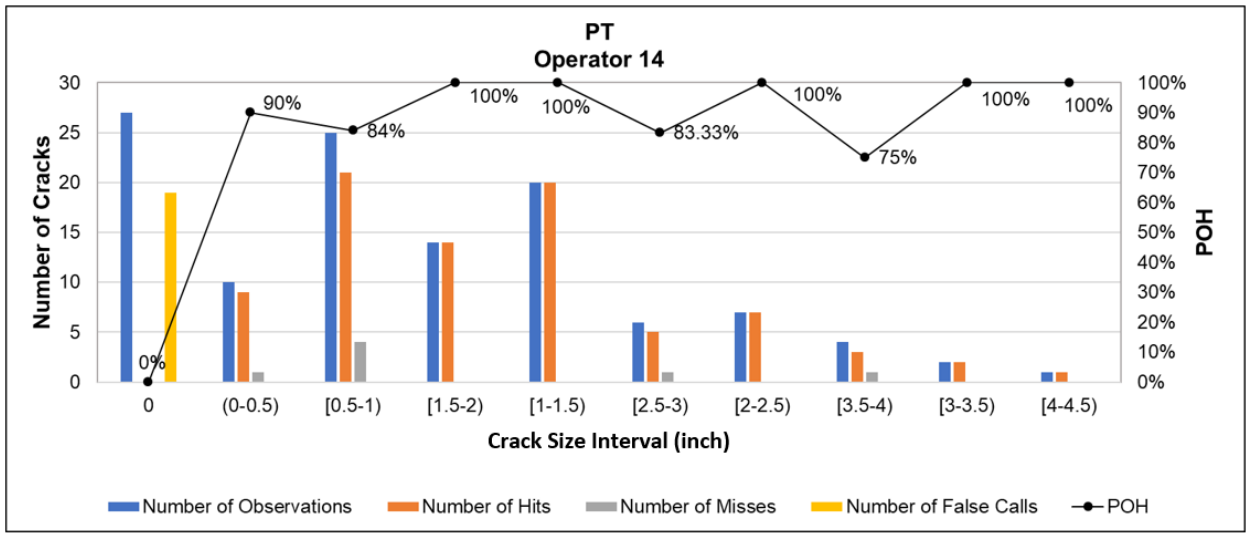

Figure 27. FW PT Distribution of Hits – Operator 14

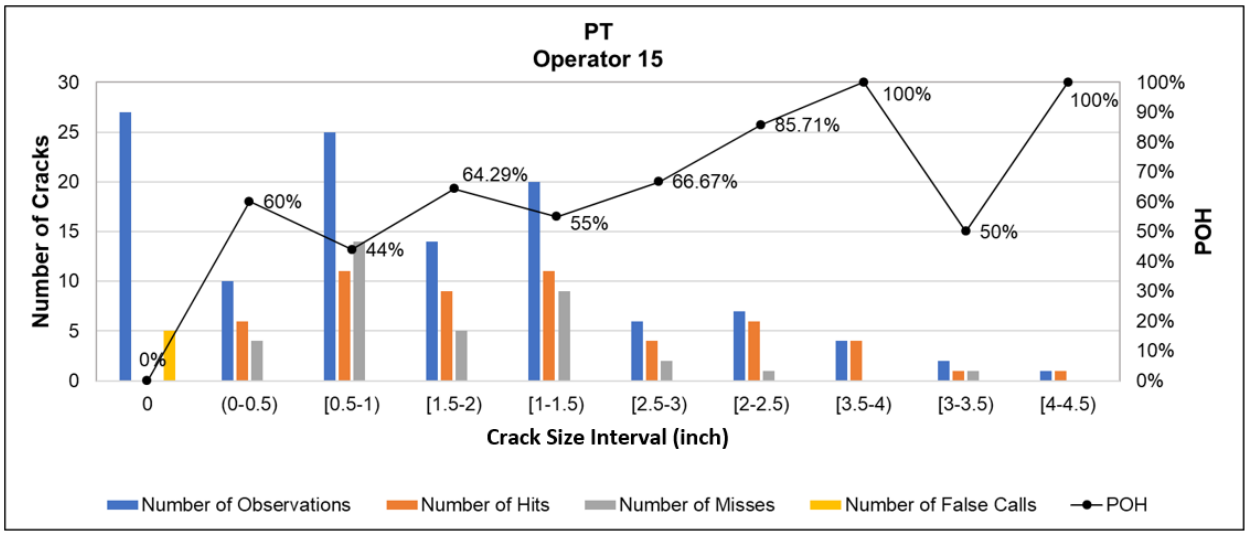

Figure 28. FW PT Distribution of Hits – Operator 15

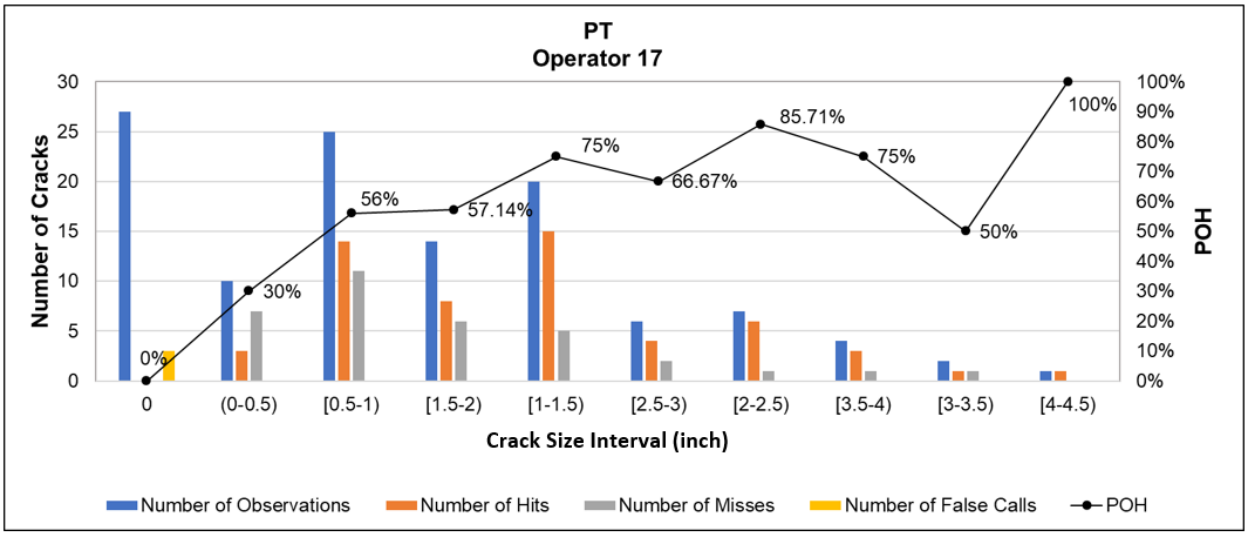

Figure 29. FW PT Distribution of Hits – Operator 17

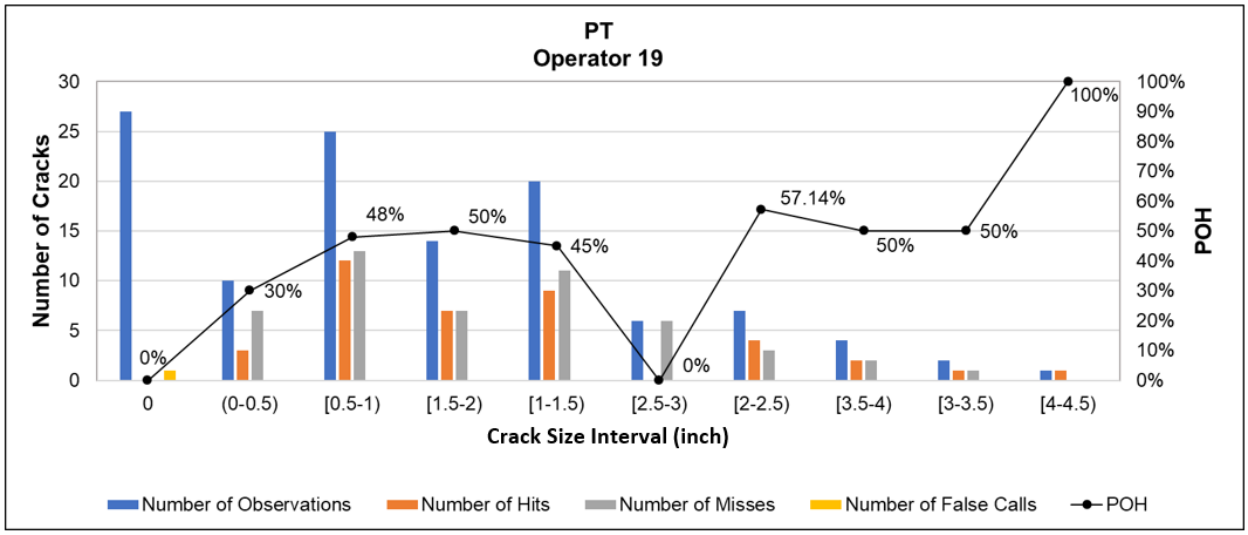

Figure 30. FW PT Distribution of Hits – Operator 19

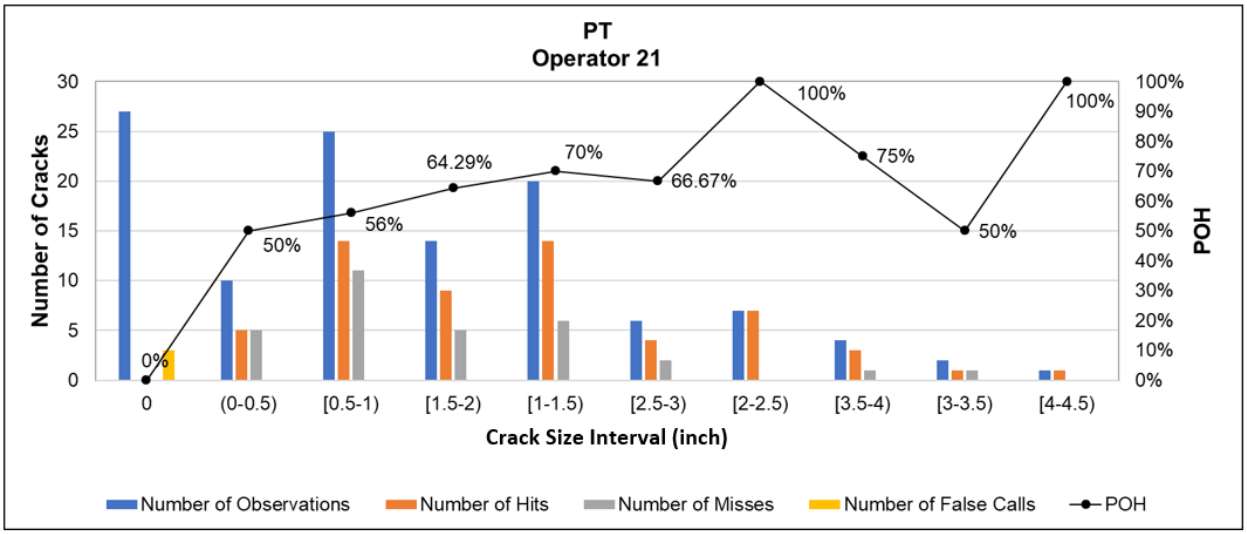

Figure 31. FW PT Distribution of Hits – Operator 21

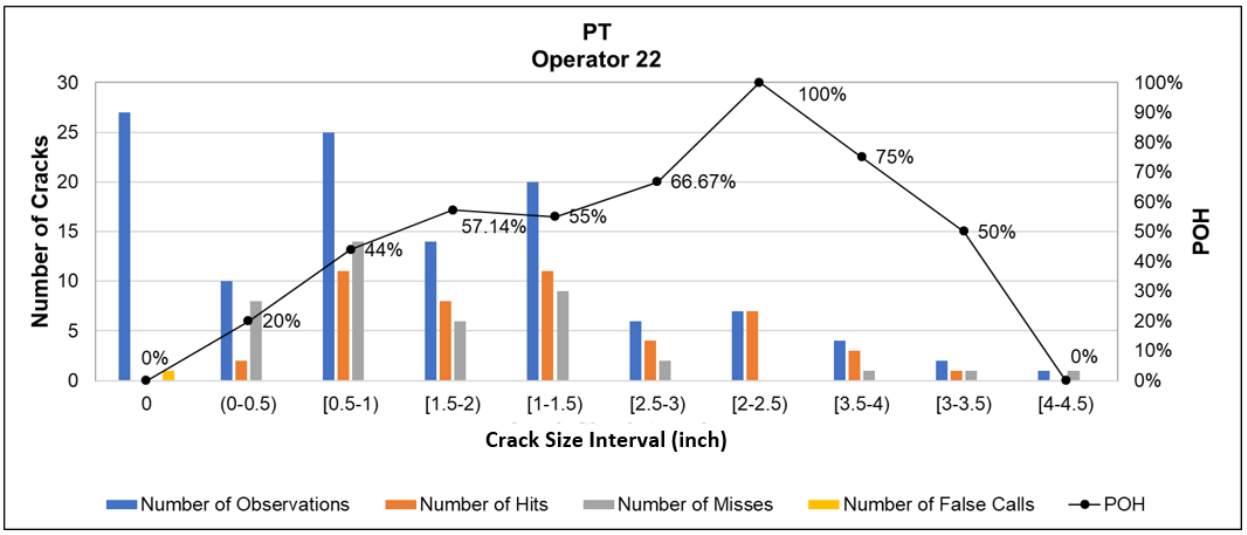

Figure 32. FW PT Distribution of Hits – Operator 22

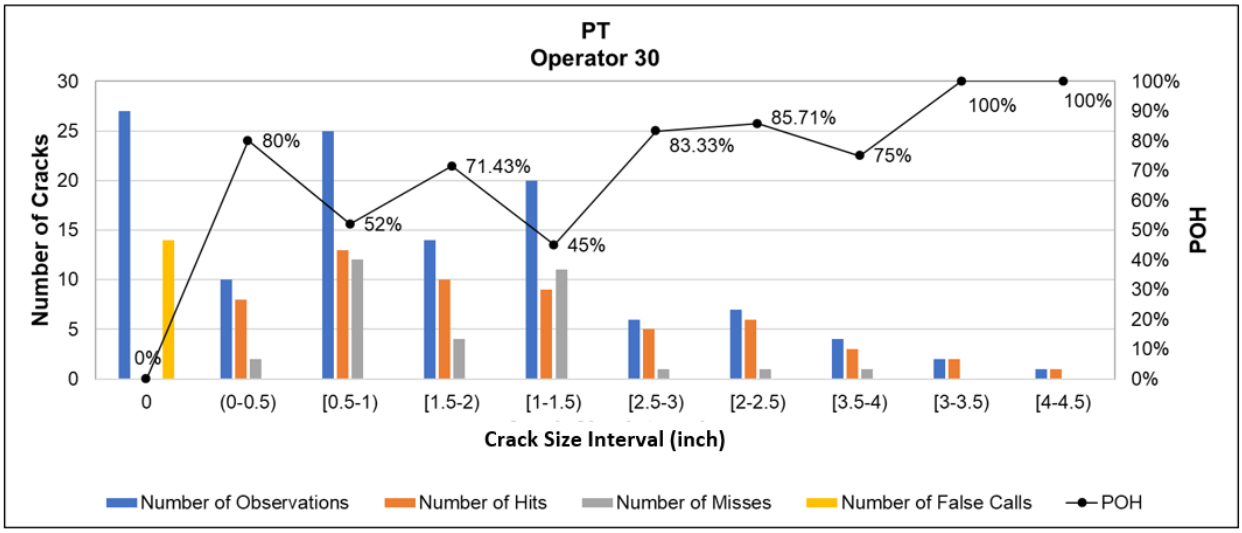

Figure 33. FW PT Distribution of Hits – Operator 30

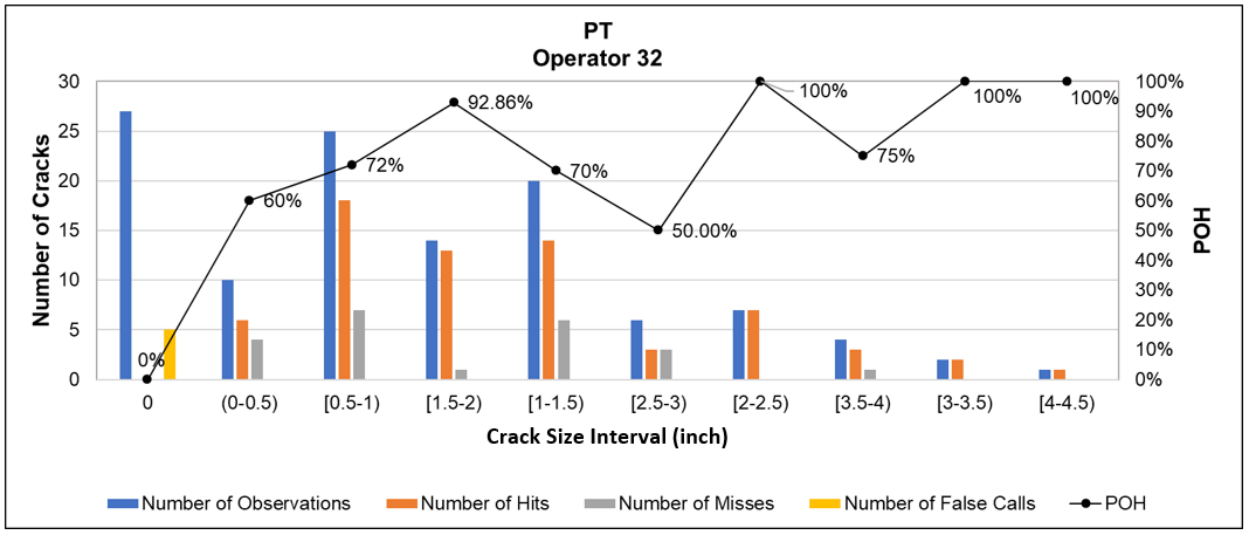

Figure 34. FW PT Distribution of Hits – Operator 32

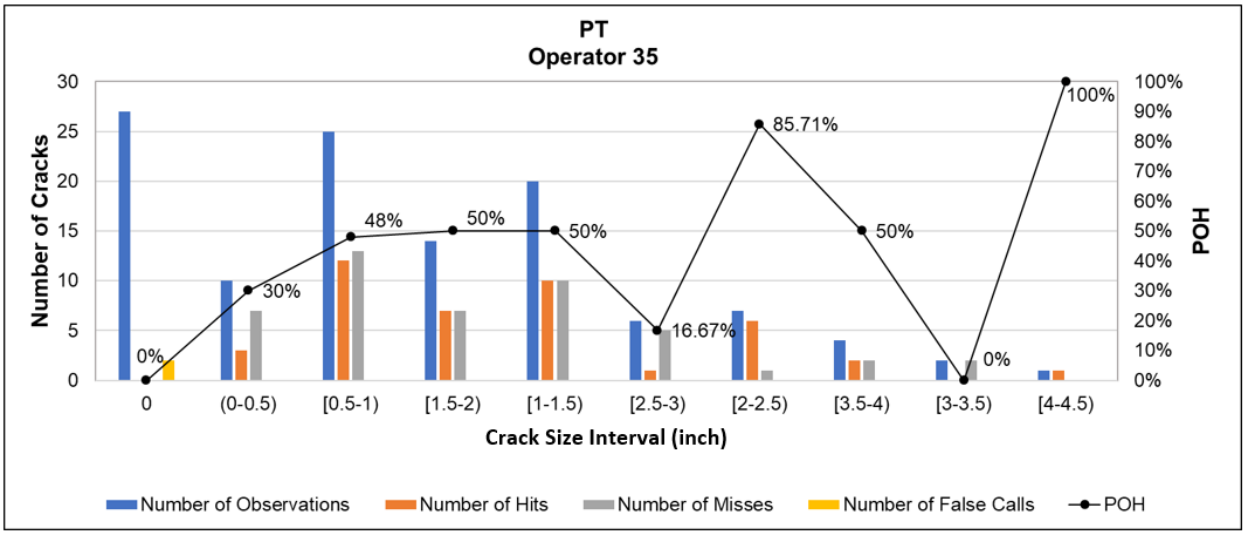

Figure 35. FW PT Distribution of Hits – Operator 35

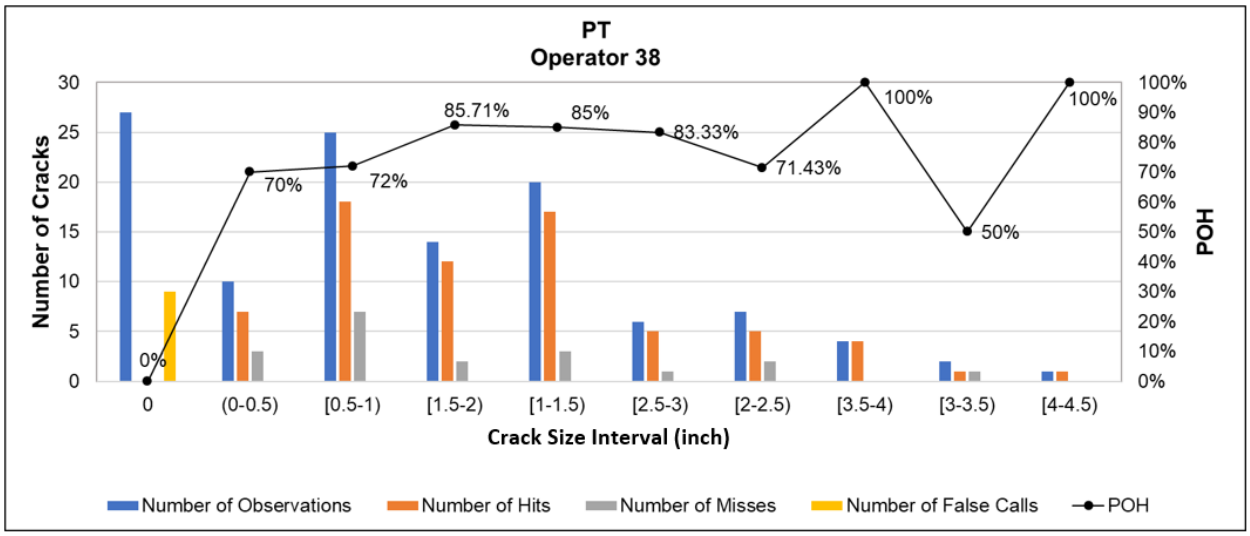

Figure 36. FW PT Distribution of Hits – Operator 38

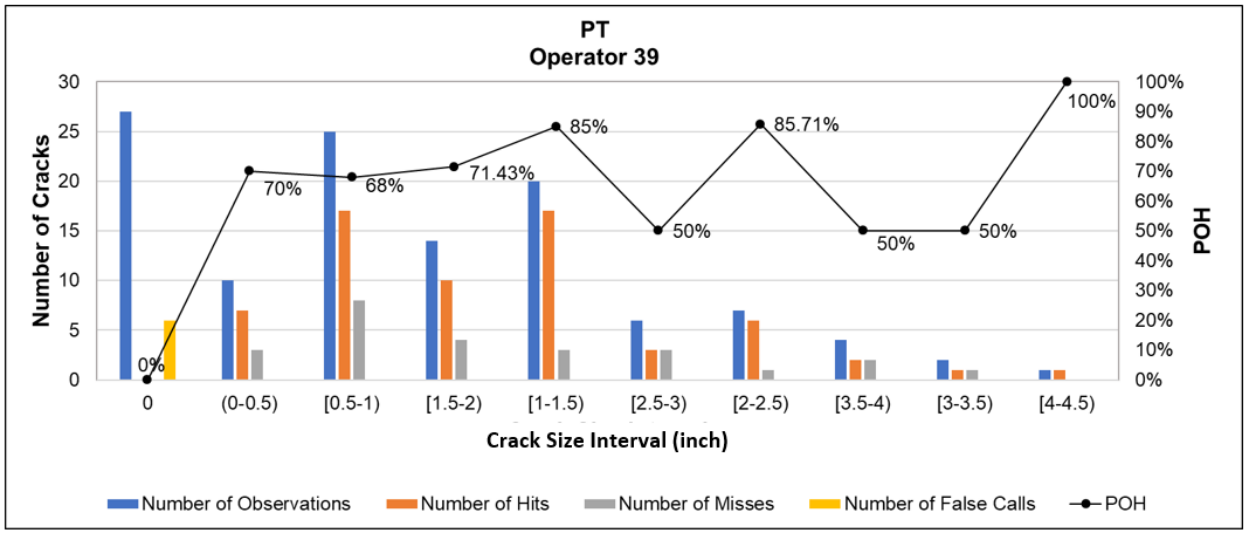

Figure 37. FW PT Distribution of Hits – Operator 39

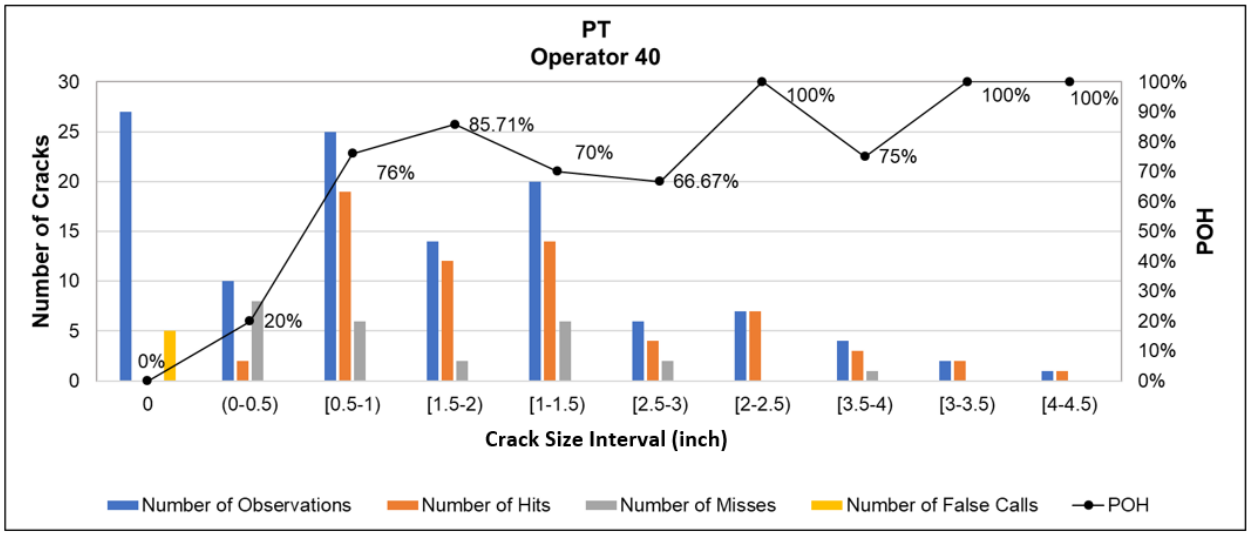

Figure 38. FW PT Distribution of Hits – Operator 40

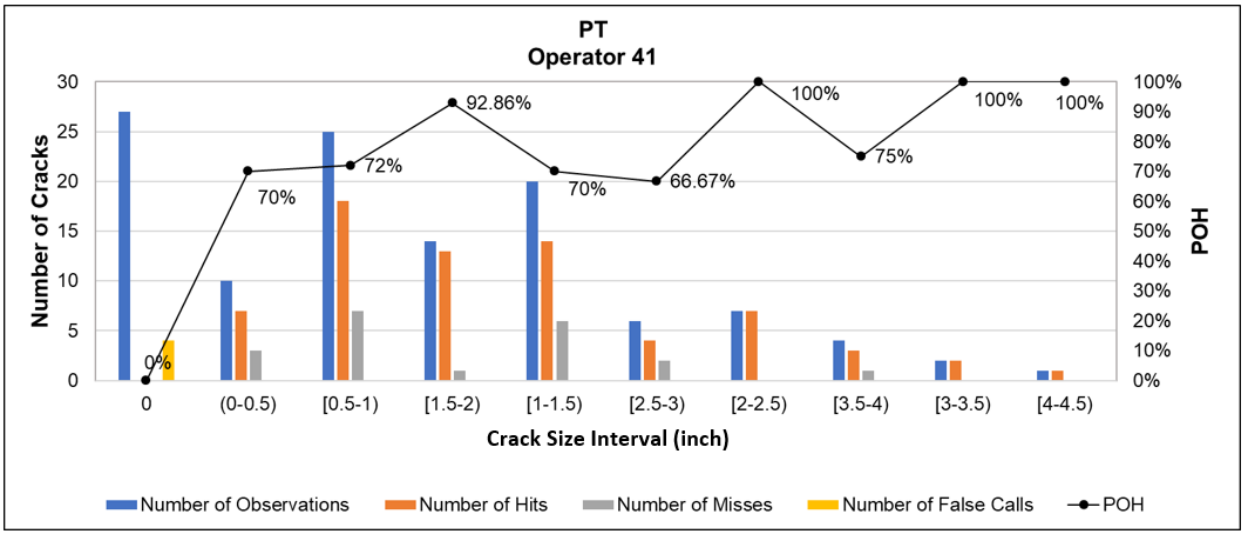

Figure 39. FW PT Distribution of Hits – Operator 41

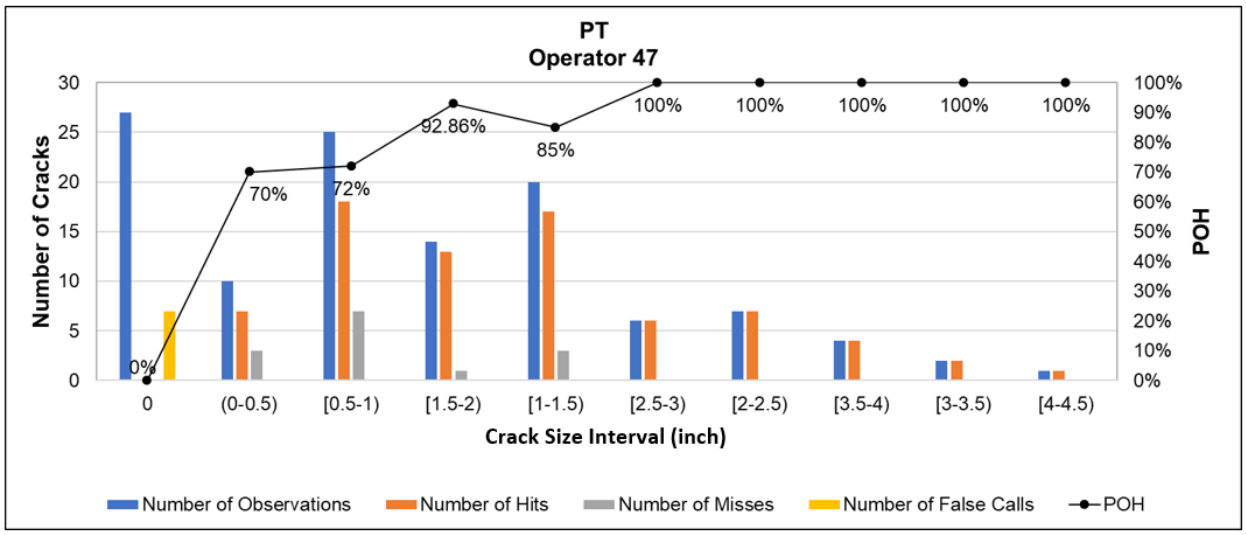

Figure 40. FW PT Distribution of Hits – Operator 47

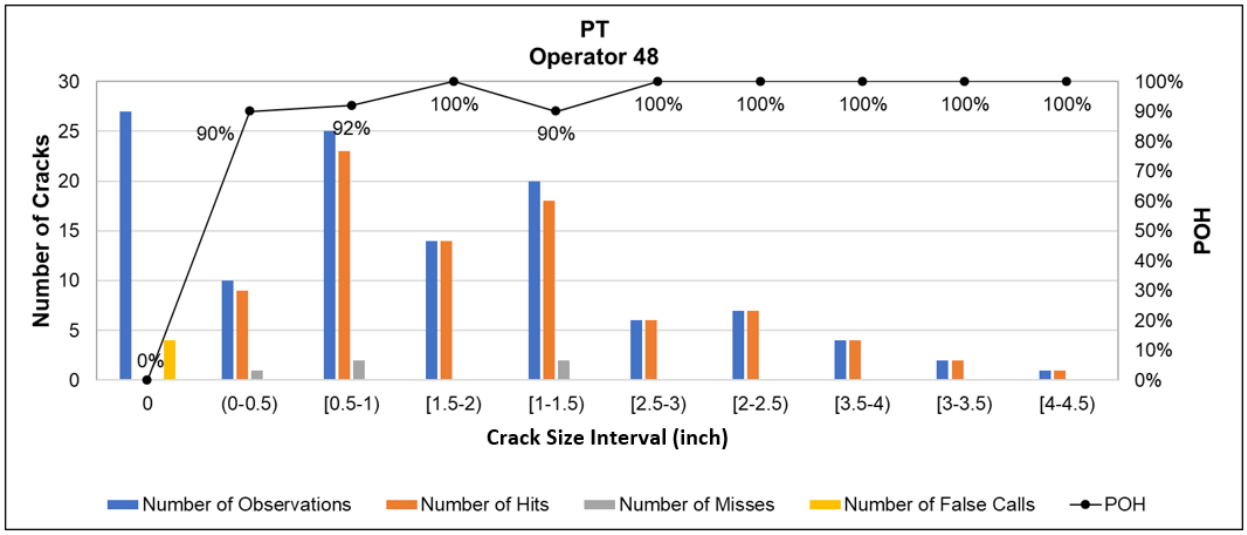

Figure 41. FW PT Distribution of Hits – Operator 48

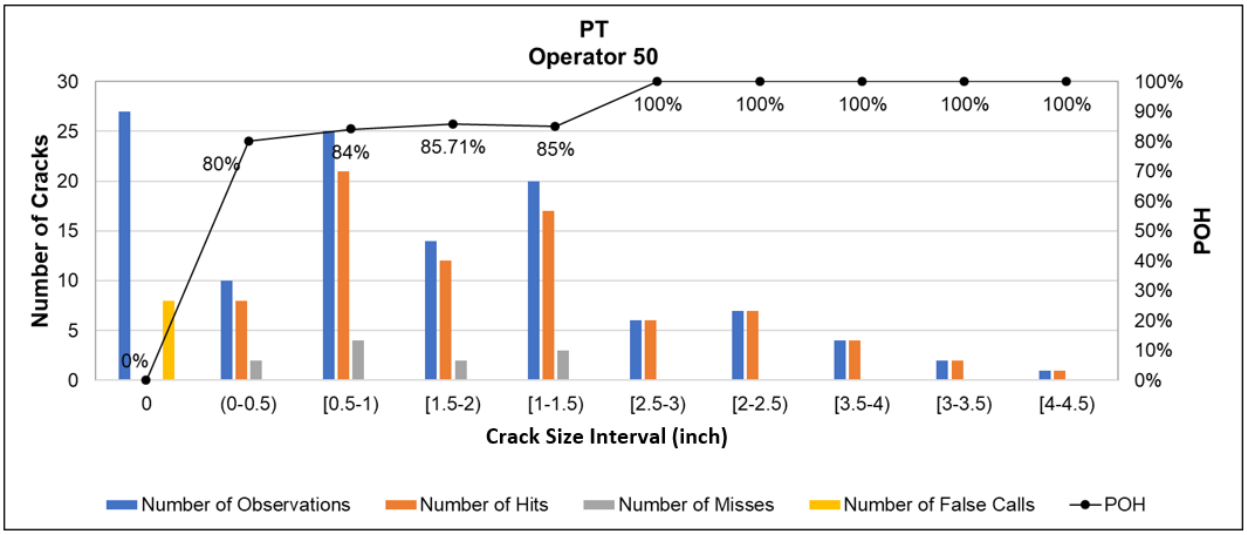

Figure 42. FW PT Distribution of Hits – Operator 50

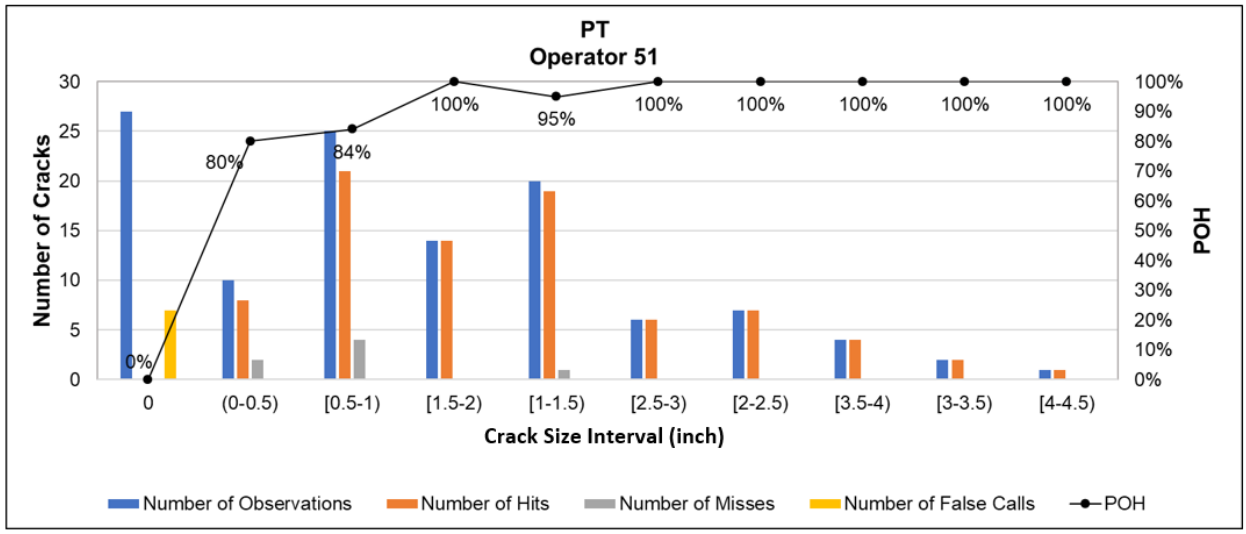

Figure 43. FW PT Distribution of Hits – Operator 51

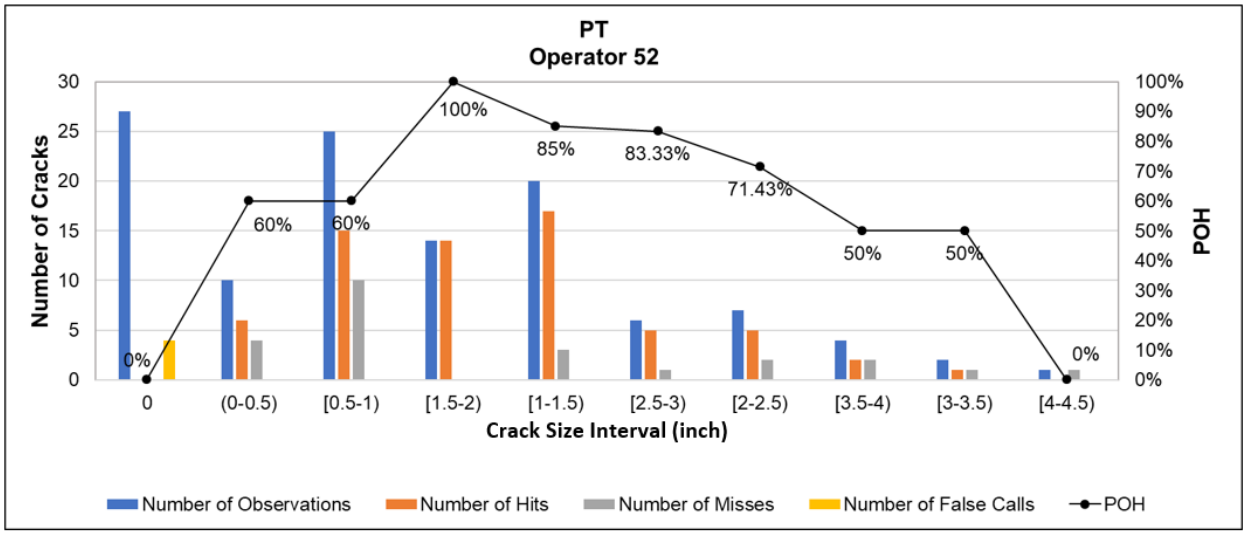

Figure 44. FW PT Distribution of Hits – Operator 52

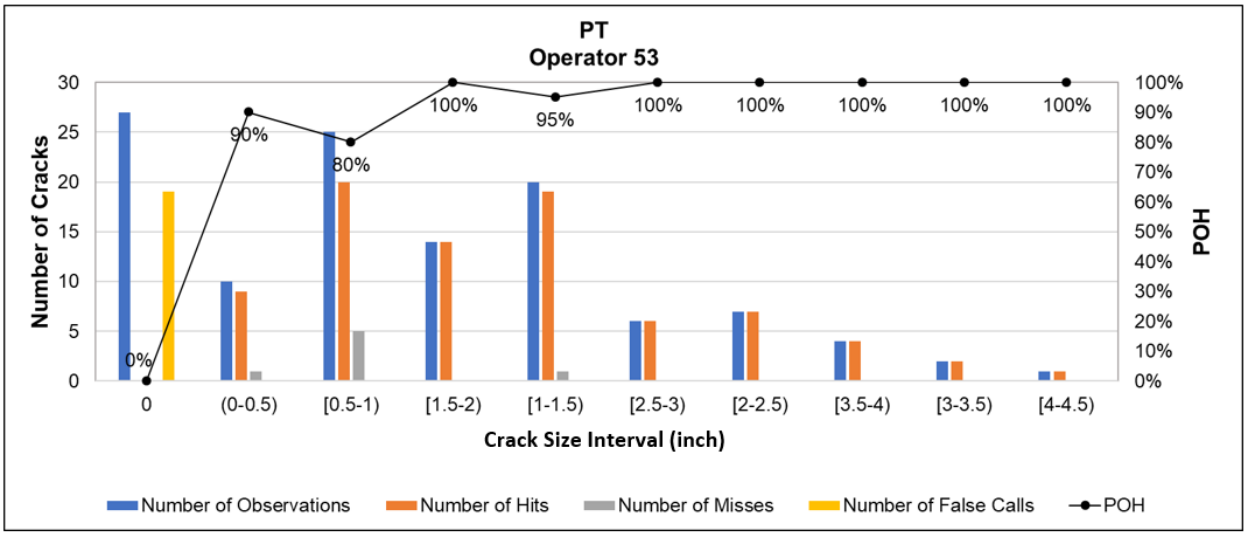

Figure 45. FW PT Distribution of Hits – Operator 53

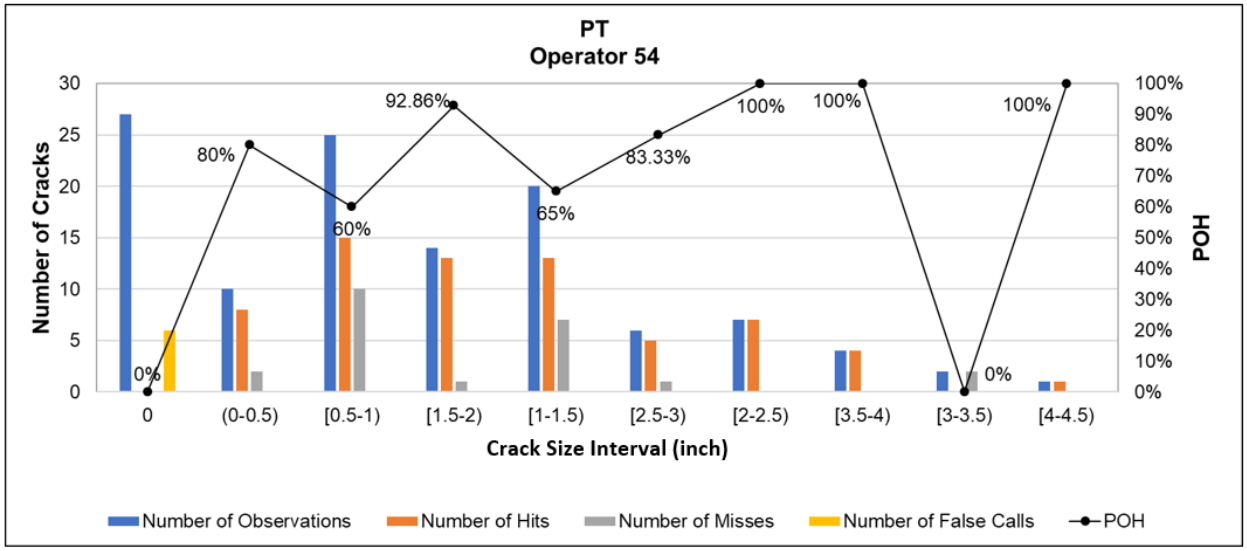

Figure 46. FW PT Distribution of Hits – Operator 54

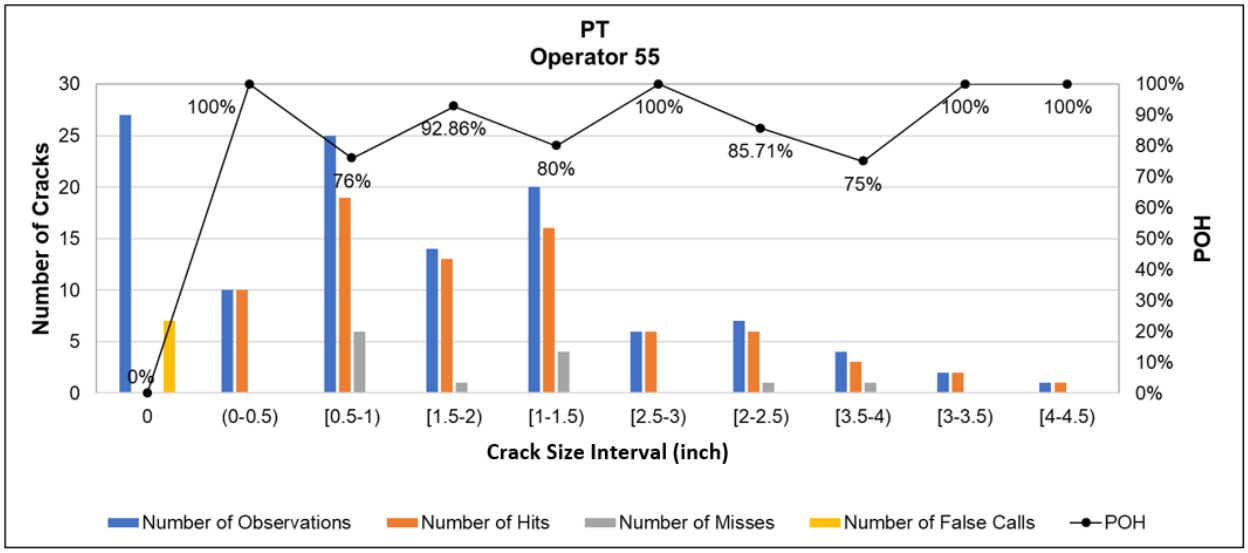

Figure 47. FW PT Distribution of Hits – Operator 55

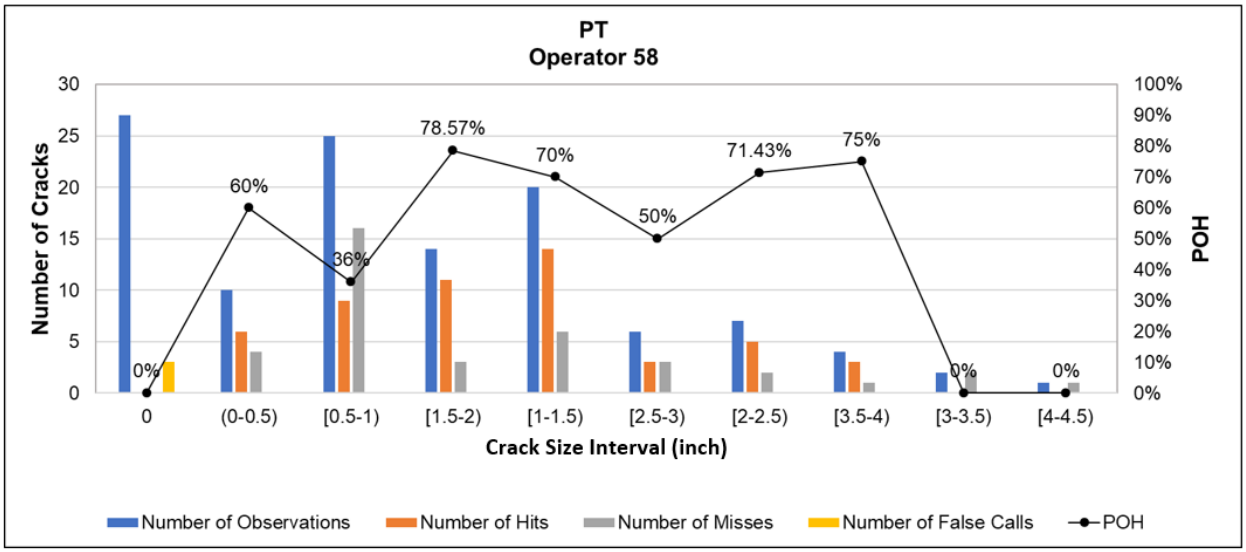

Figure 48. FW PT Distribution of Hits – Operator 58

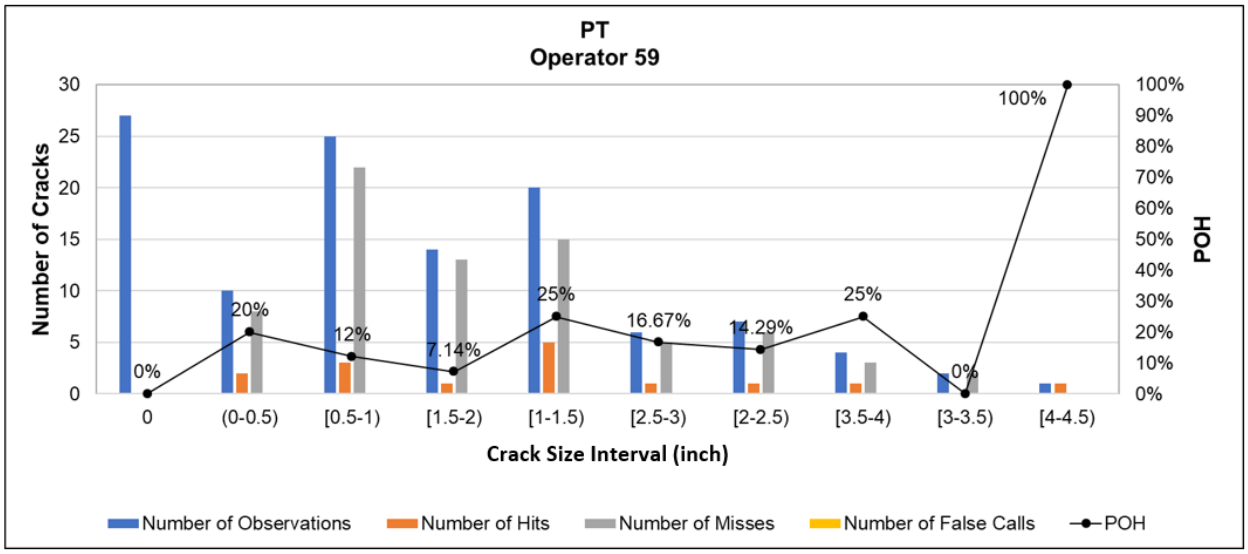

Figure 49. FW PT Distribution of Hits – Operator 59

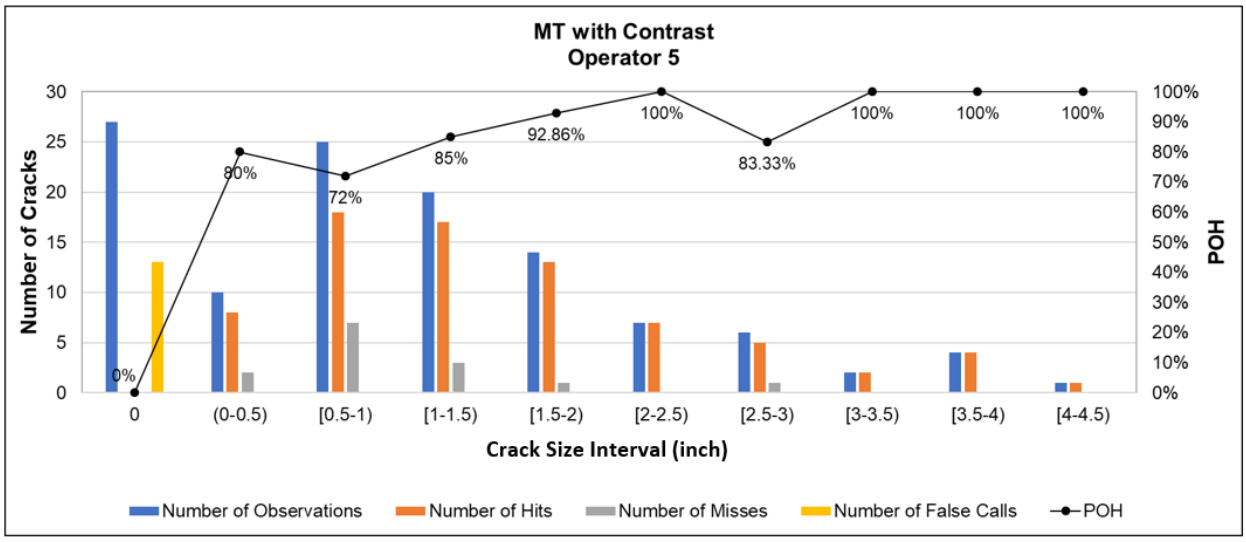

Figure 50. FW MT with Contrast Distribution of Hits – Operator 5

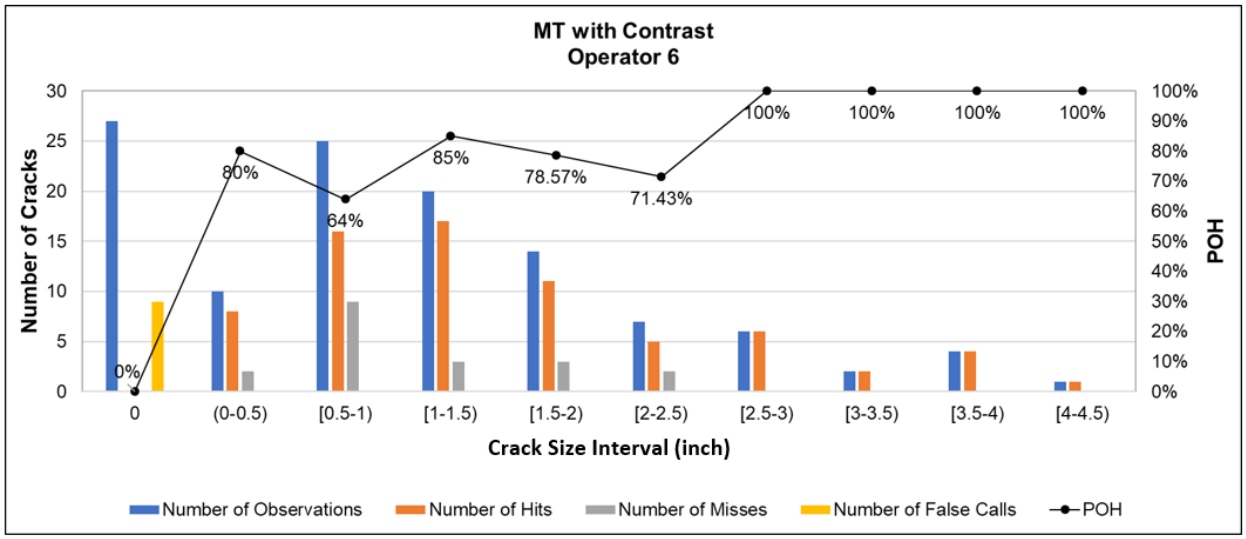

Figure 51. FW MT with Contrast Distribution of Hits – Operator 6

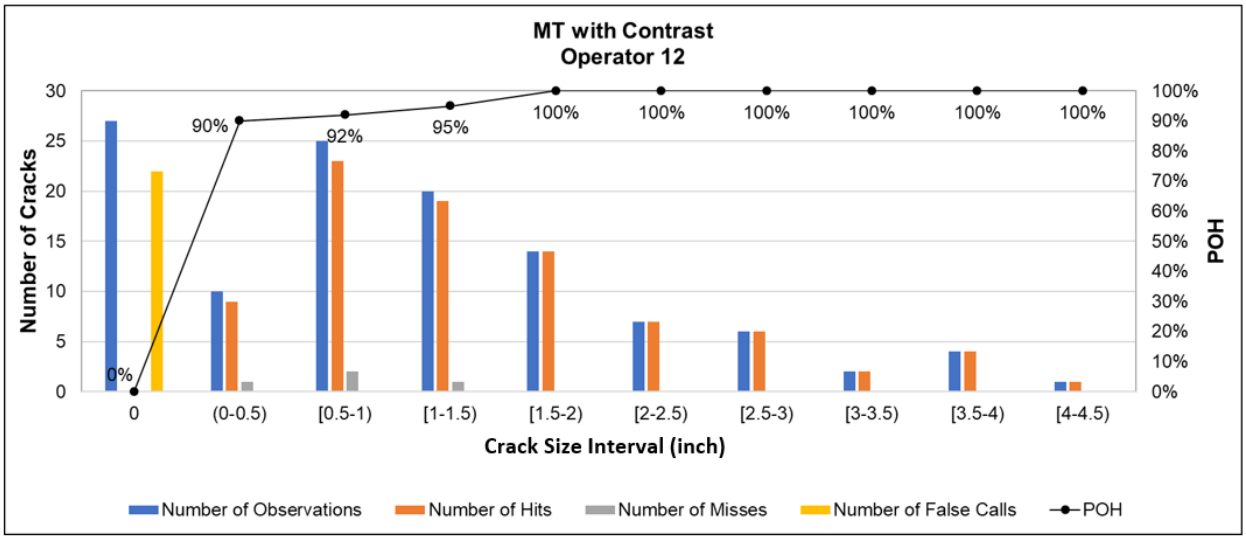

Figure 52. FW MT with Contrast Distribution of Hits – Operator 12

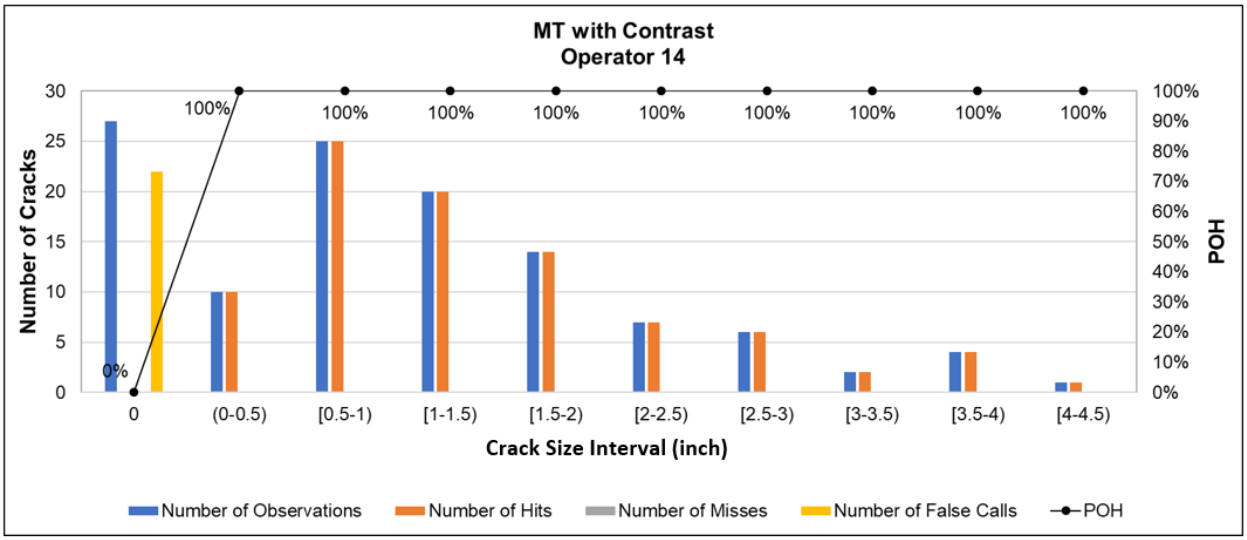

Figure 53. FW MT with Contrast Distribution of Hits – Operator 14

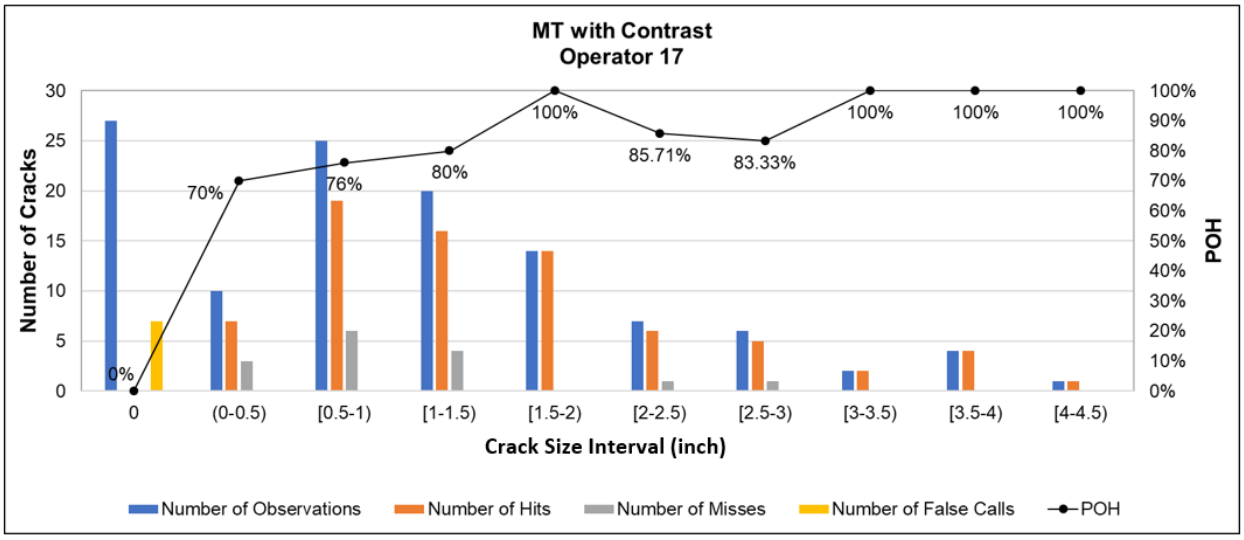

Figure 54. FW MT with Contrast Distribution of Hits – Operator 17

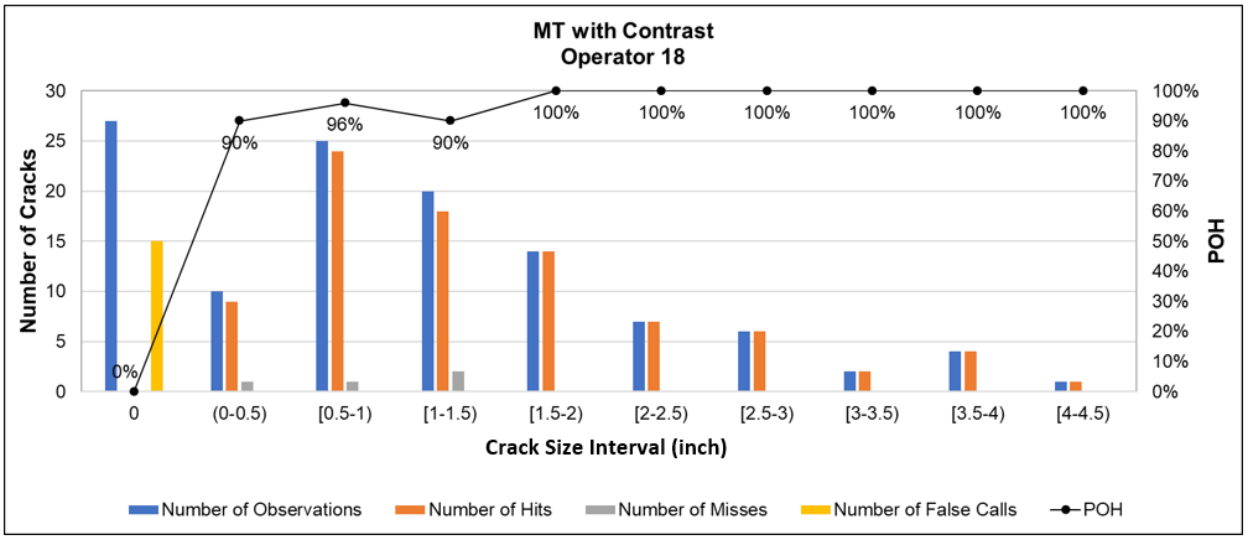

Figure 55. FW MT with Contrast Distribution of Hits – Operator 18

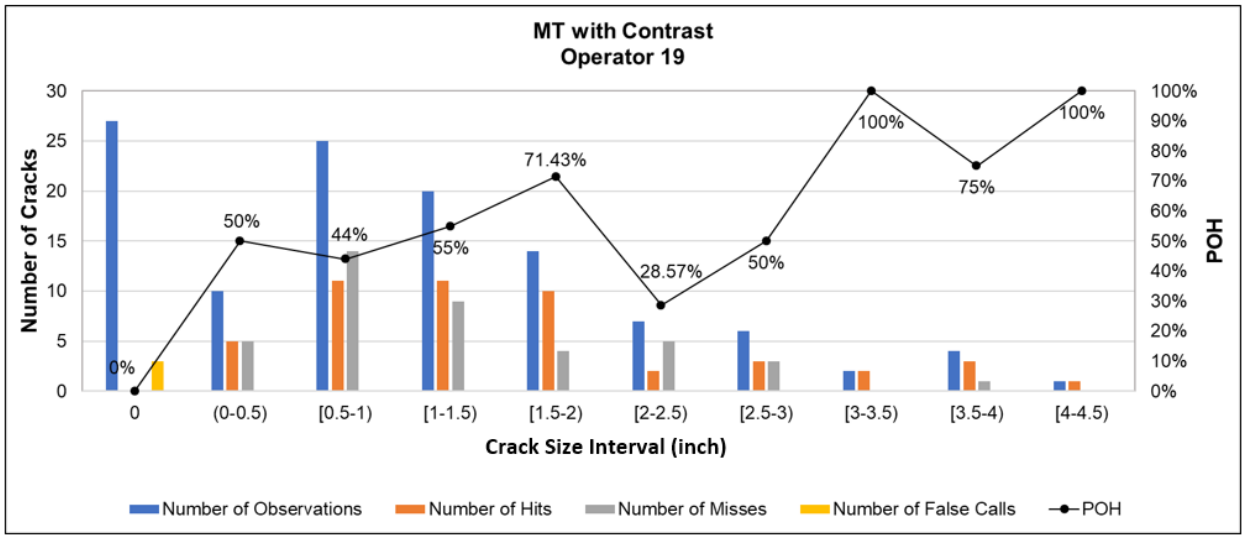

Figure 56. FW MT with Contrast Distribution of Hits – Operator 19

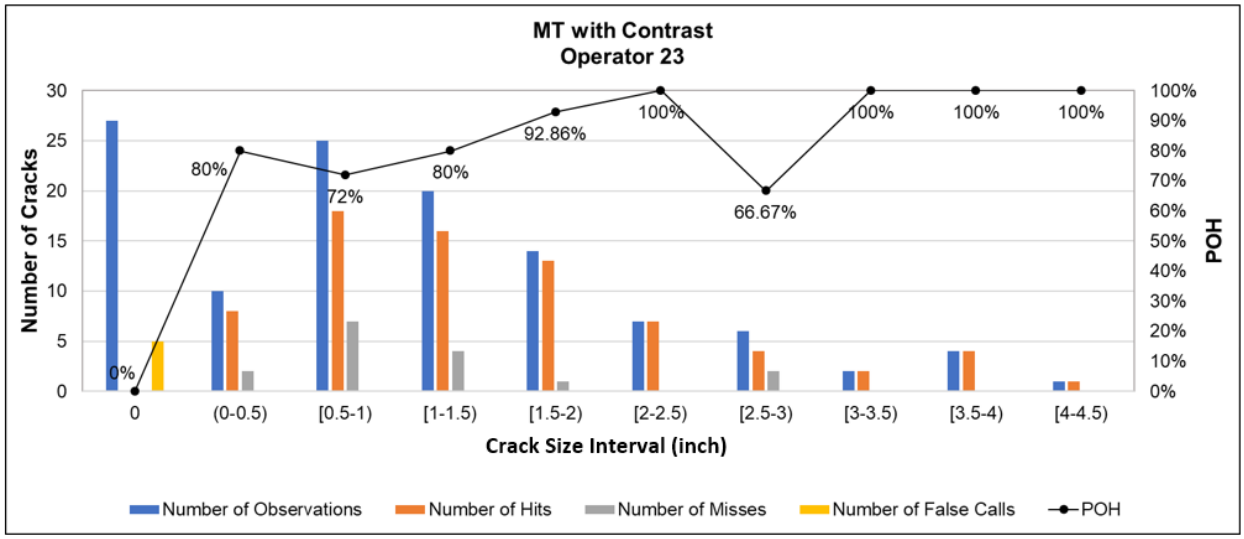

Figure 57. FW MT with Contrast Distribution of Hits – Operator 23

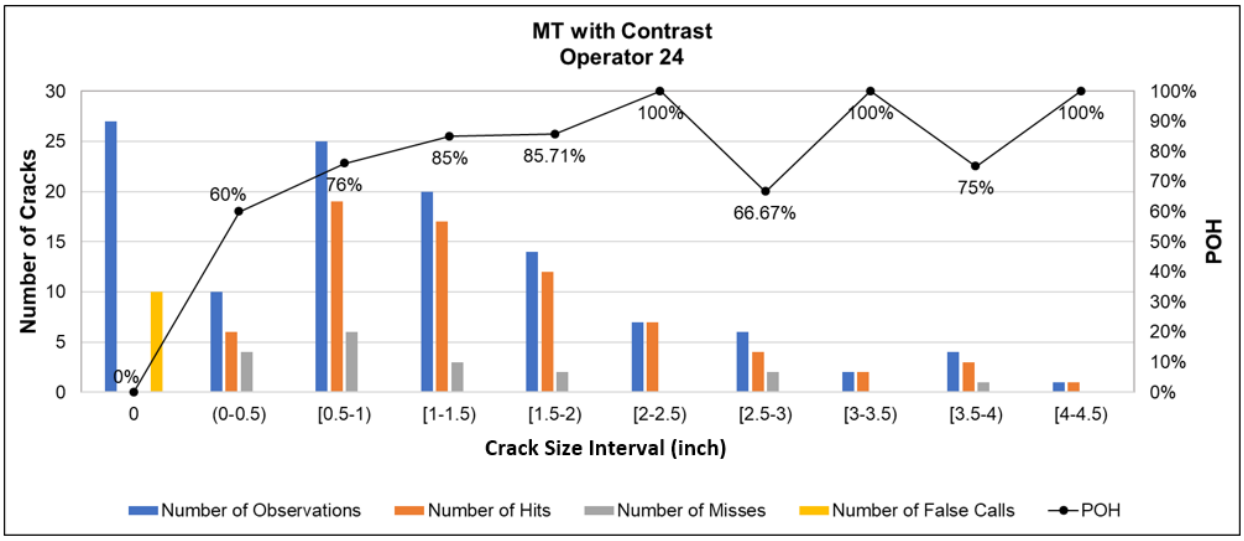

Figure 58. FW MT with Contrast Distribution of Hits – Operator 24

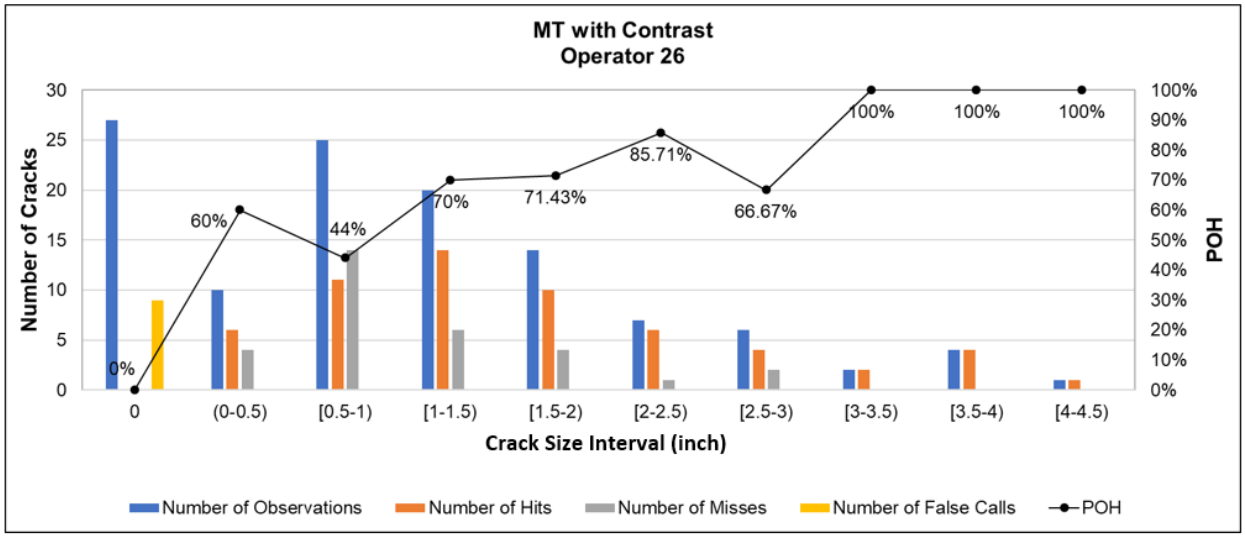

Figure 59. FW MT with Contrast Distribution of Hits – Operator 26

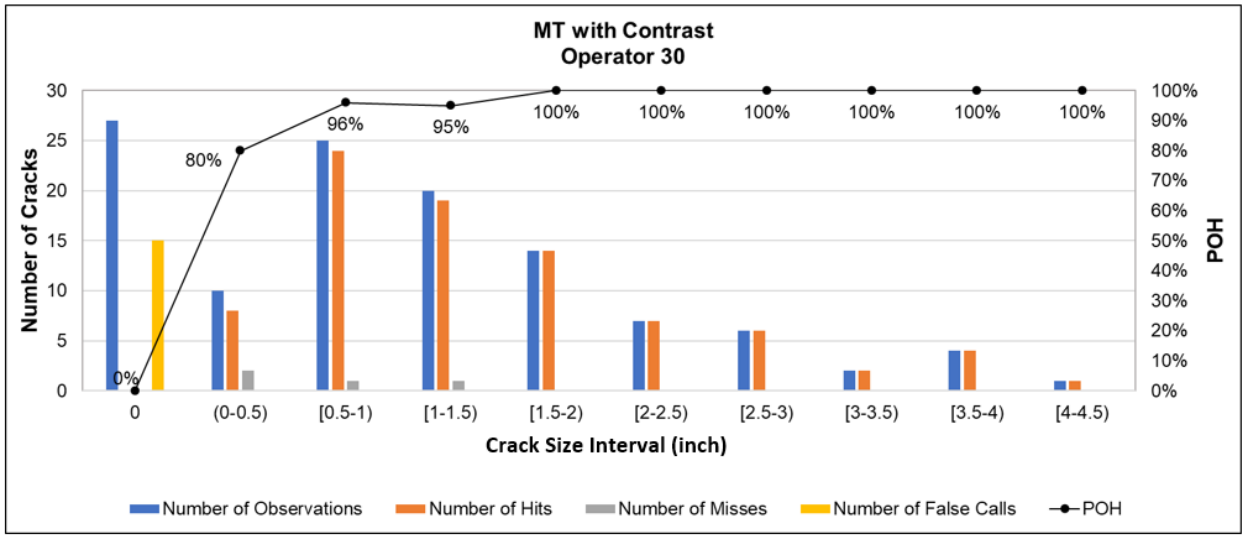

Figure 60. FW MT with Contrast Distribution of Hits – Operator 30

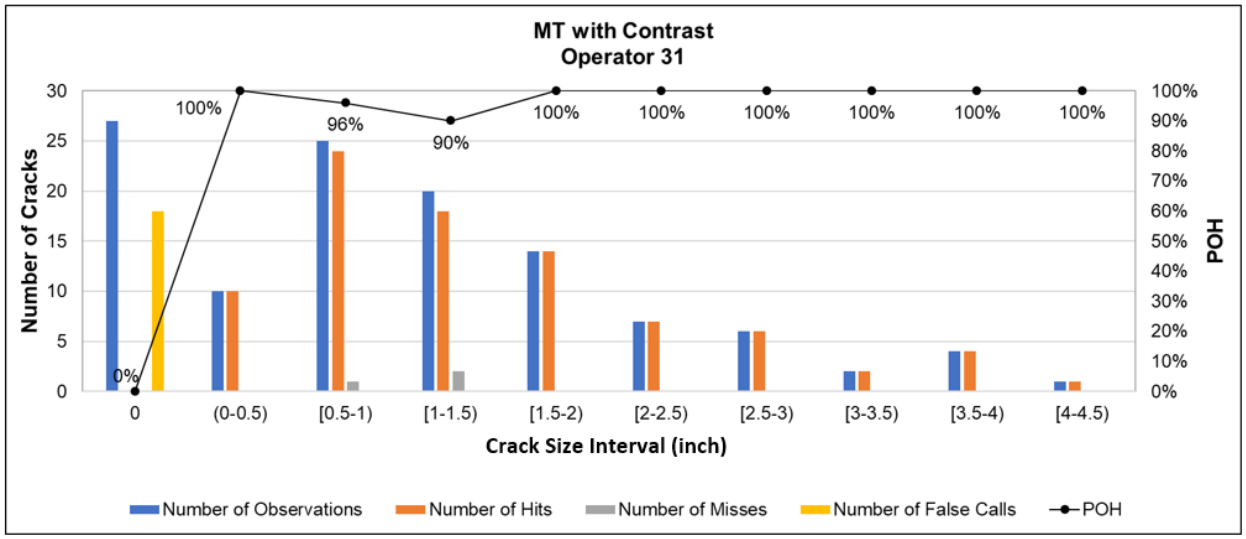

Figure 61. FW MT with Contrast Distribution of Hits – Operator 31

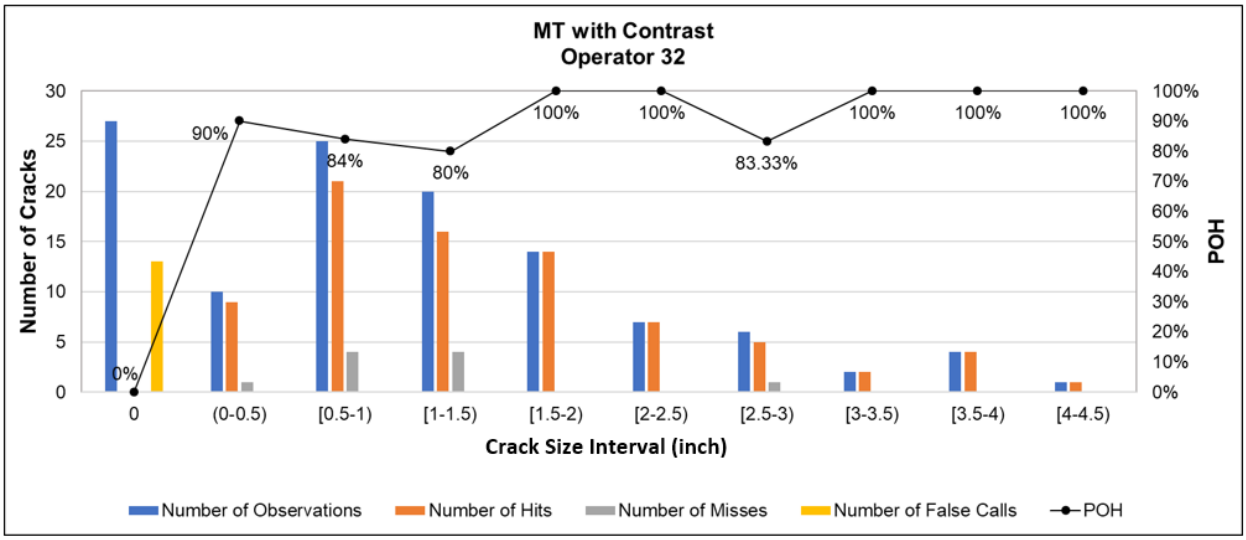

Figure 62. FW MT with Contrast Distribution of Hits – Operator 32

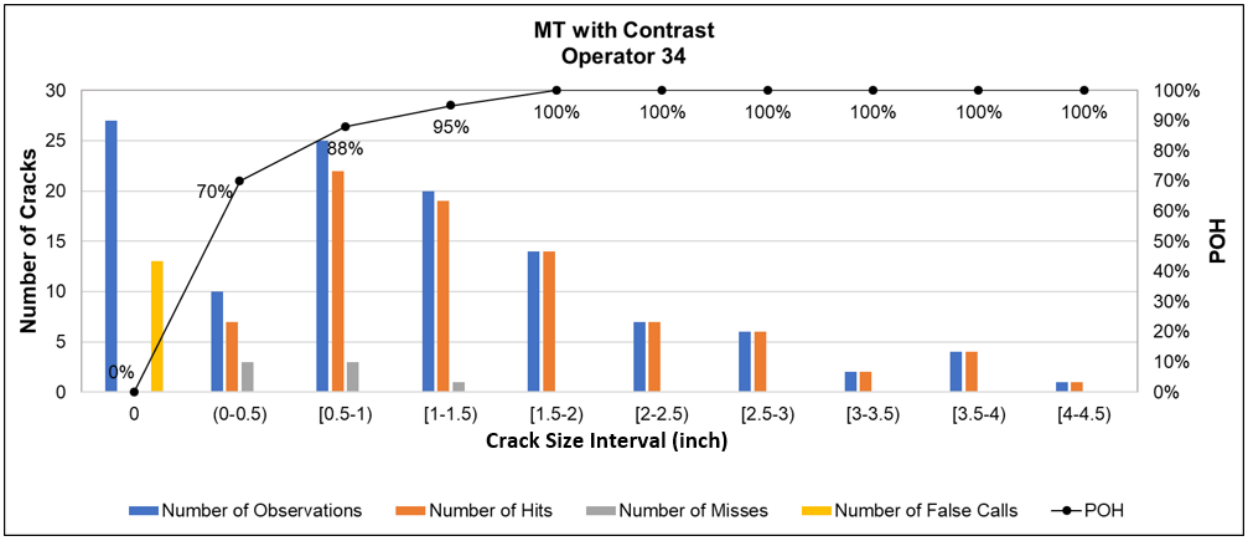

Figure 63. FW MT with Contrast Distribution of Hits – Operator 34

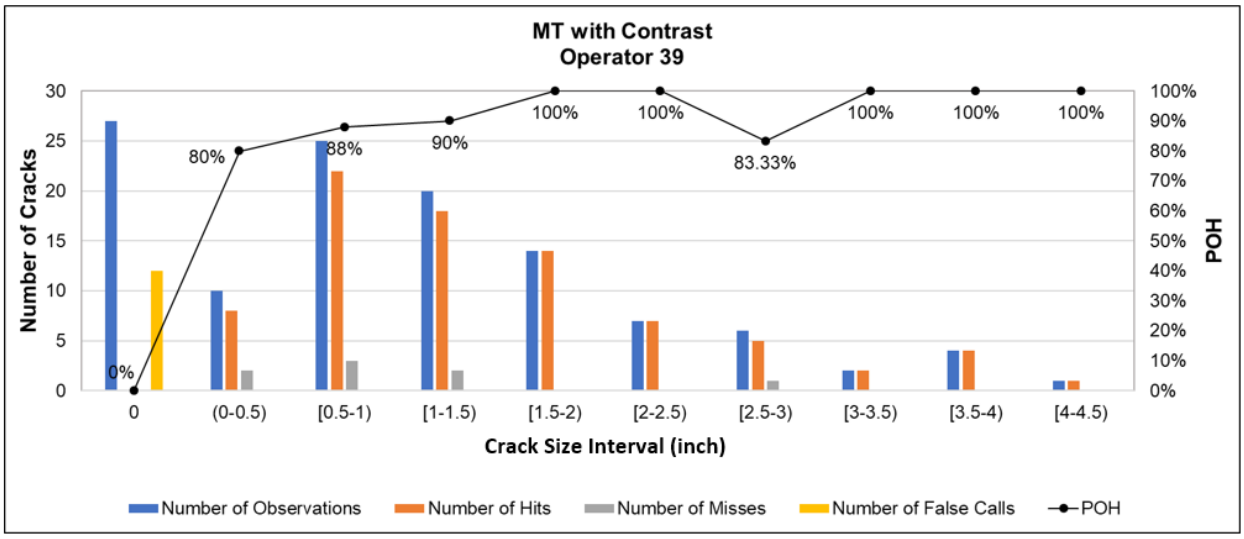

Figure 64. FW MT with Contrast Distribution of Hits – Operator 39

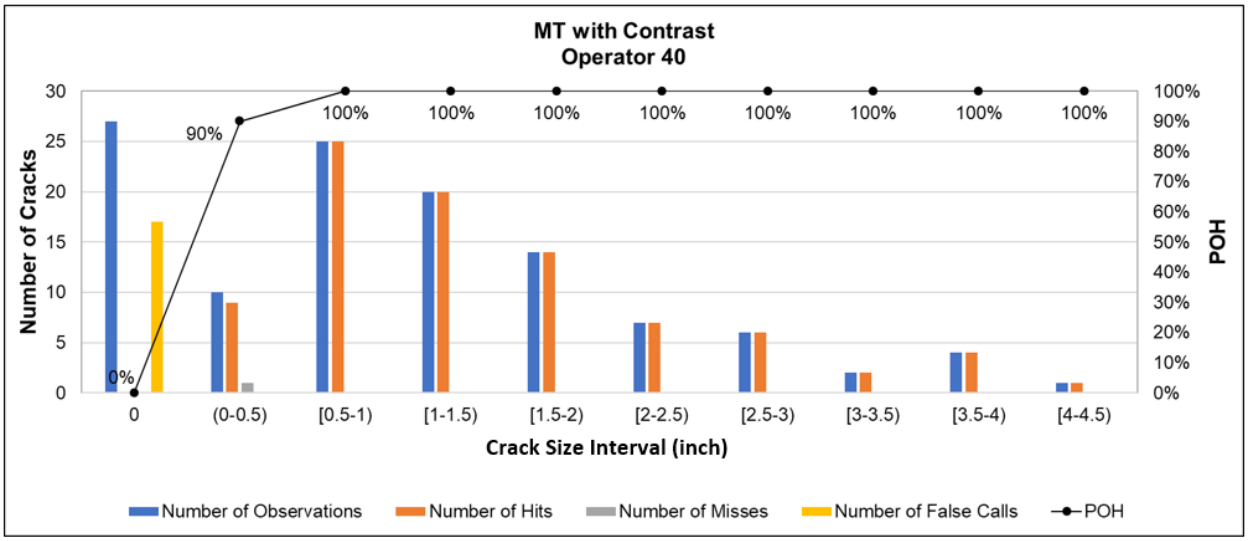

Figure 65. FW MT with Contrast Distribution of Hits – Operator 40

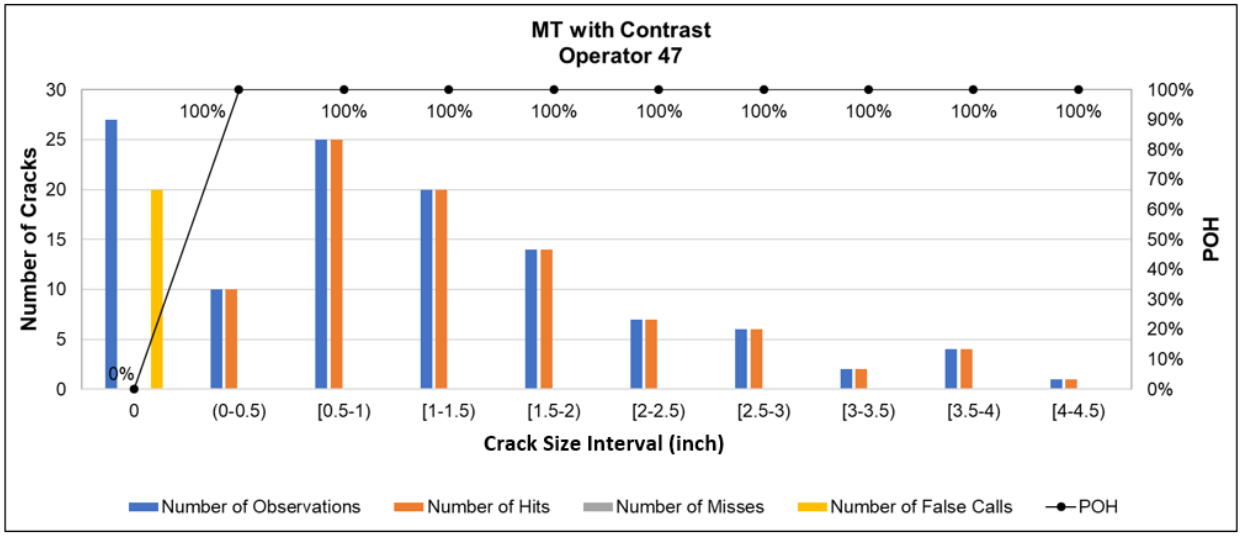

Figure 66. FW MT with Contrast Distribution of Hits – Operator 47

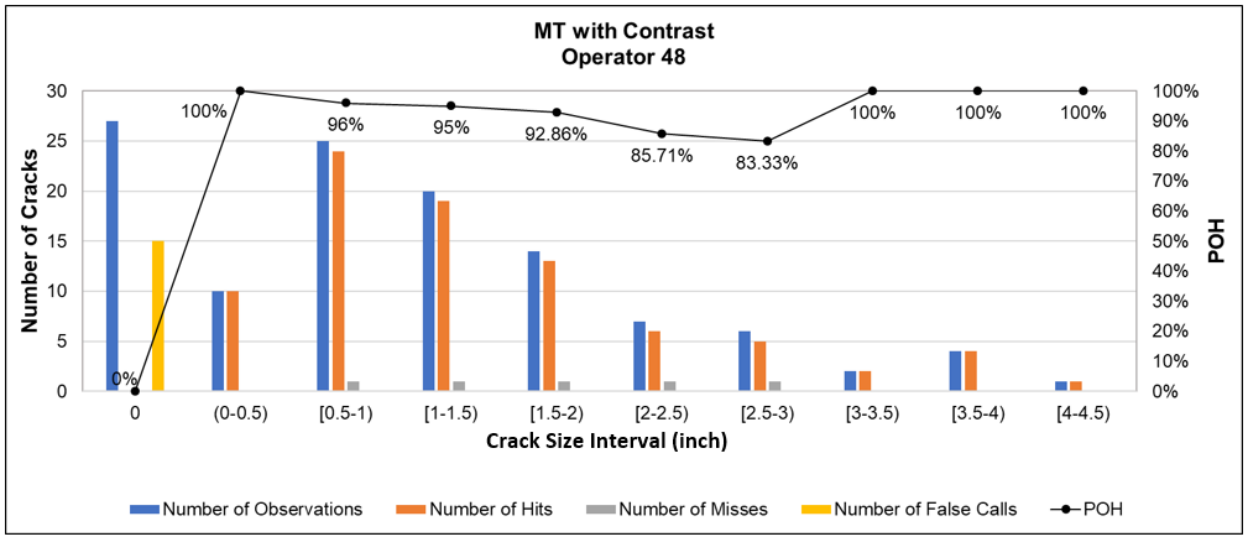

Figure 67. FW MT with Contrast Distribution of Hits – Operator 48

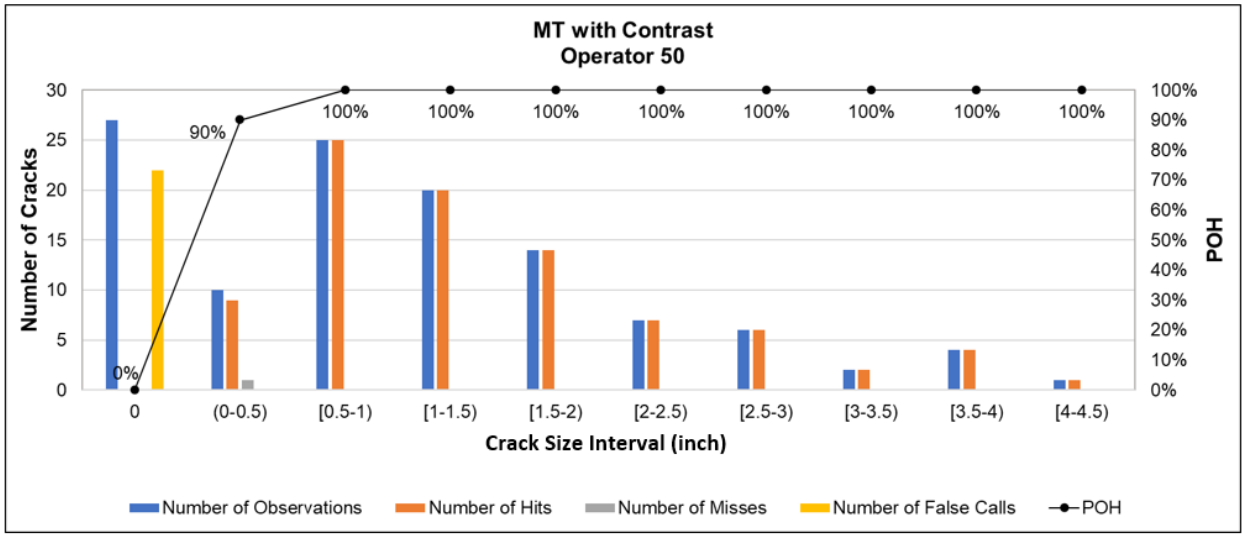

Figure 68. FW MT with Contrast Distribution of Hits – Operator 50

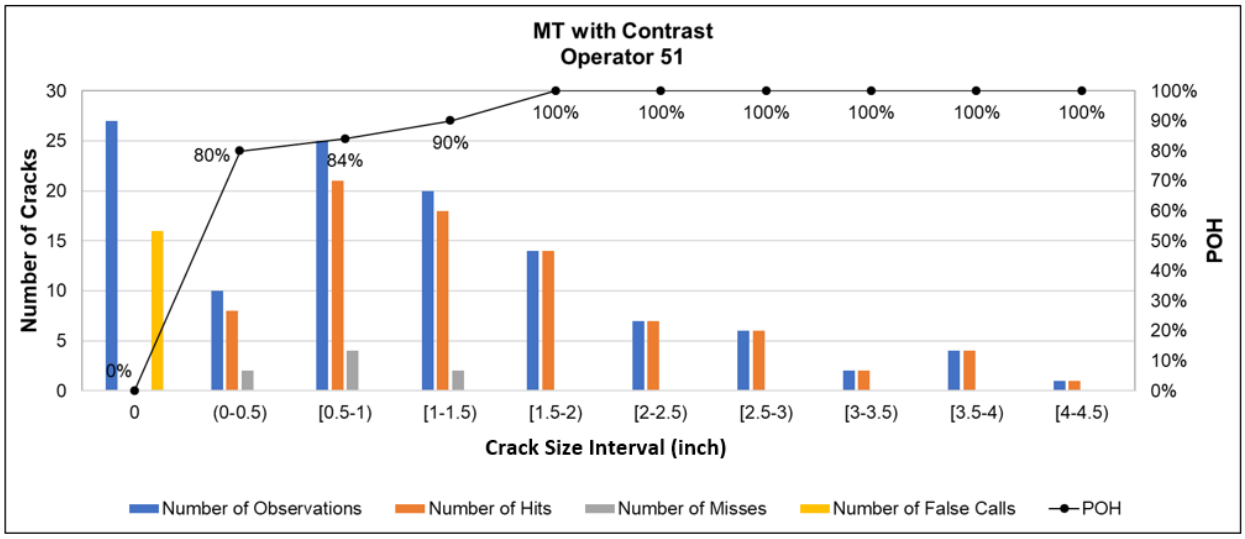

Figure 69. FW MT with Contrast Distribution of Hits – Operator 51

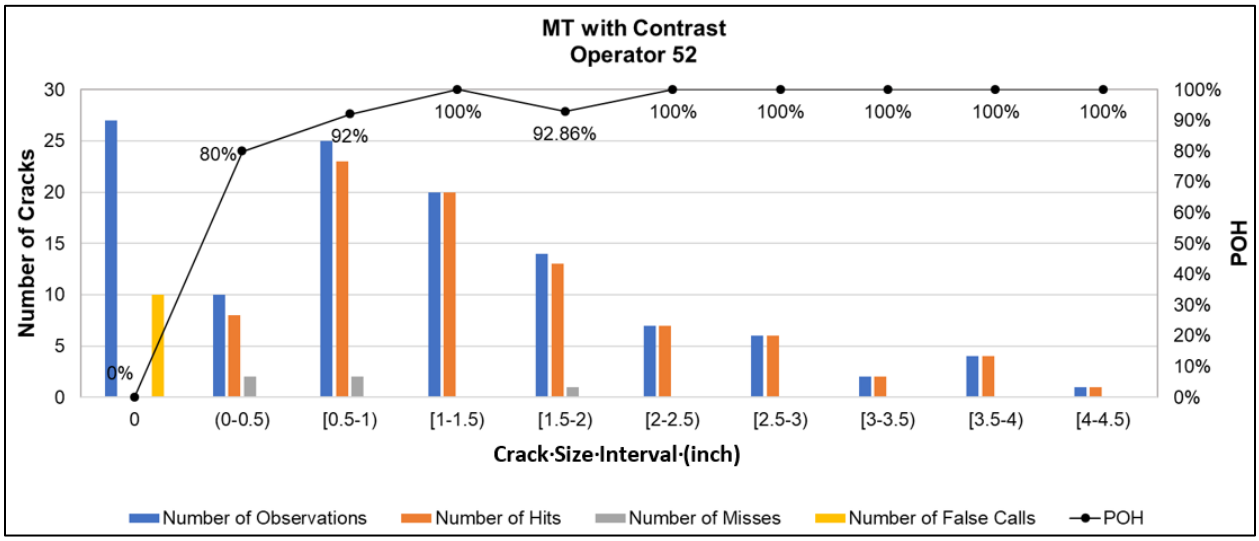

Figure 70. FW MT with Contrast Distribution of Hits – Operator 52

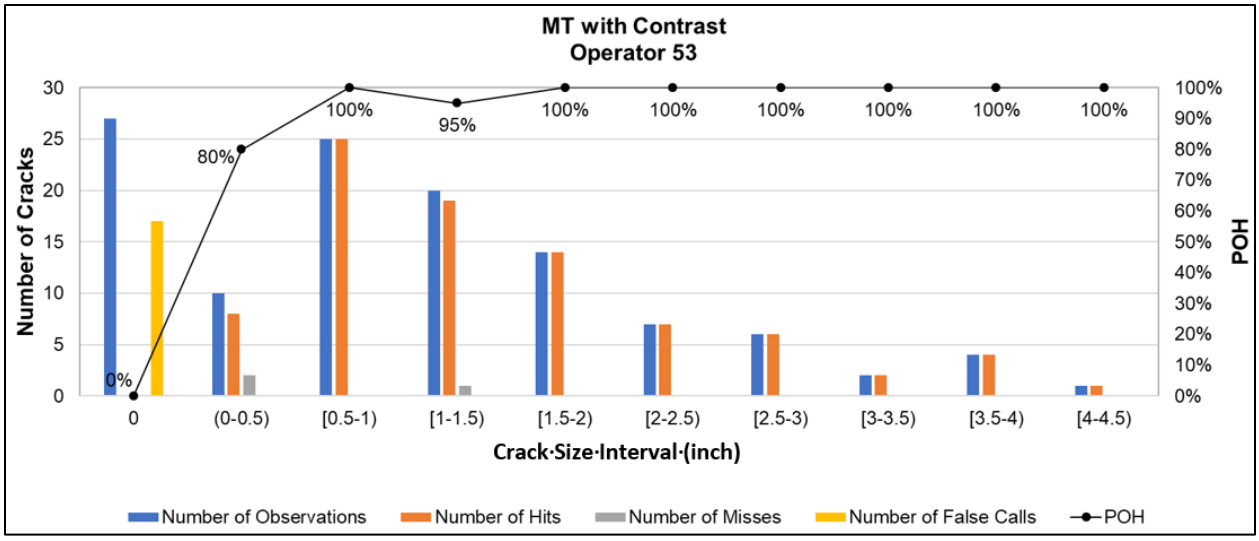

Figure 71. FW MT with Contrast Distribution of Hits – Operator 53

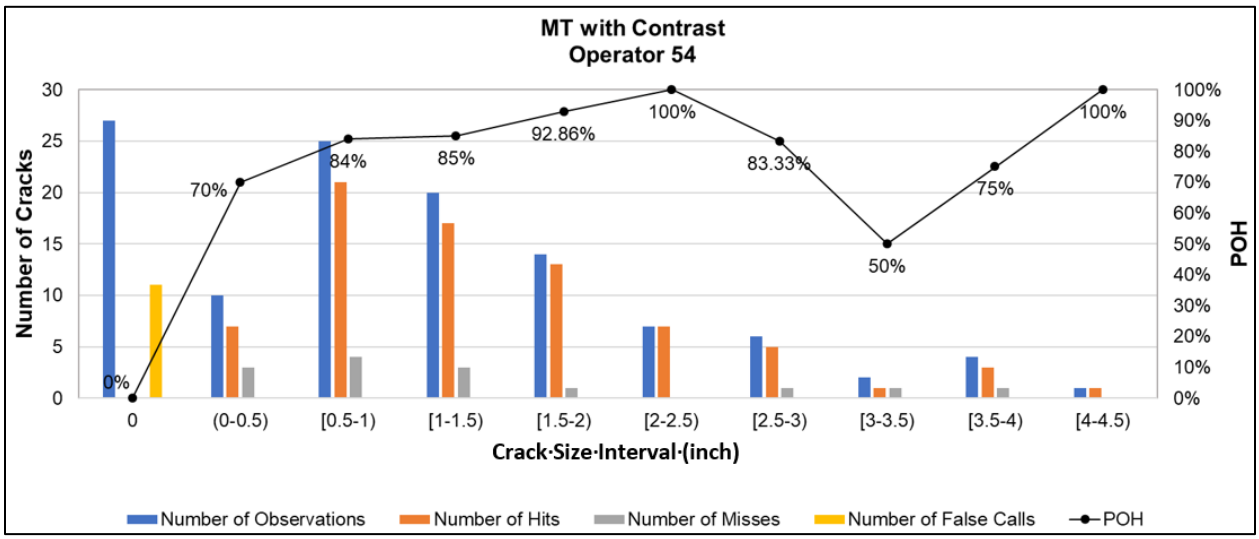

Figure 72. FW MT with Contrast Distribution of Hits – Operator 54

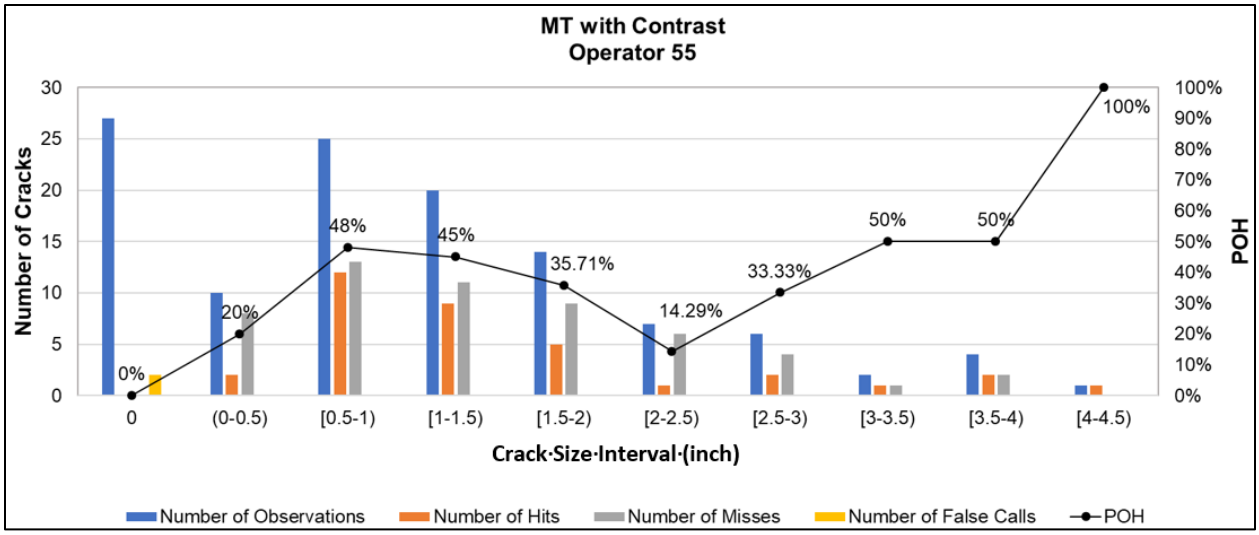

Figure 73. FW MT with Contrast Distribution of Hits – Operator 55

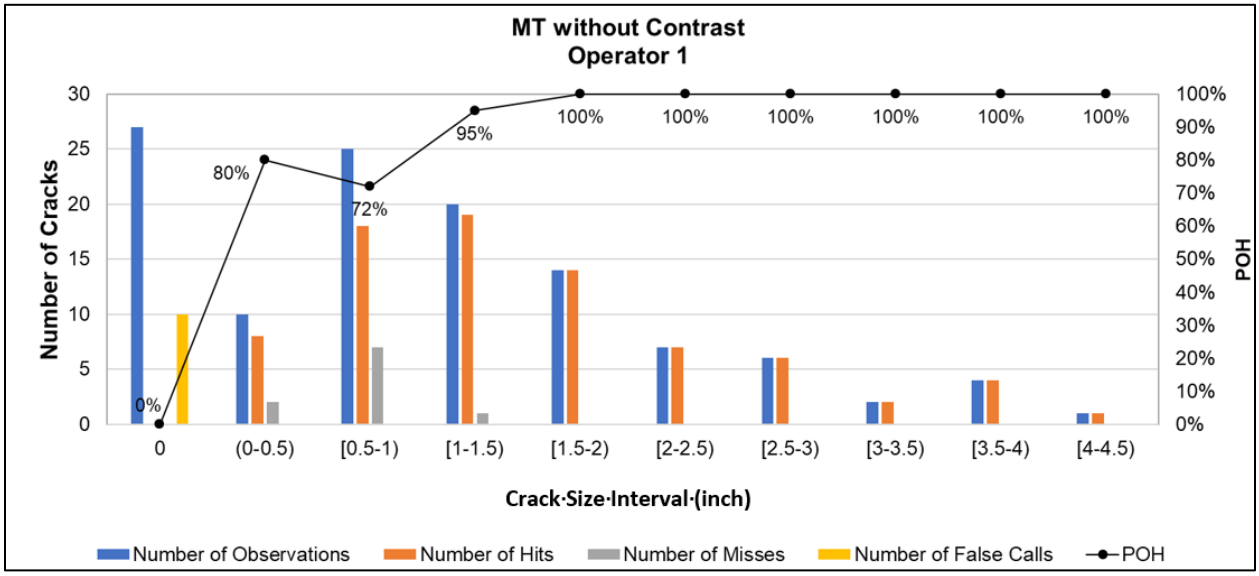

Figure 74. FW MT without Contrast Distribution of Hits – Operator 1

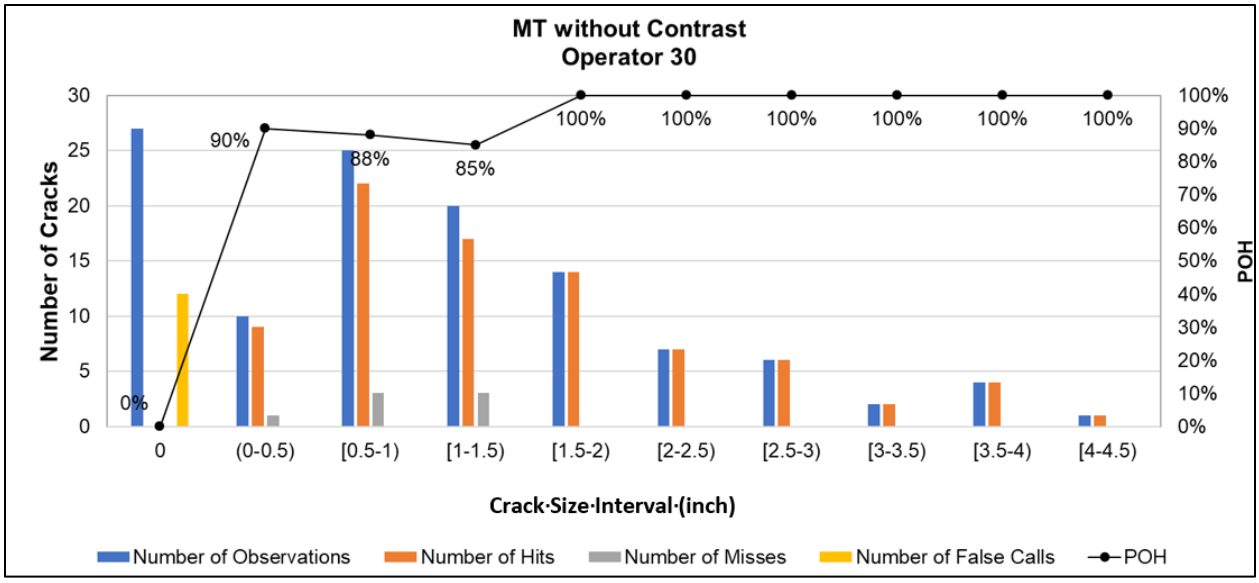

Figure 75. FW MT without Contrast Distribution of Hits – Operator 30

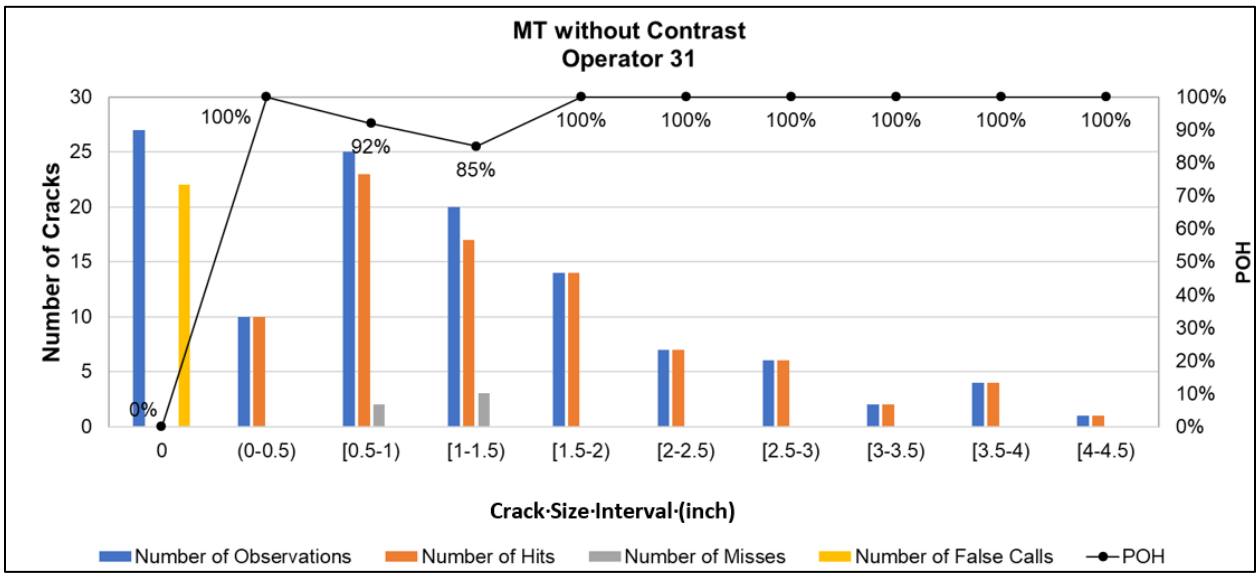

Figure 76. FW MT without Contrast Distribution of Hits – Operator 31

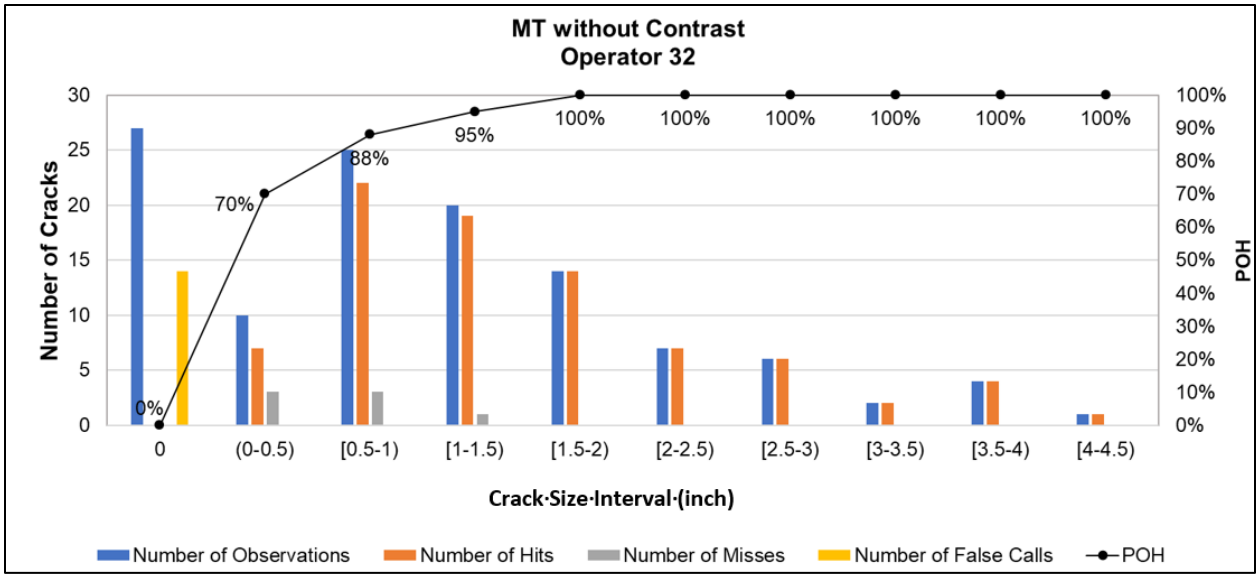

Figure 77. FW MT without Contrast Distribution of Hits – Operator 32

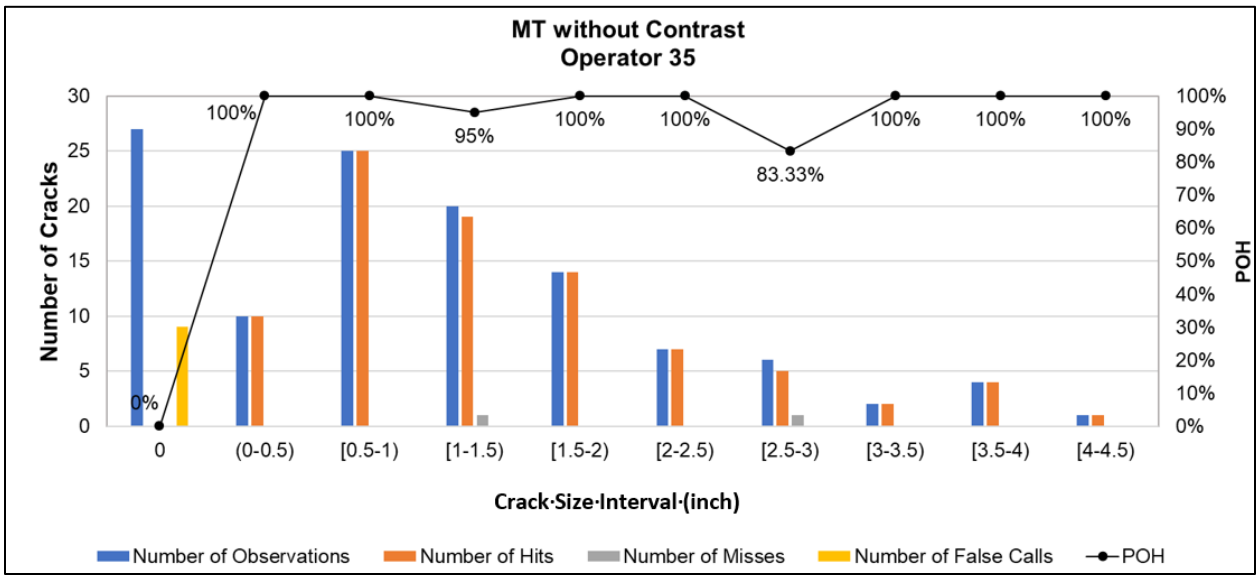

Figure 78. FW MT without Contrast Distribution of Hits – Operator 35

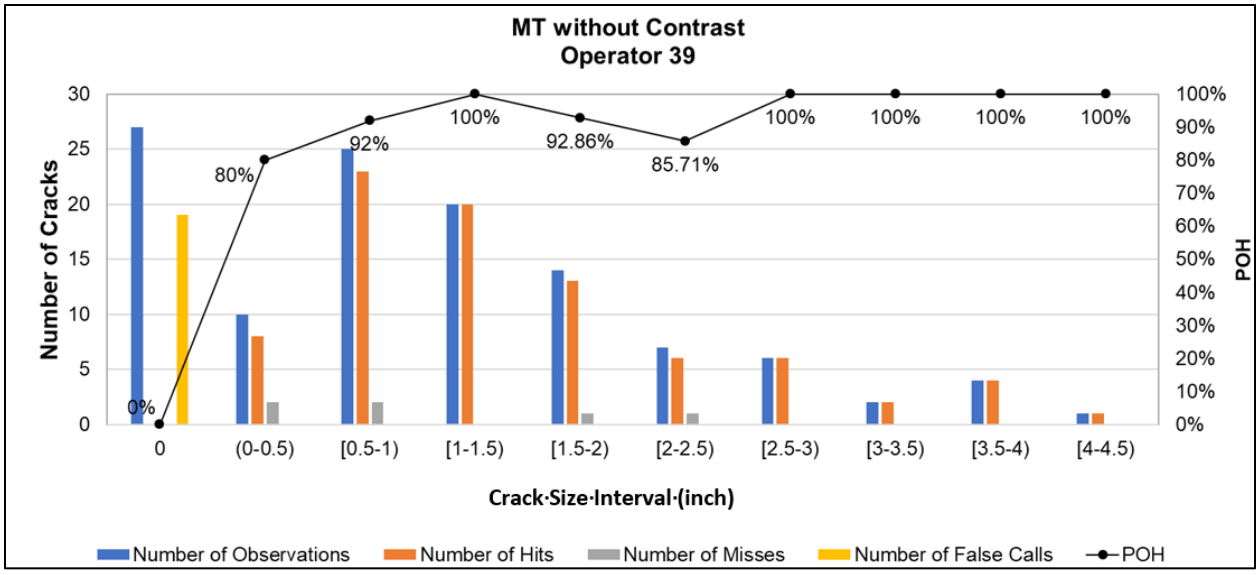

Figure 79. FW MT without Contrast Distribution of Hits – Operator 39

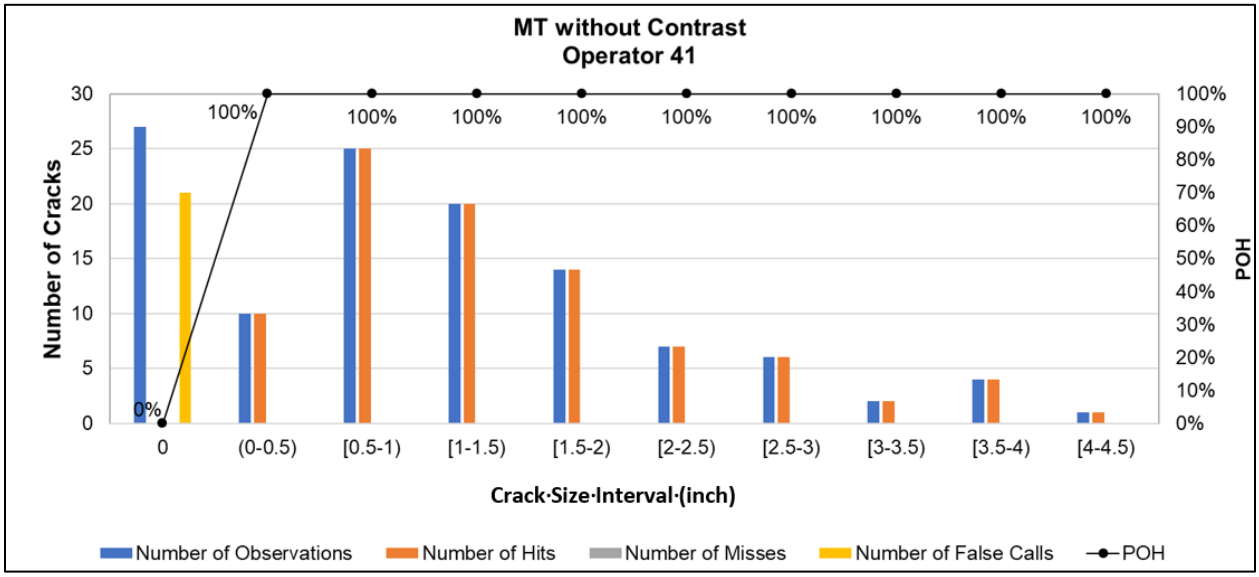

Figure 80. FW MT without Contrast Distribution of Hits – Operator 41

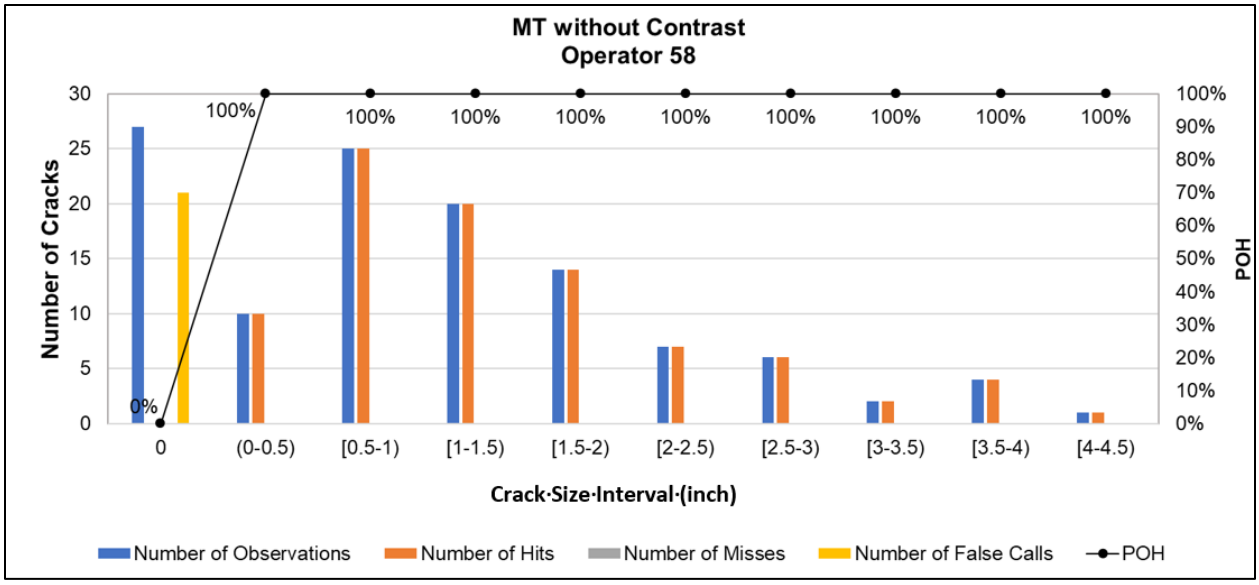

Figure 81. FW MT without Contrast Distribution of Hits – Operator 58

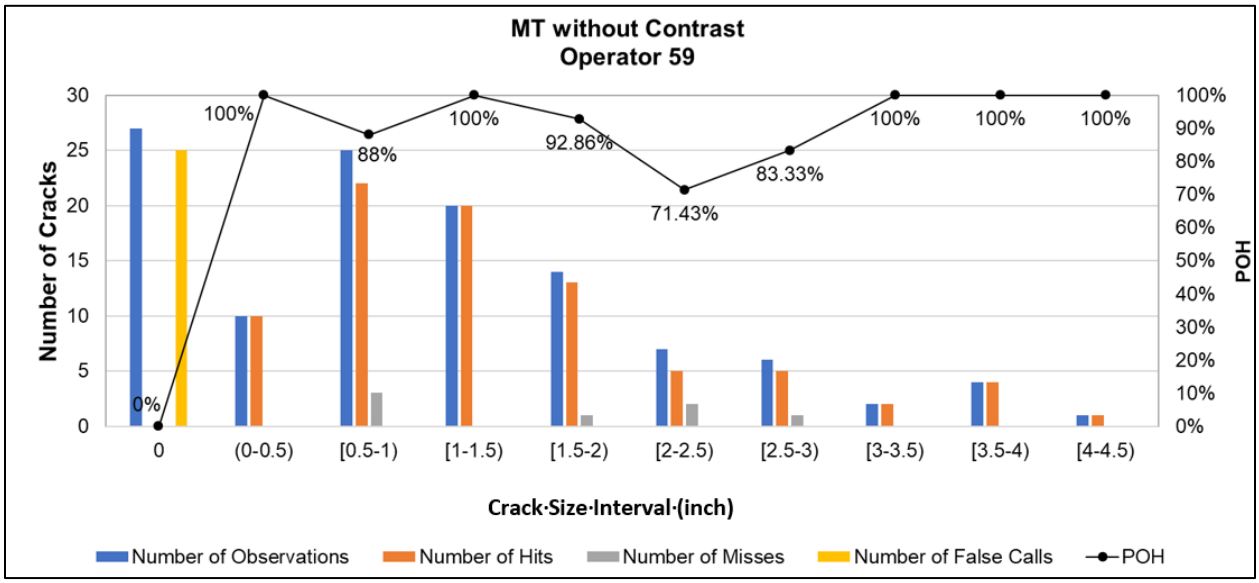

Figure 82. FW MT without Contrast Distribution of Hits – Operator 59

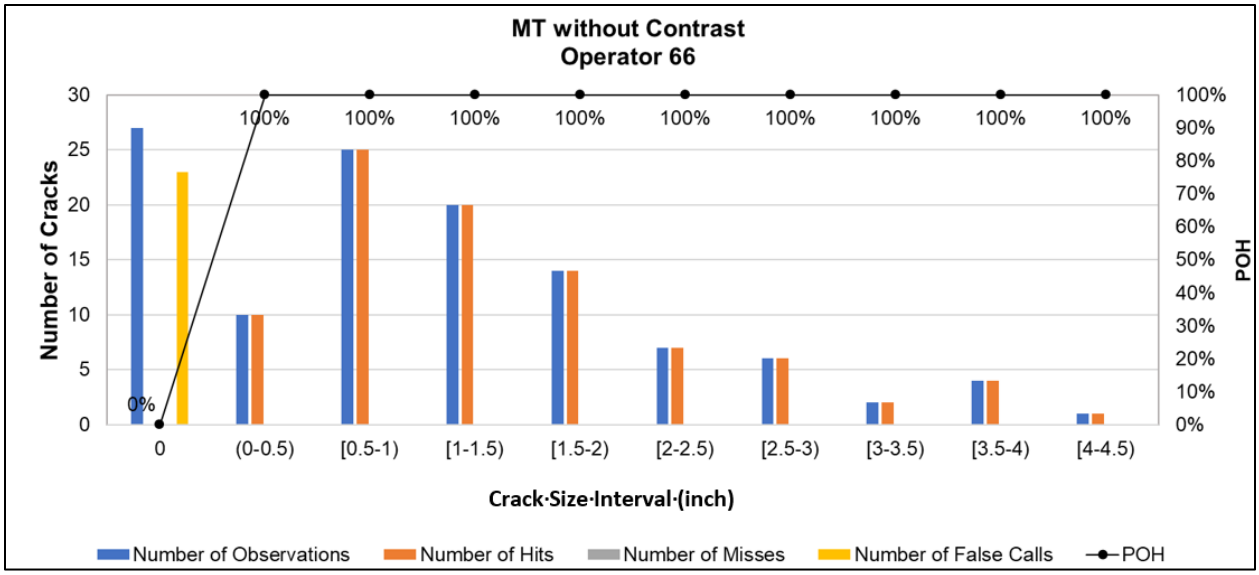

Figure 83. FW MT without Contrast Distribution of Hits – Operator 66

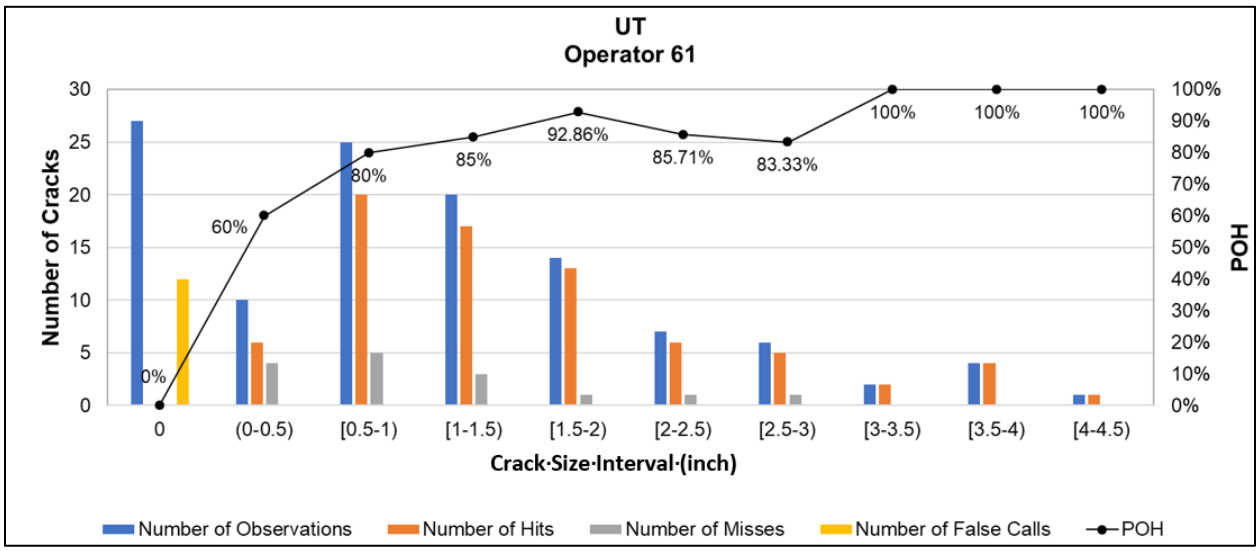

Figure 84. FW UT Distribution of Hits – Operator 61

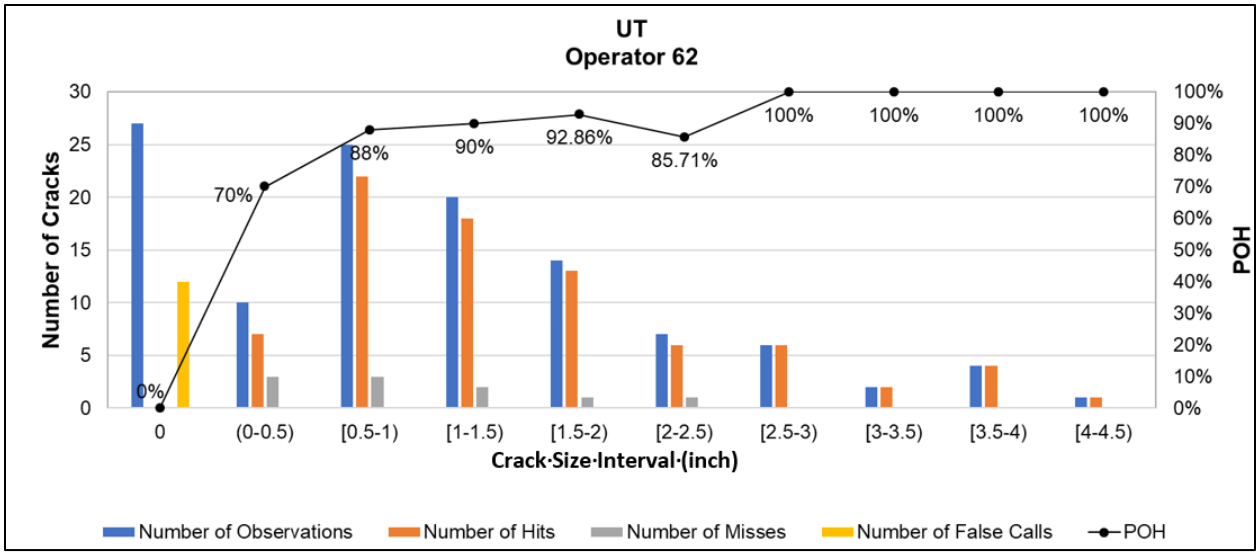

Figure 85. FW UT Distribution of Hits – Operator 62

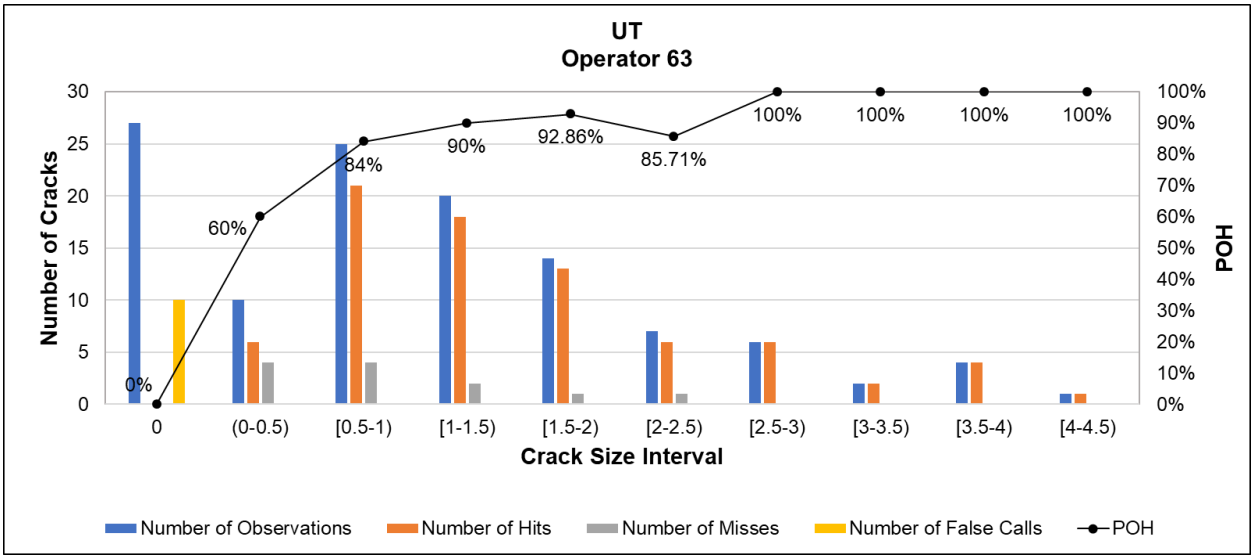

Figure 86. FW UT Distribution of Hits – Operator 63

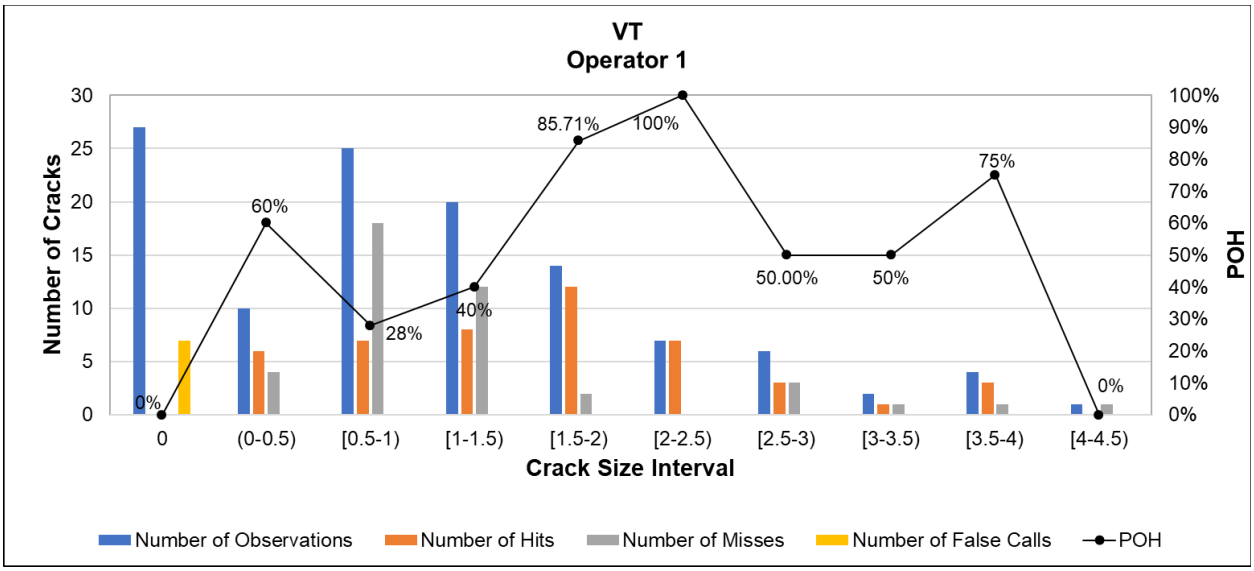

Figure 87. FW VT Distribution of Hits – Operator 1

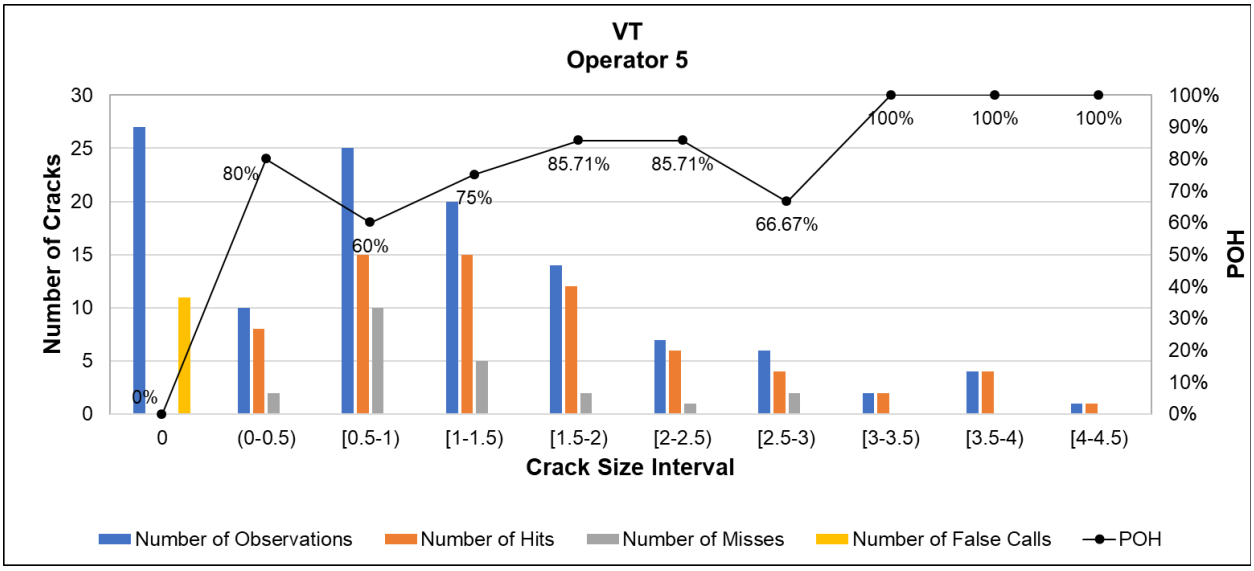

Figure 88. FW VT Distribution of Hits – Operator 5

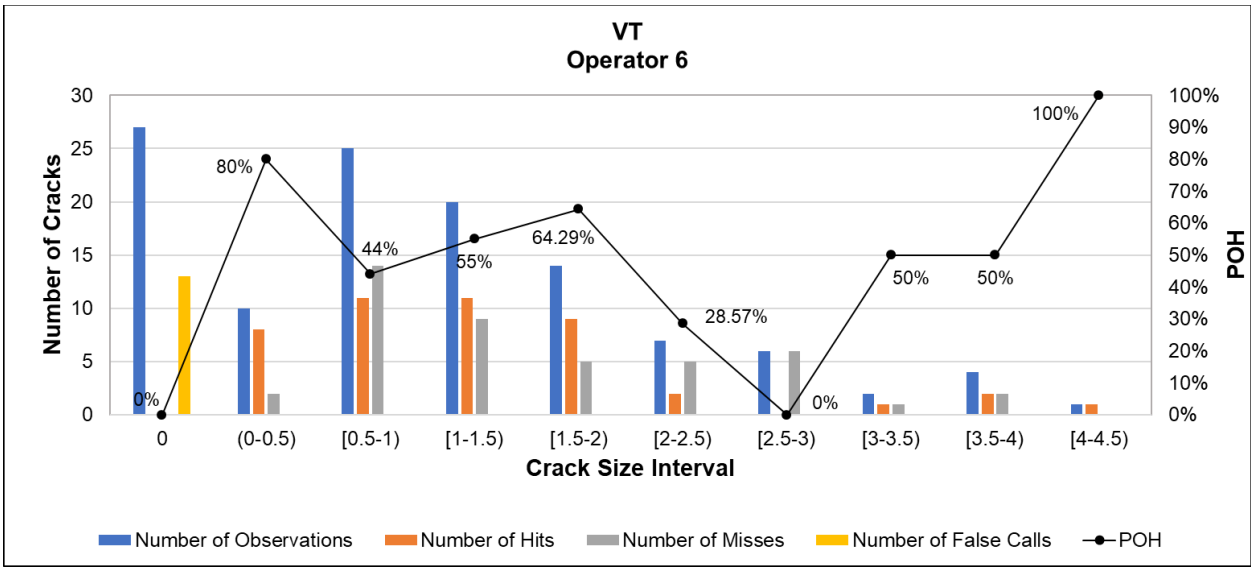

Figure 89. FW VT Distribution of Hits – Operator 6

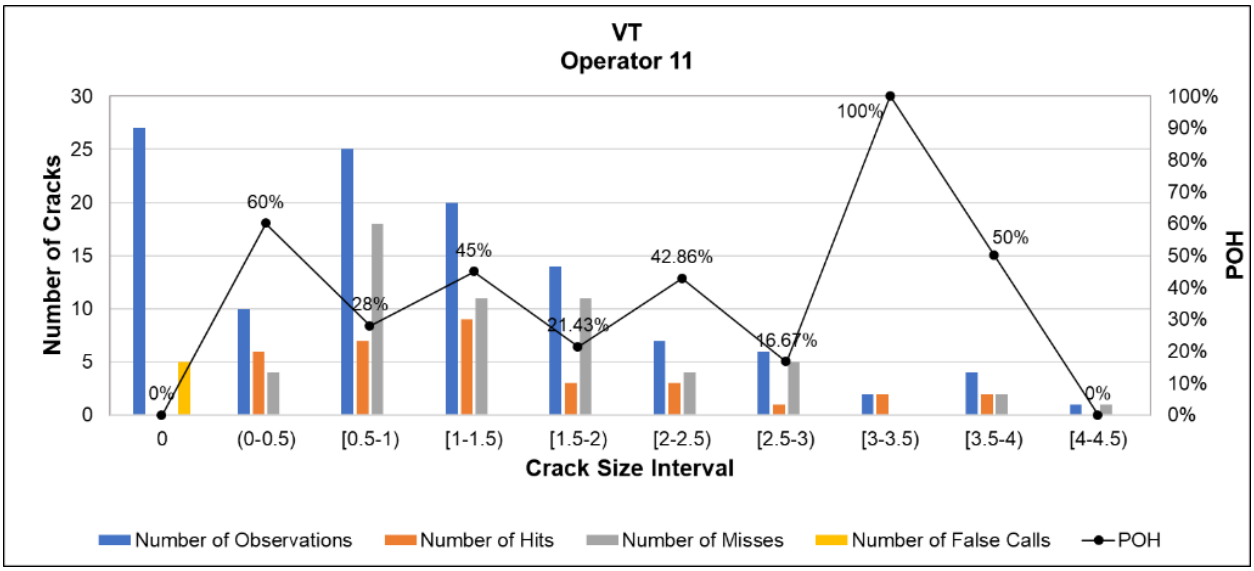

Figure 90. FW VT Distribution of Hits – Operator 11

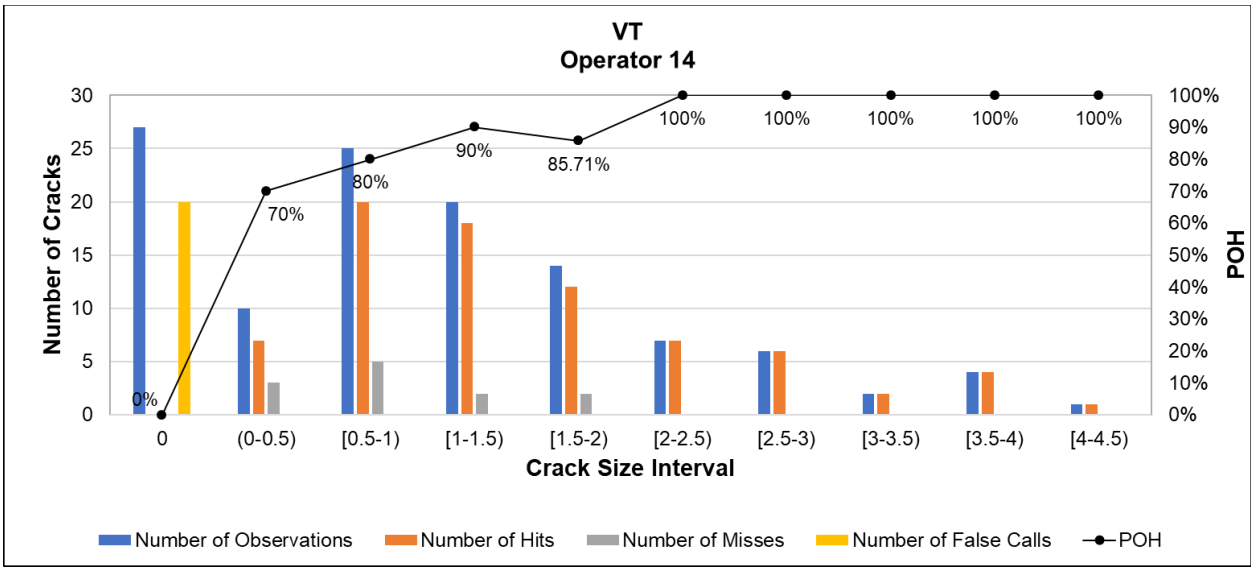

Figure 91. FW VT Distribution of Hits – Operator 14

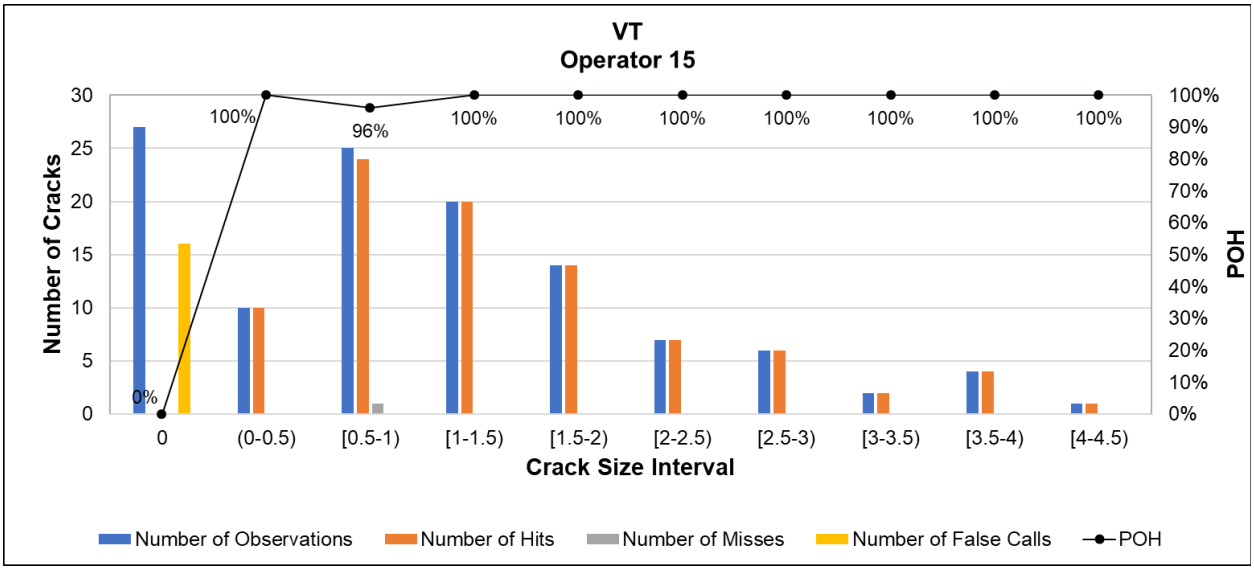

Figure 92. FW VT Distribution of Hits – Operator 15

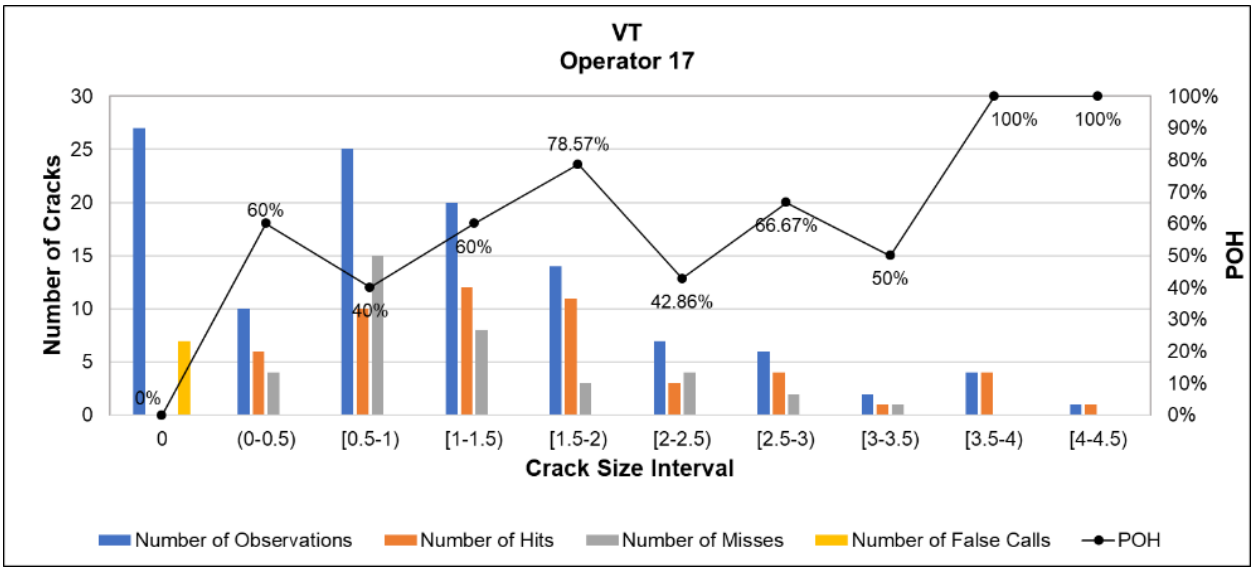

Figure 93. FW VT Distribution of Hits – Operator 17

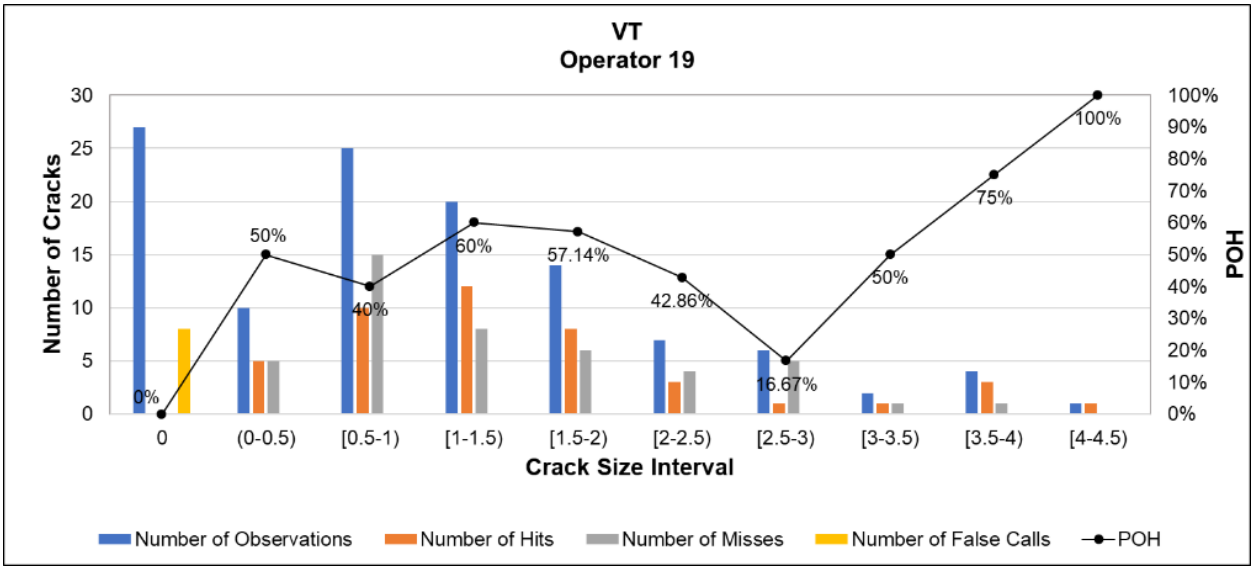

Figure 94. FW VT Distribution of Hits – Operator 19

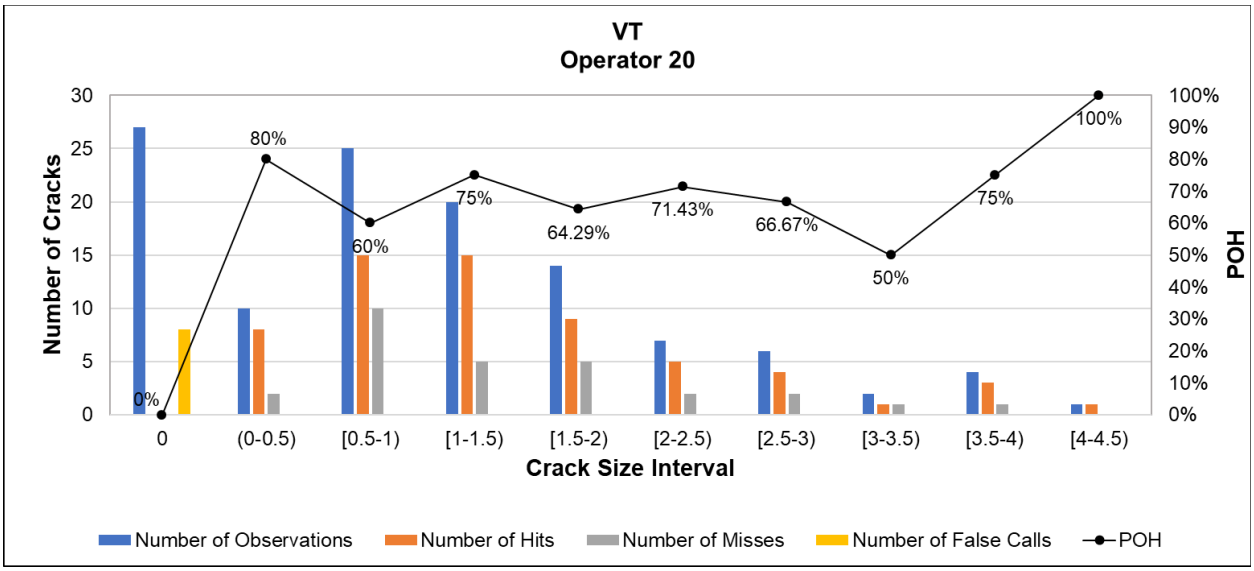

Figure 95. FW VT Distribution of Hits – Operator 20

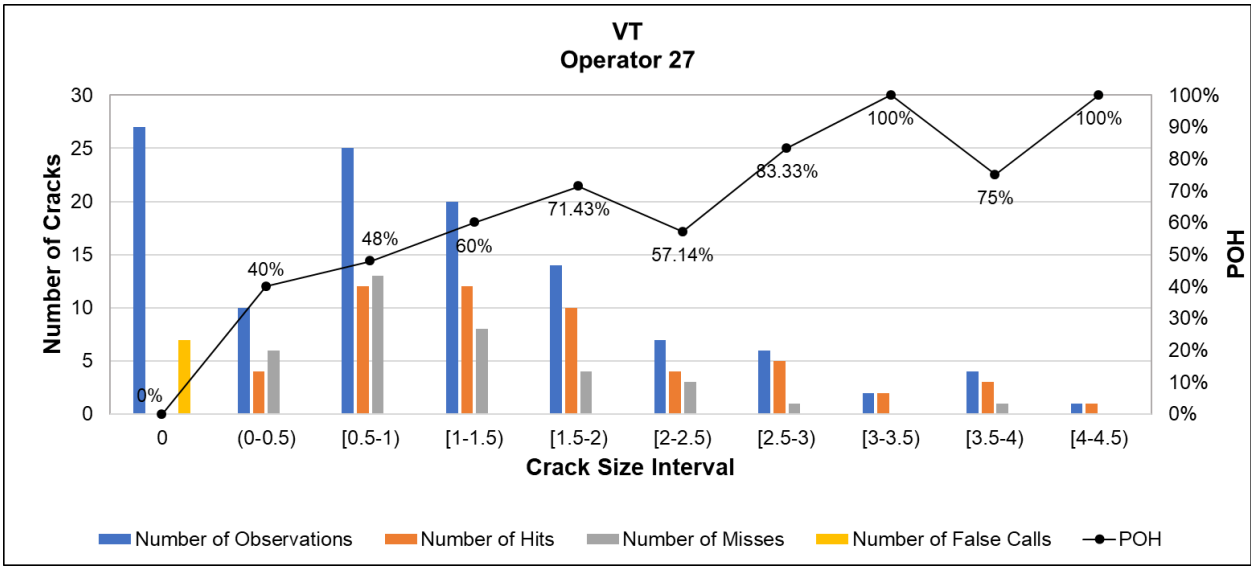

Figure 96. FW VT Distribution of Hits – Operator 27

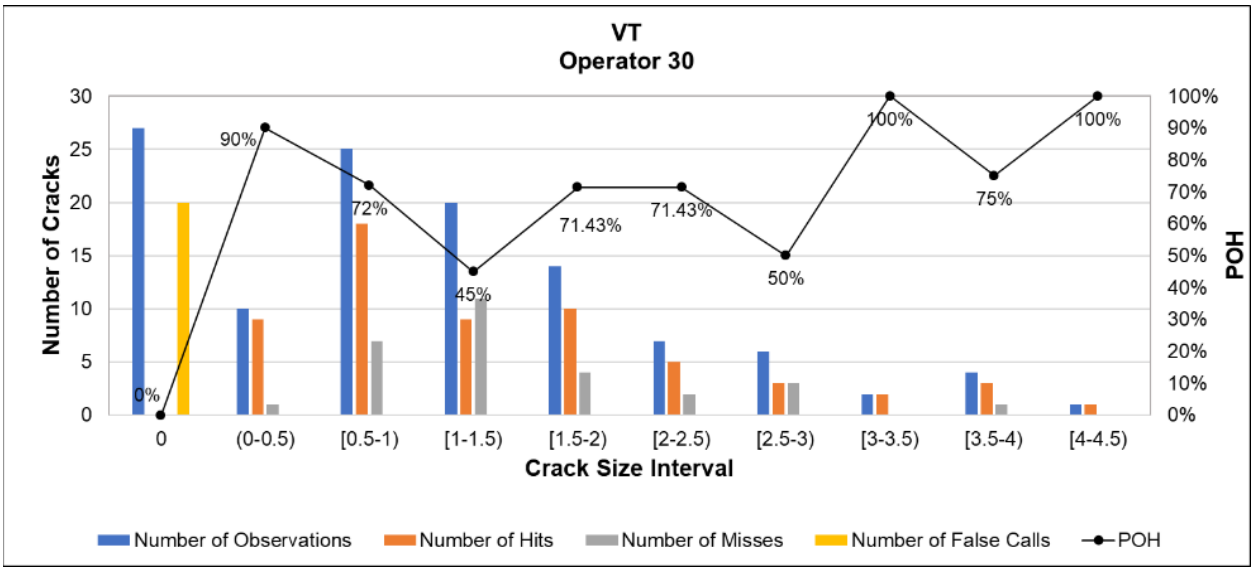

Figure 97. FW VT Distribution of Hits – Operator 30

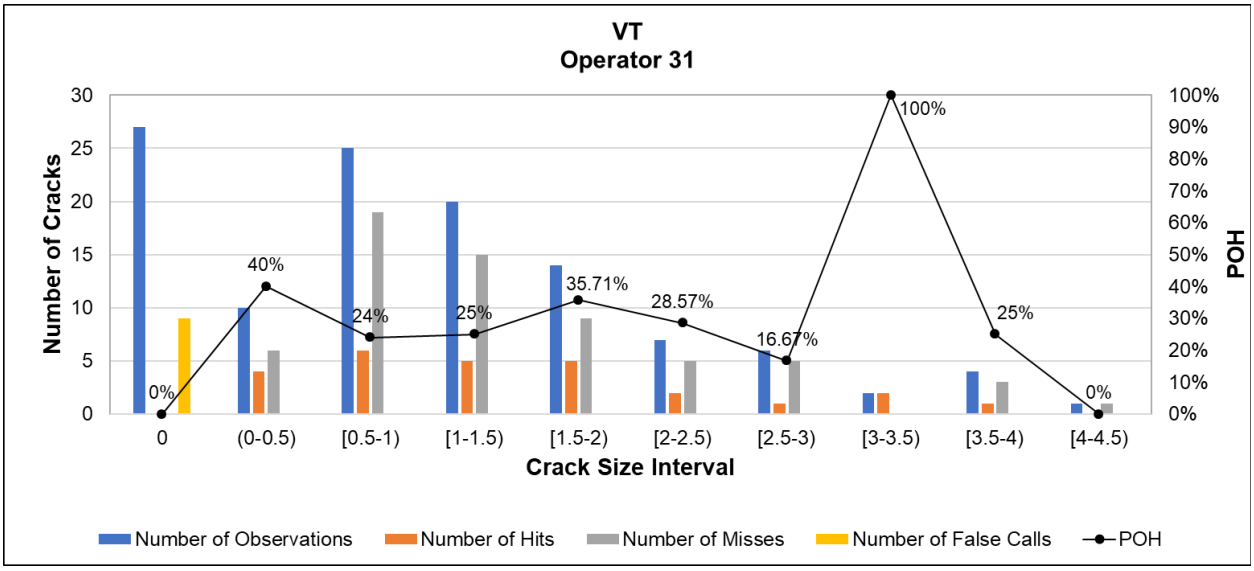

Figure 98. FW VT Distribution of Hits – Operator 31

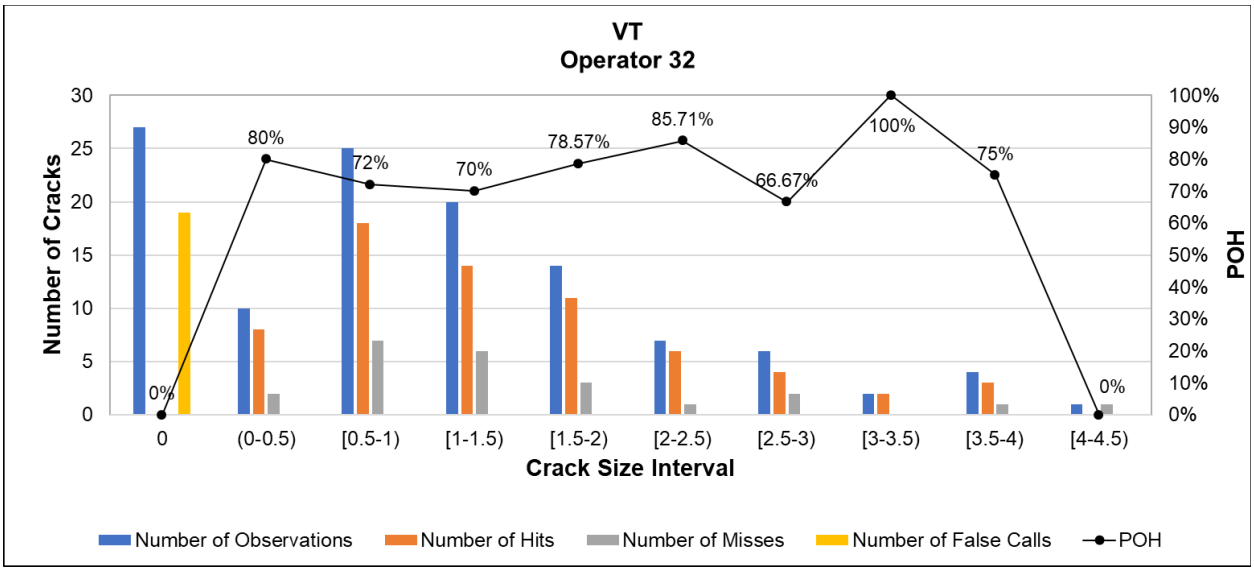

Figure 99. FW VT Distribution of Hits – Operator 32

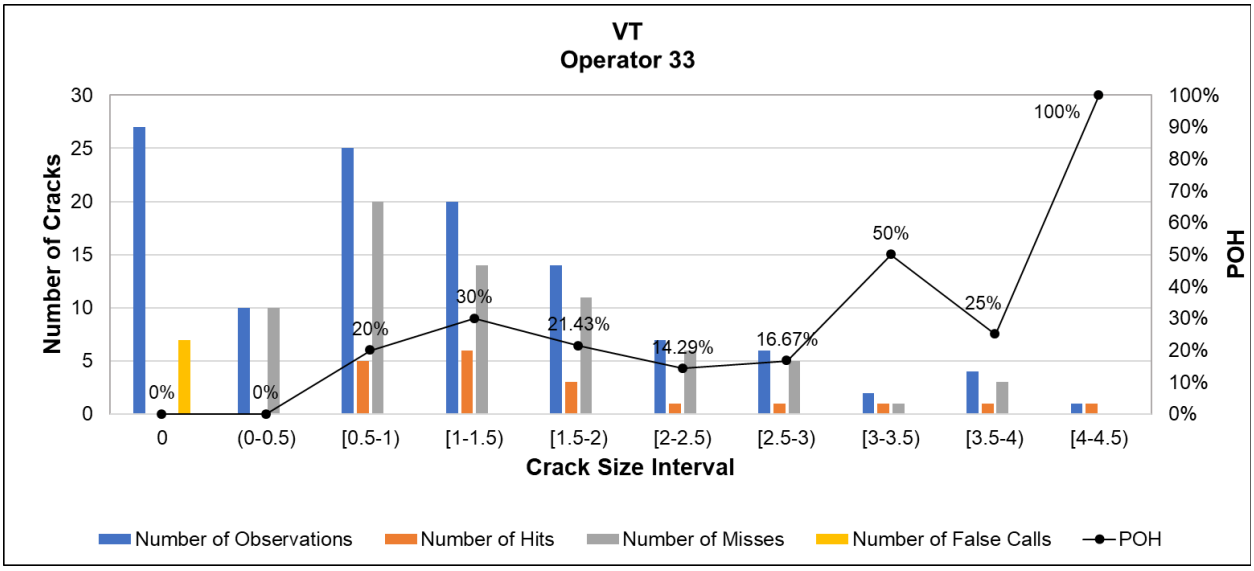

Figure 100. FW VT Distribution of Hits – Operator 33

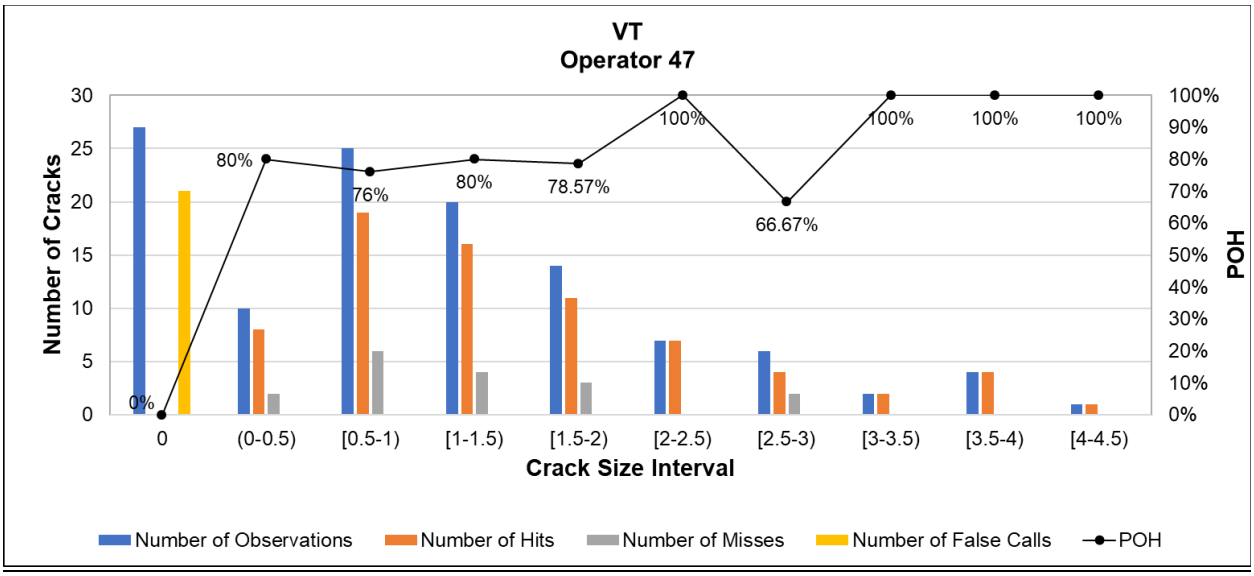

Figure 101. FW VT Distribution of Hits – Operator 47

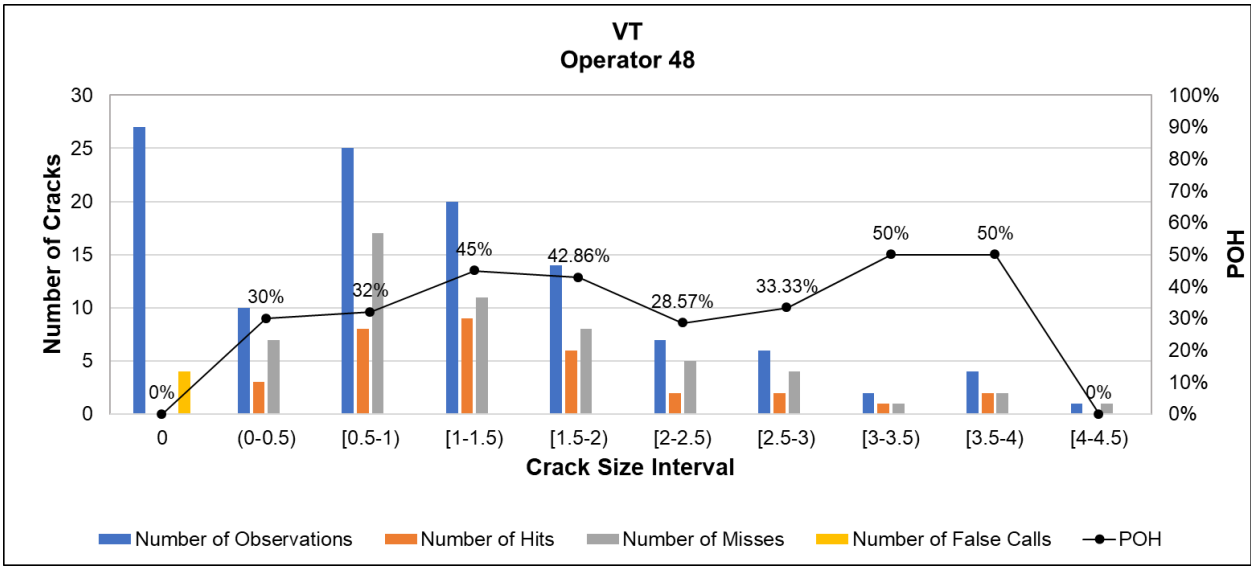

Figure 102. FW VT Distribution of Hits – Operator 48

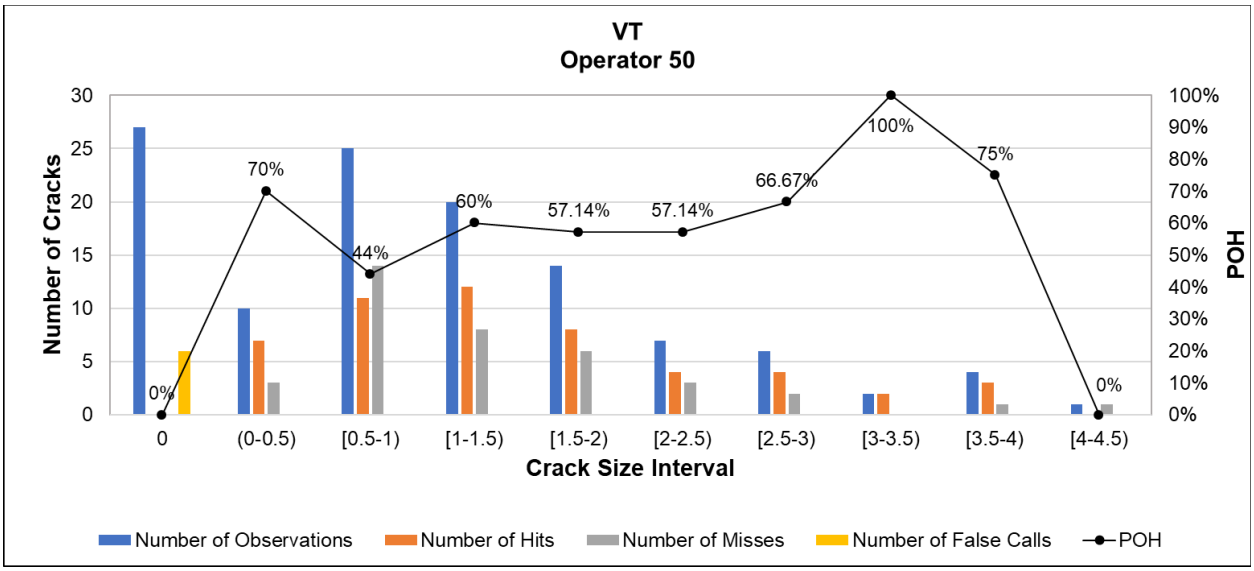

Figure 103. FW VT Distribution of Hits – Operator 50

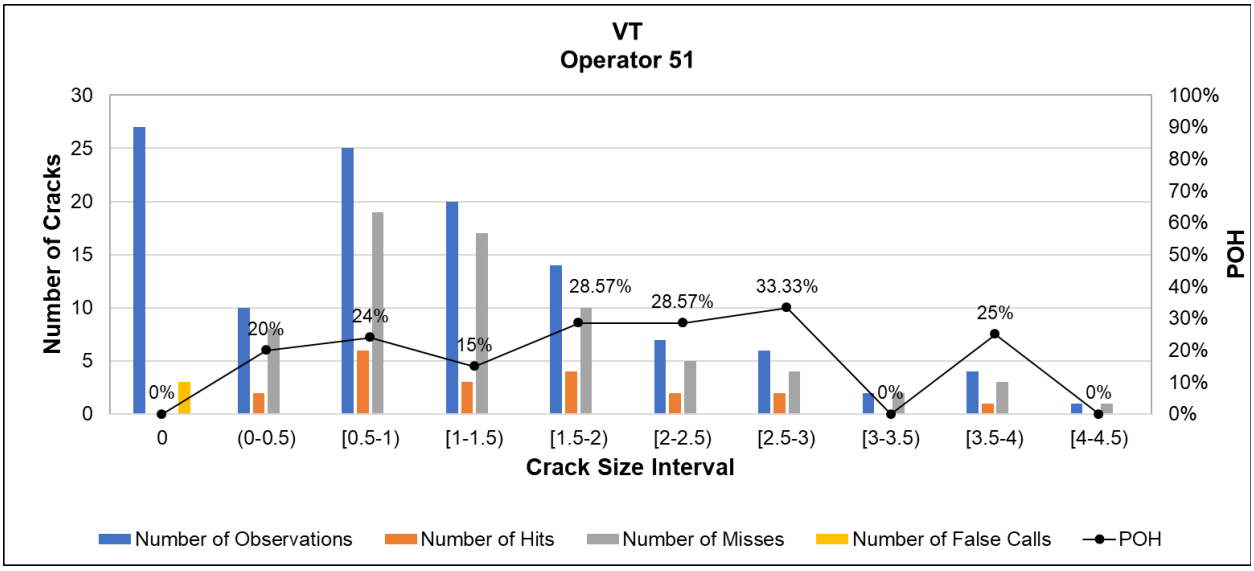

Figure 104. FW VT Distribution of Hits – Operator 51

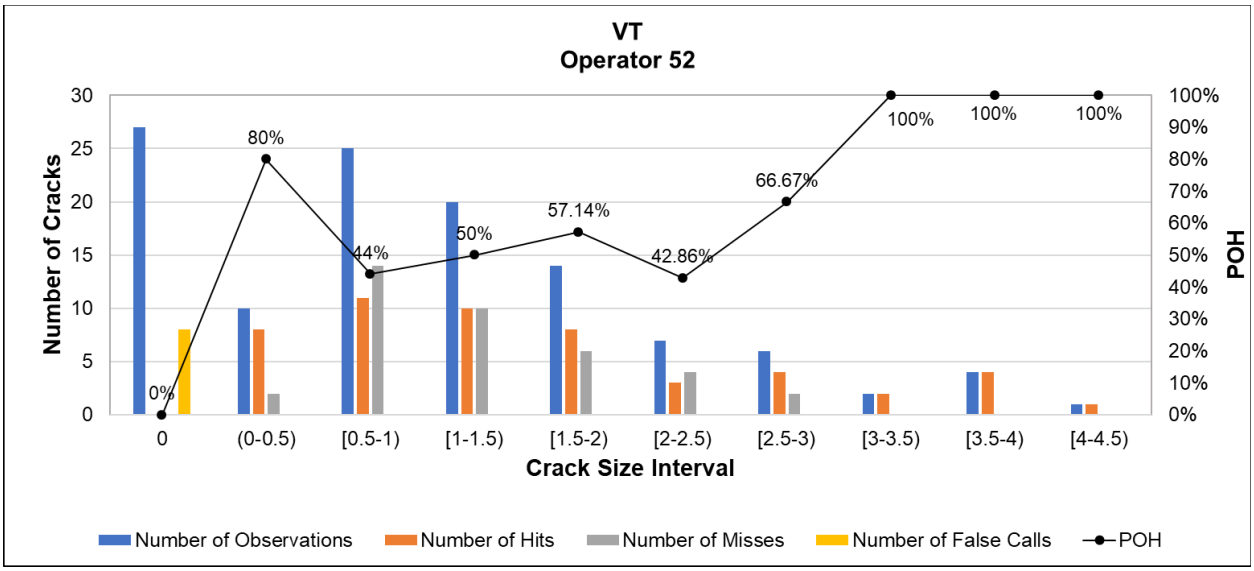

Figure 105. FW VT Distribution of Hits – Operator 52

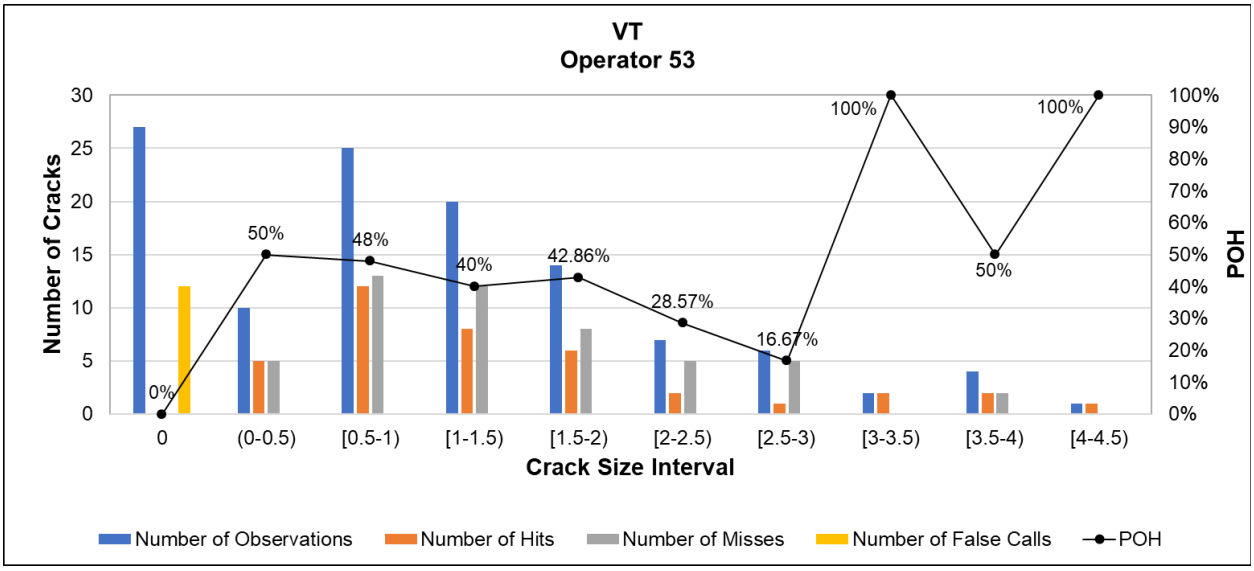

Figure 106. FW VT Distribution of Hits – Operator 53

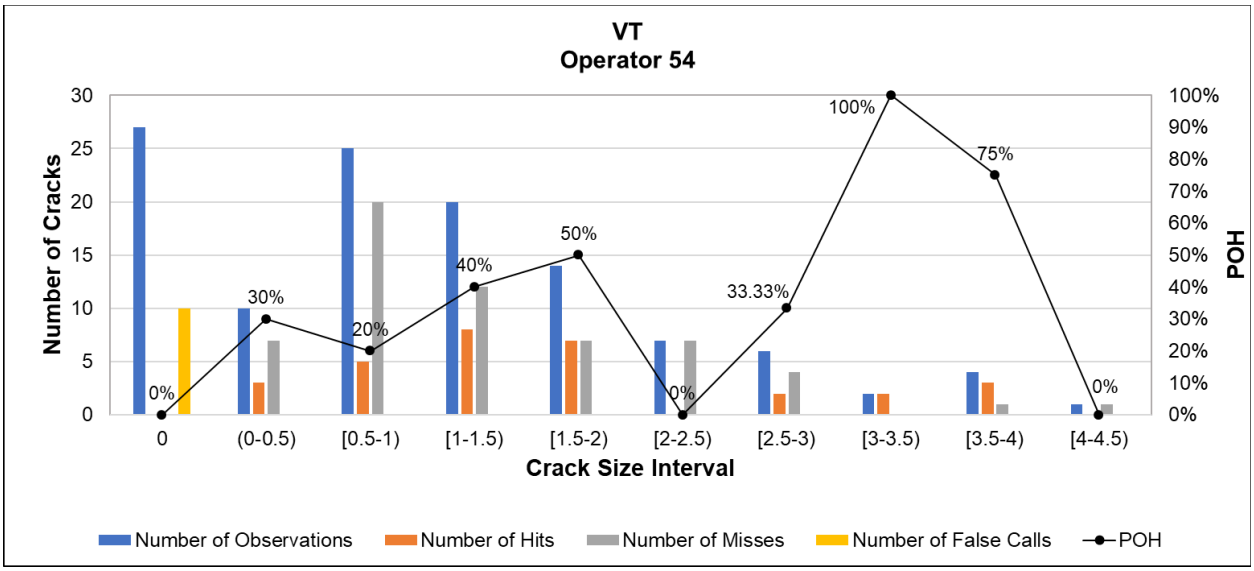

Figure 107. FW VT Distribution of Hits – Operator 54

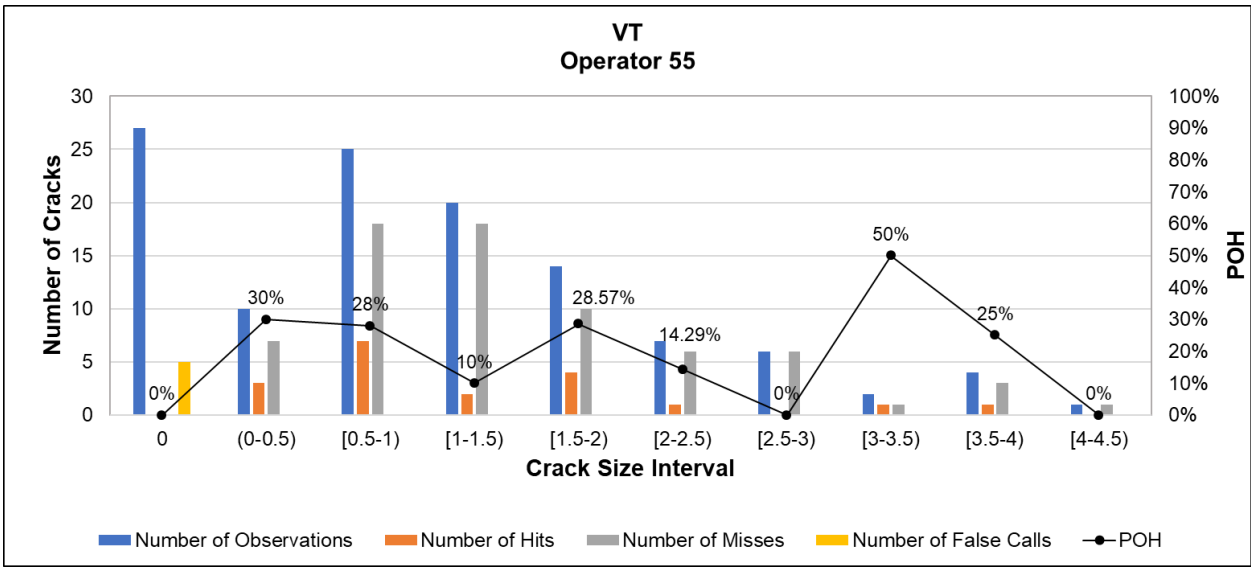

Figure 108. FW VT Distribution of Hits – Operator 55

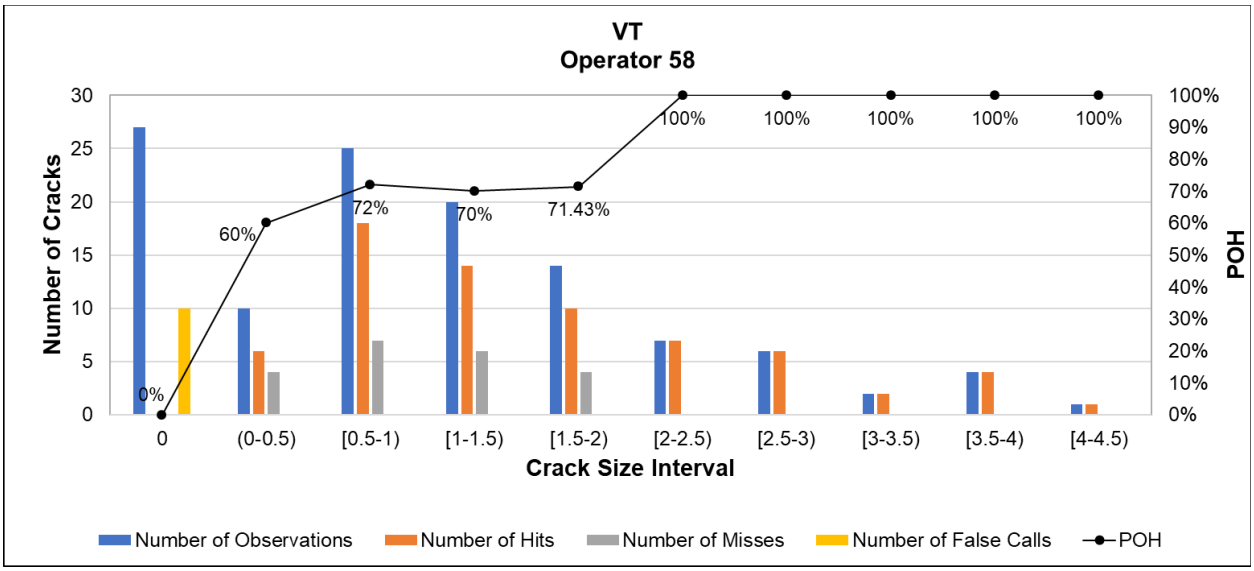

Figure 109. FW VT Distribution of Hits – Operator 58

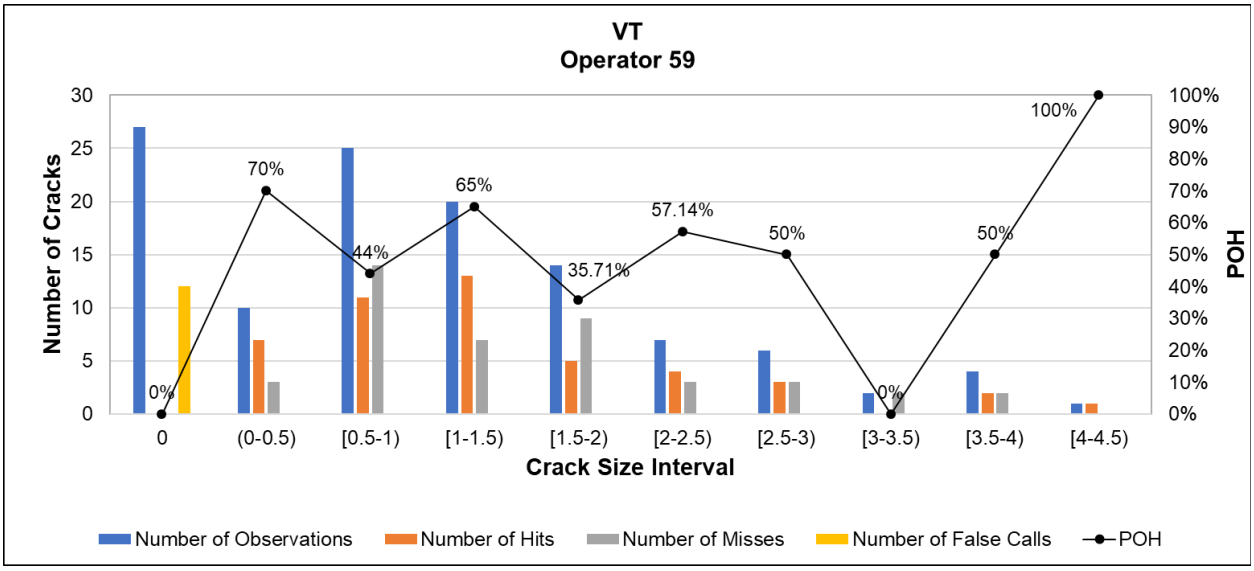

Figure 110. FW VT Distribution of Hits – Operator 59

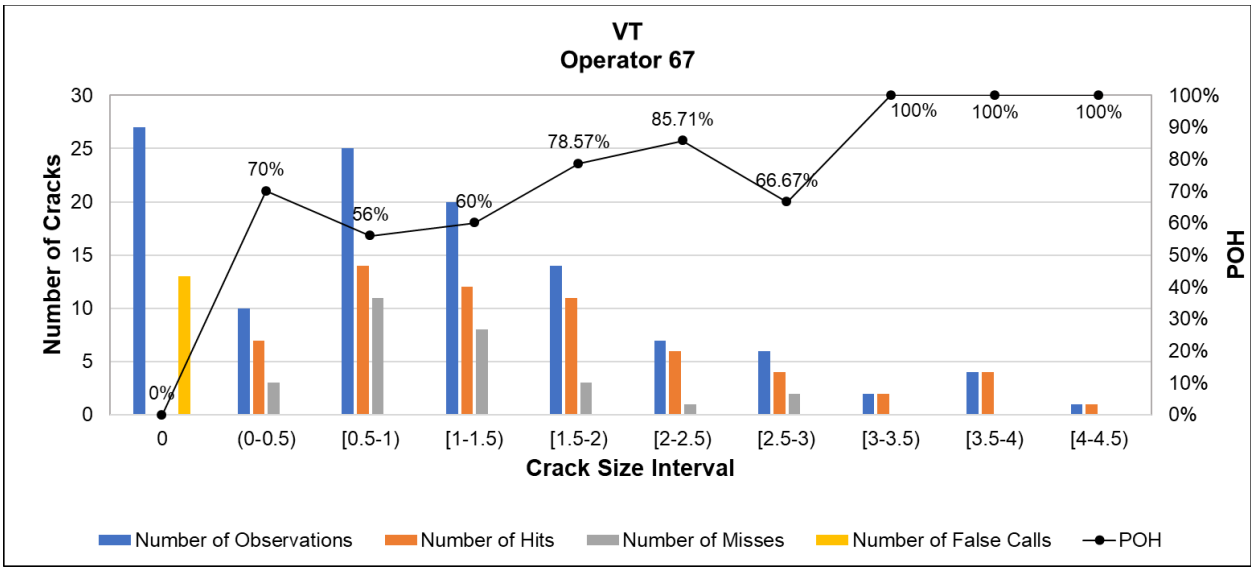

Figure 111. FW VT Distribution of Hits – Operator 67

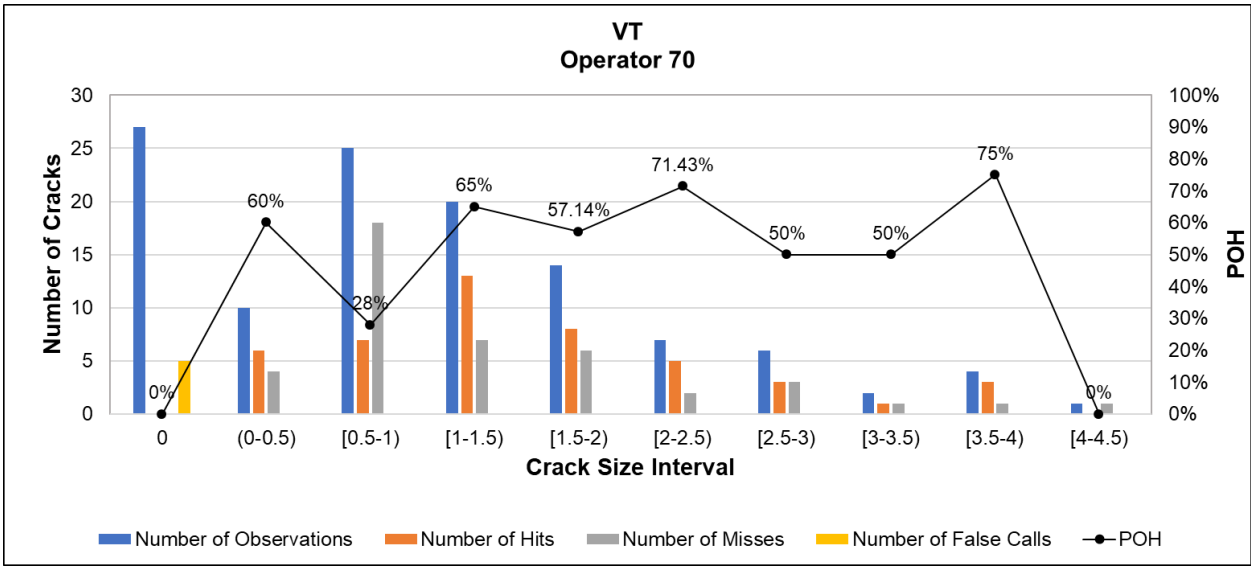

Figure 112. FW VT Distribution of Hits – Operator 70

Appendix D.
Traditional Statistics POD Operator Graphs – Butt Welds

This appendix shows statistical POD operator graph-butt welds in Figure 113 through Figure 216.

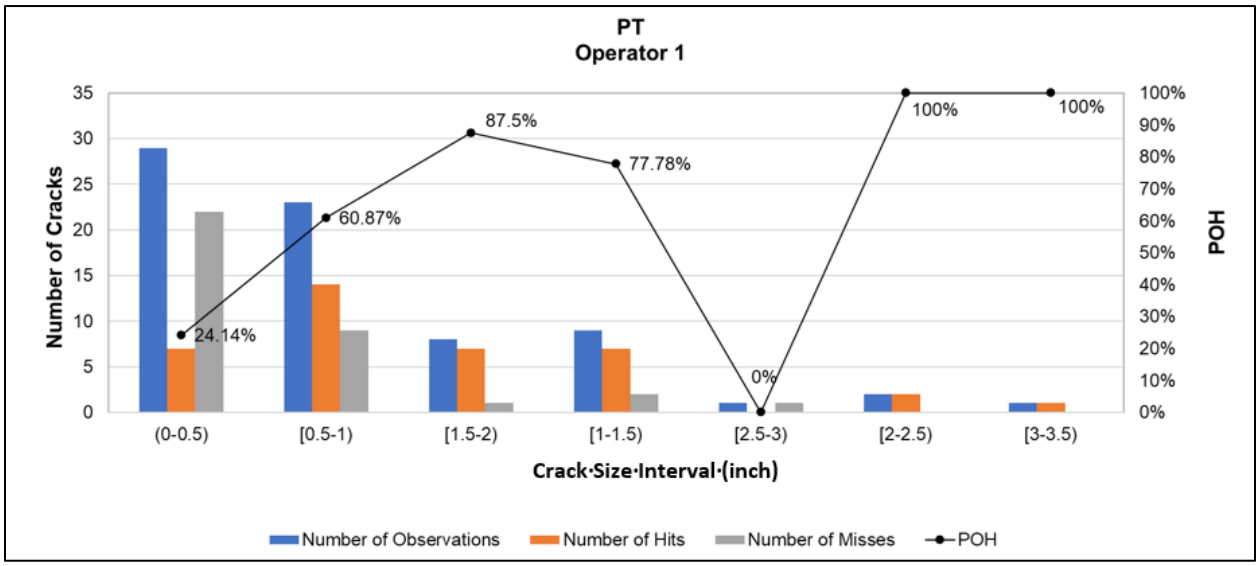

Figure 113. BW PT Distribution of Hits – Operator 1

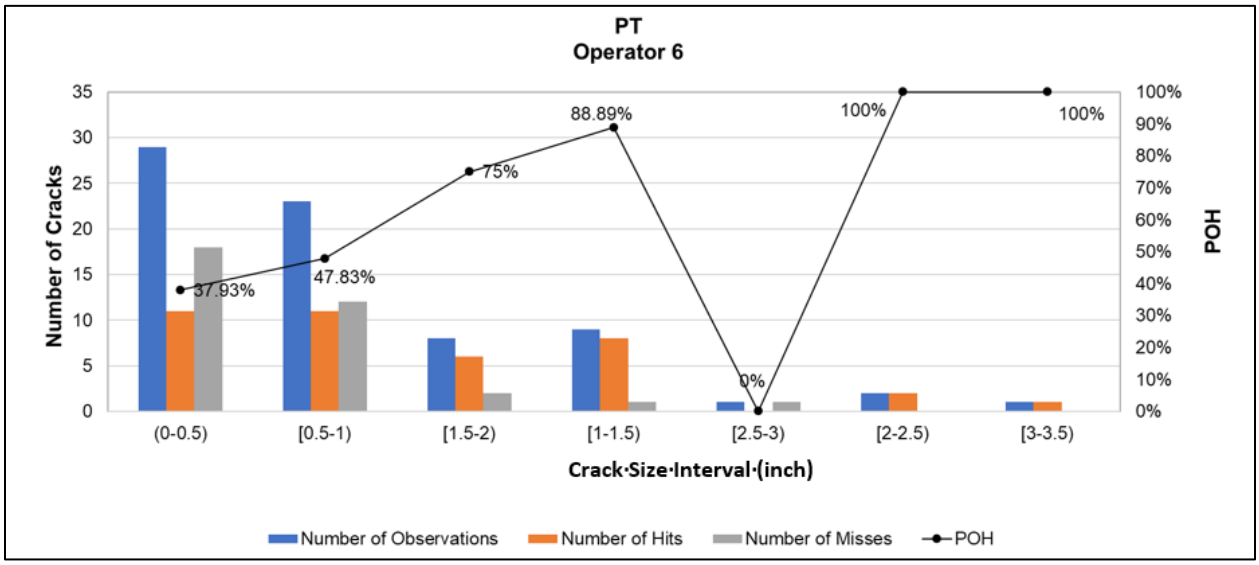

Figure 114. BW PT Distribution of Hits – Operator 6

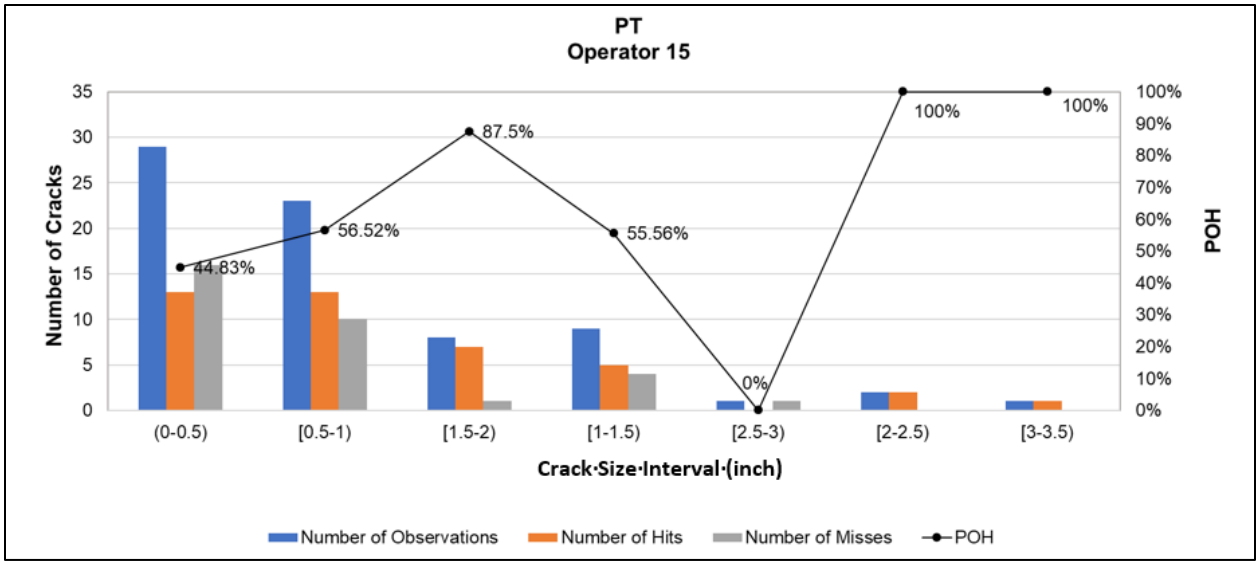

Figure 115. BW PT Distribution of Hits – Operator 15

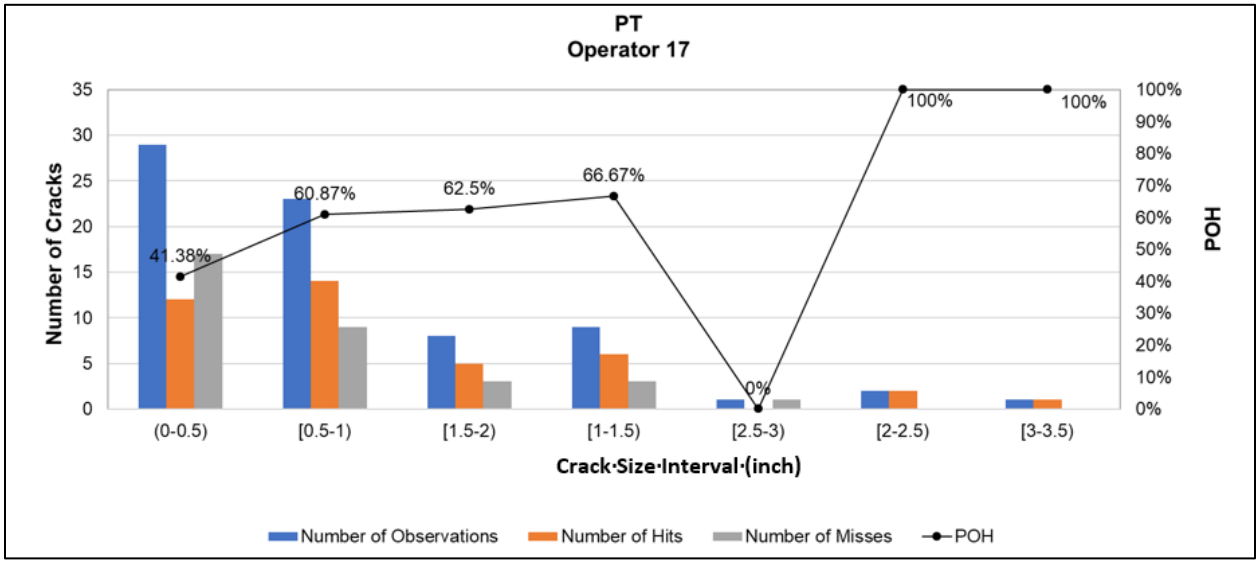

Figure 116. BW PT Distribution of Hits – Operator 17

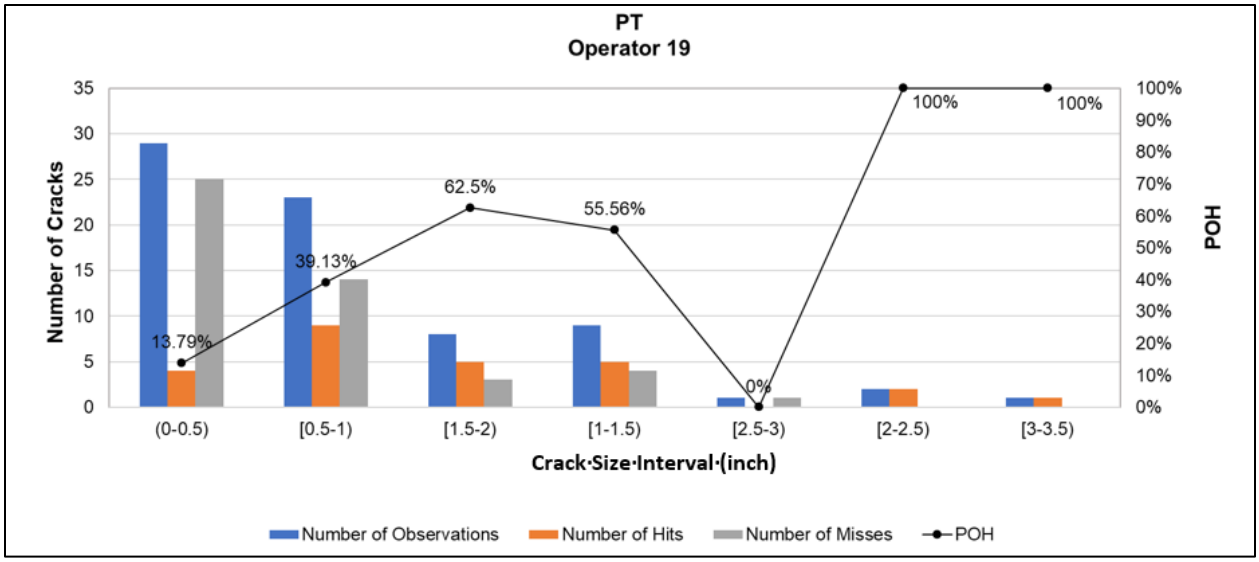

Figure 117. BW PT Distribution of Hits – Operator 19

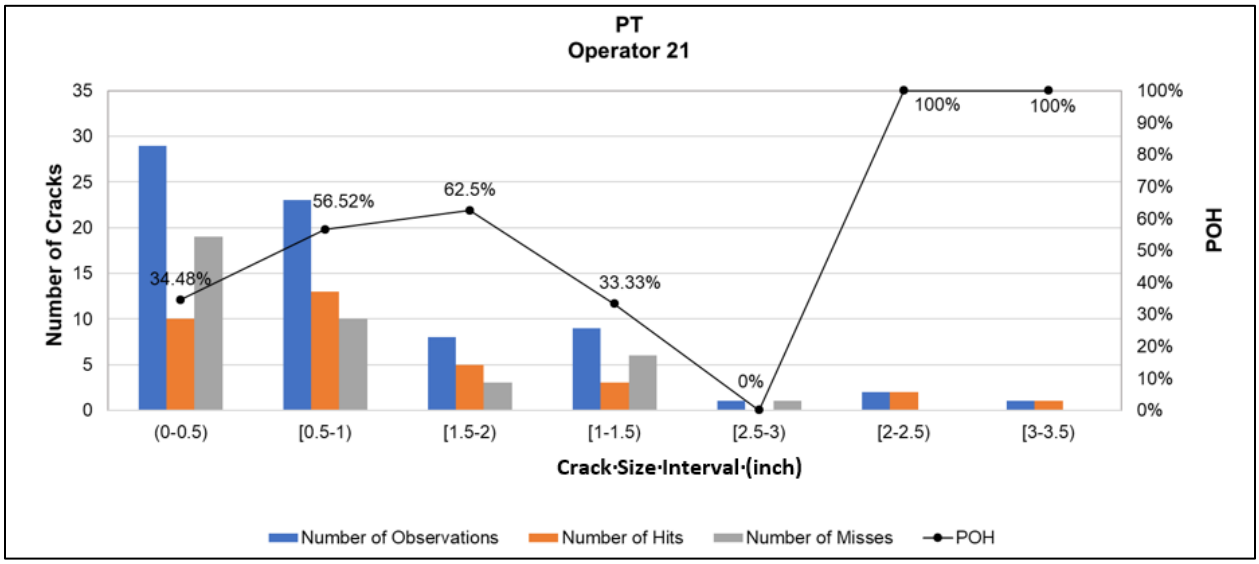

Figure 118. BW PT Distribution of Hits – Operator 21

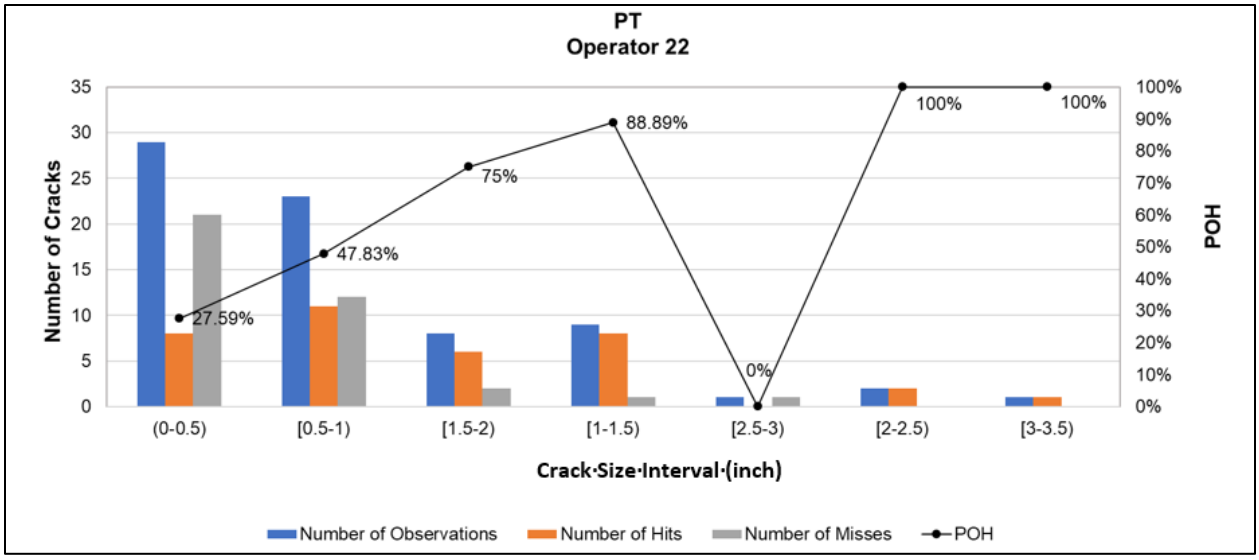

Figure 119. BW PT Distribution of Hits – Operator 22

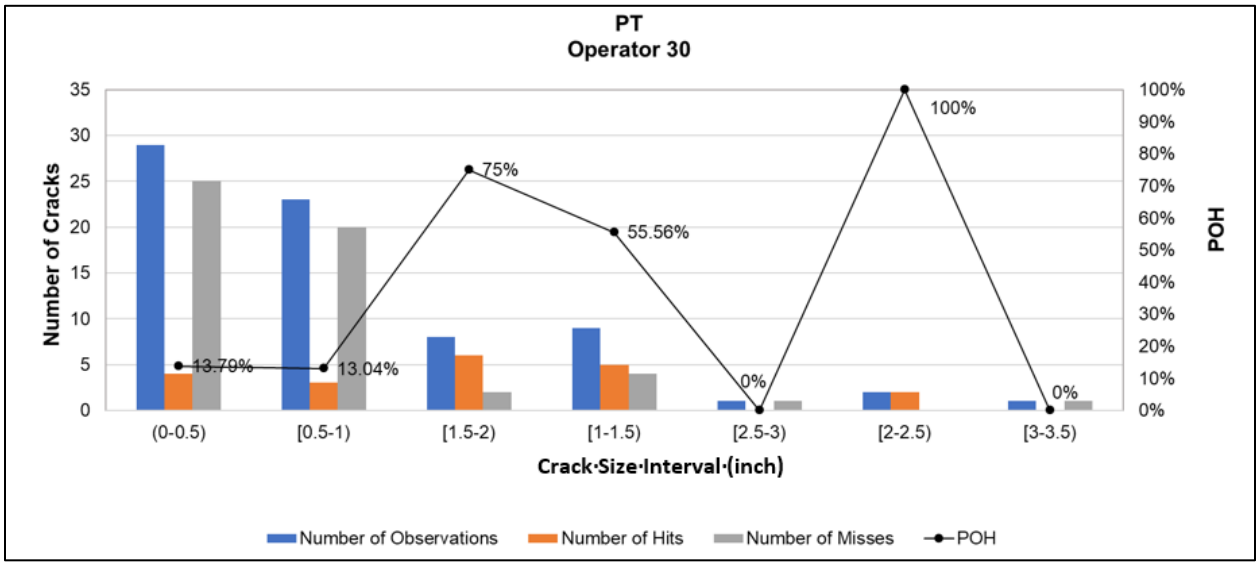

Figure 120. BW PT Distribution of Hits – Operator 30

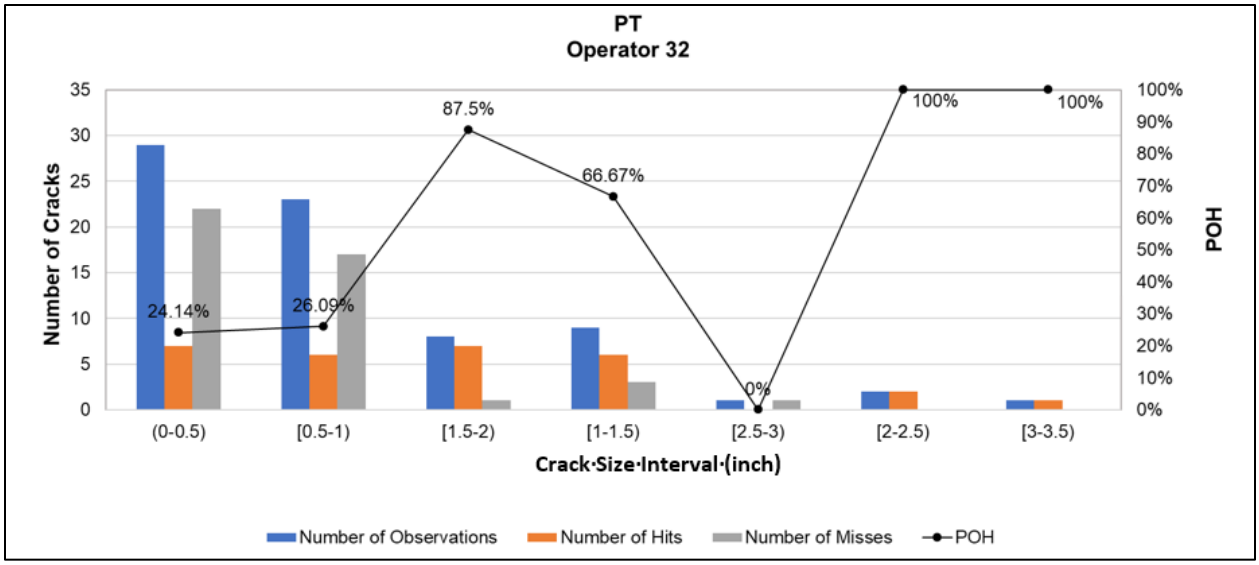

Figure 121. BW PT Distribution of Hits – Operator 32

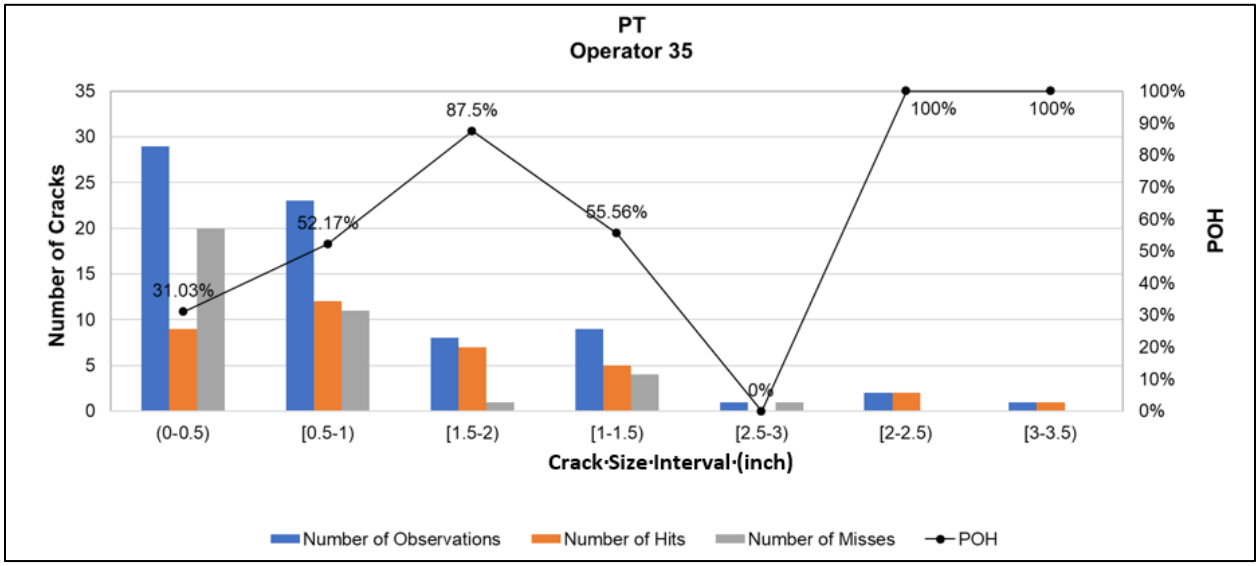

Figure 122. BW PT Distribution of Hits – Operator 35

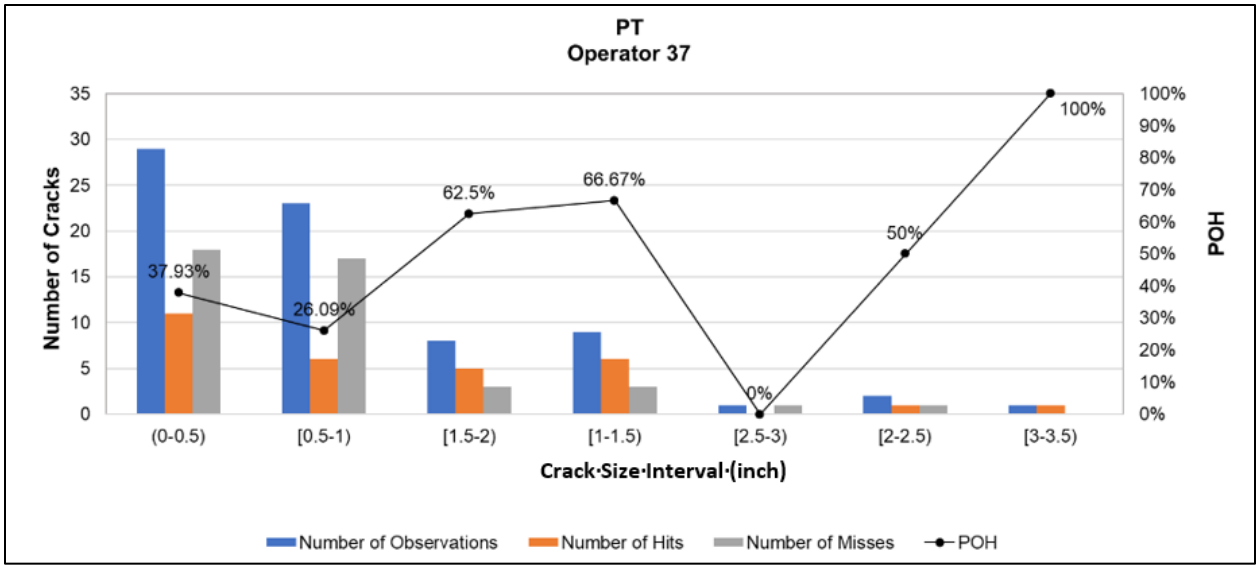

Figure 123. BW PT Distribution of Hits – Operator 37

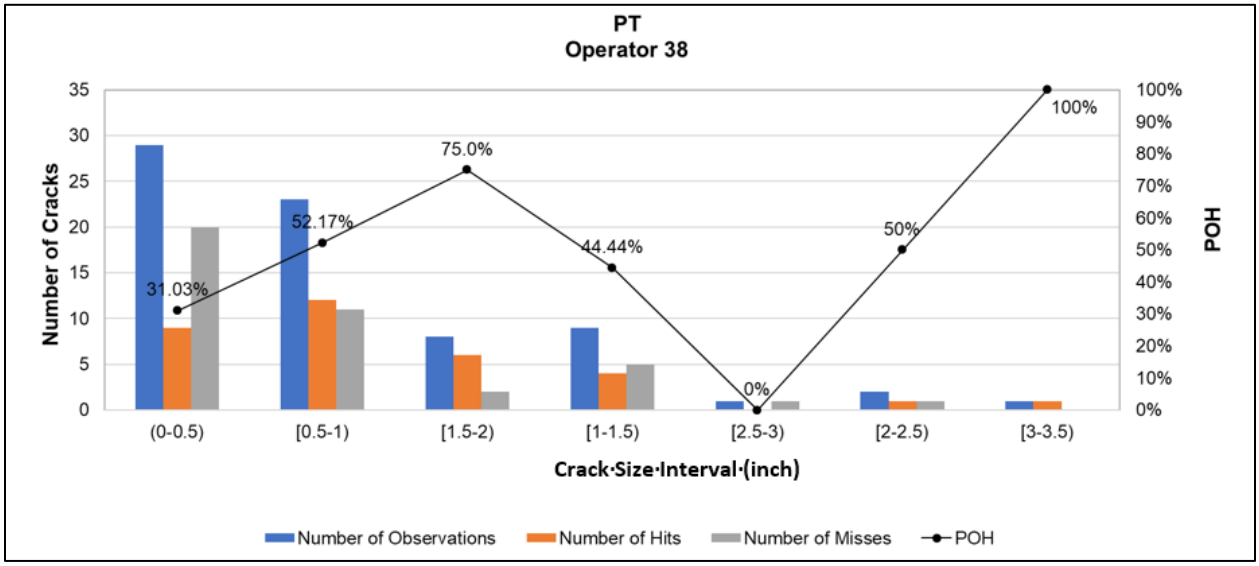

Figure 124. BW PT Distribution of Hits – Operator 38

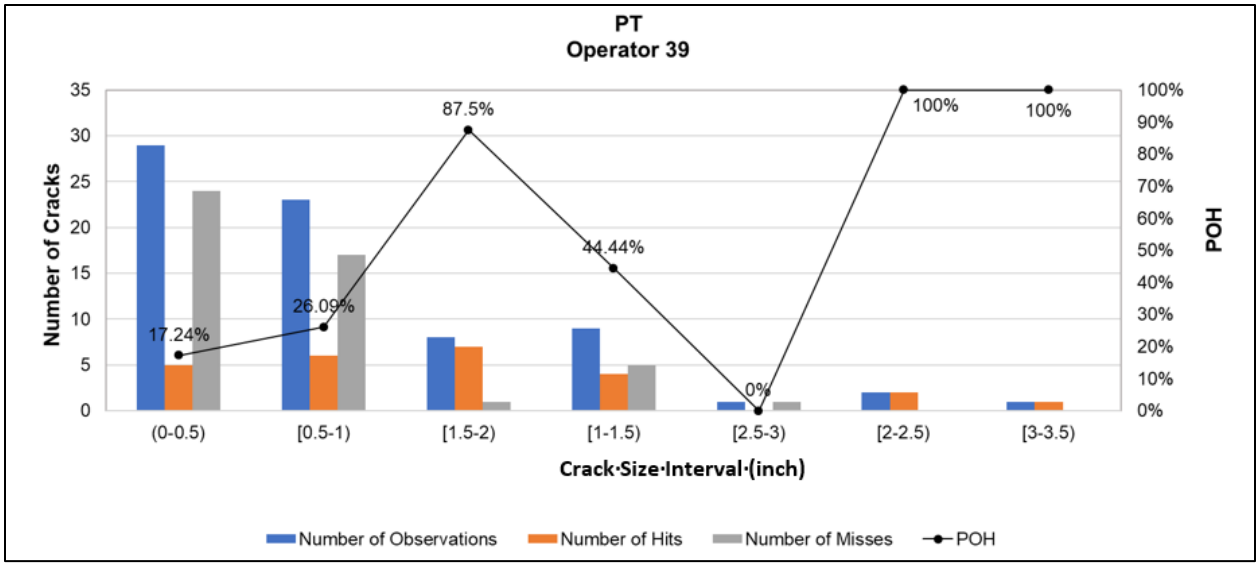

Figure 125. BW PT Distribution of Hits – Operator 39

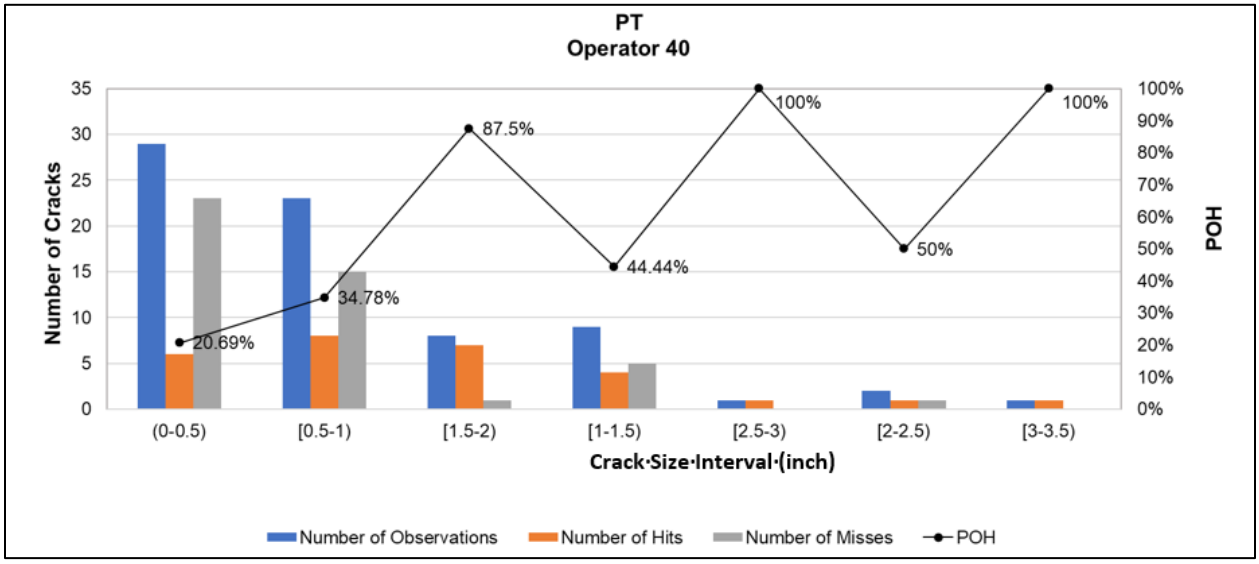

Figure 126. BW PT Distribution of Hits – Operator 40

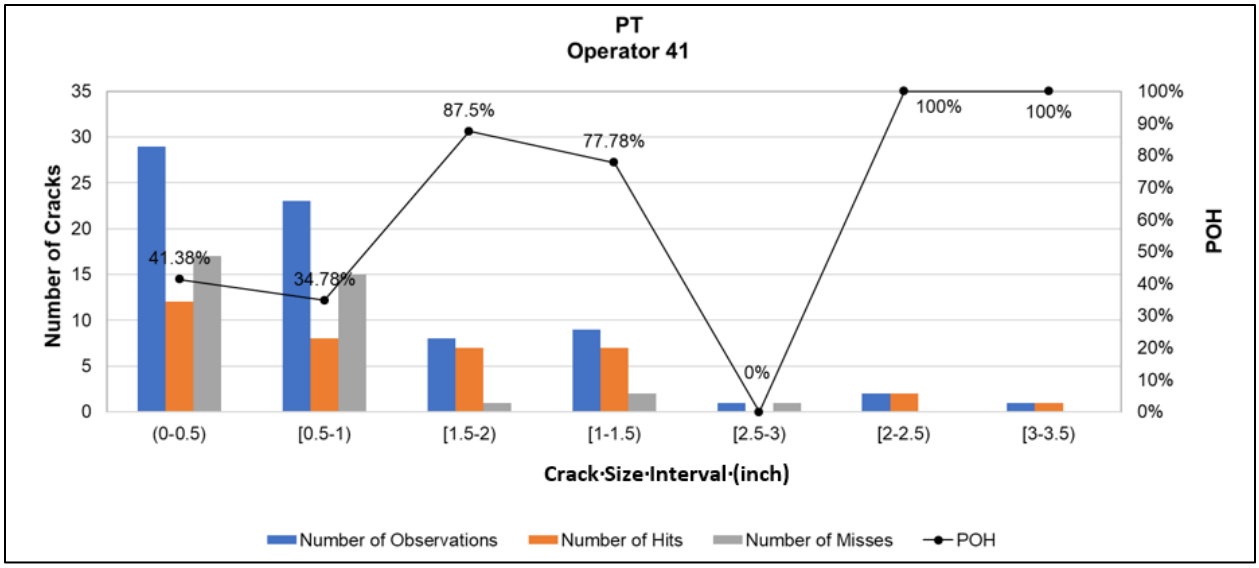

Figure 127. BW PT Distribution of Hits – Operator 41

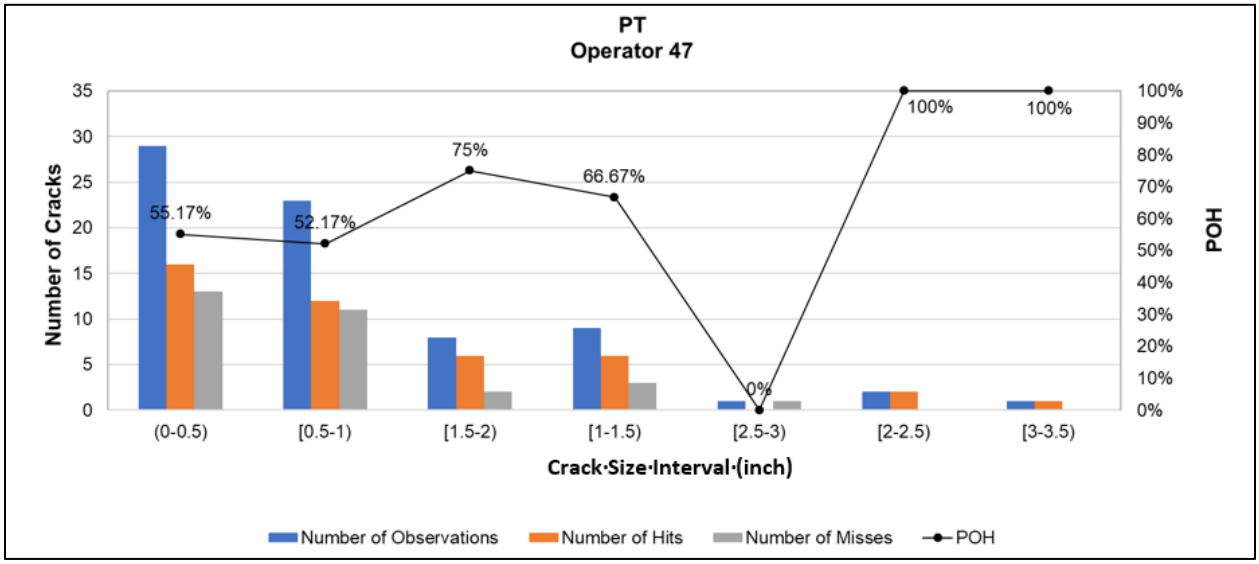

Figure 128. BW PT Distribution of Hits – Operator 47

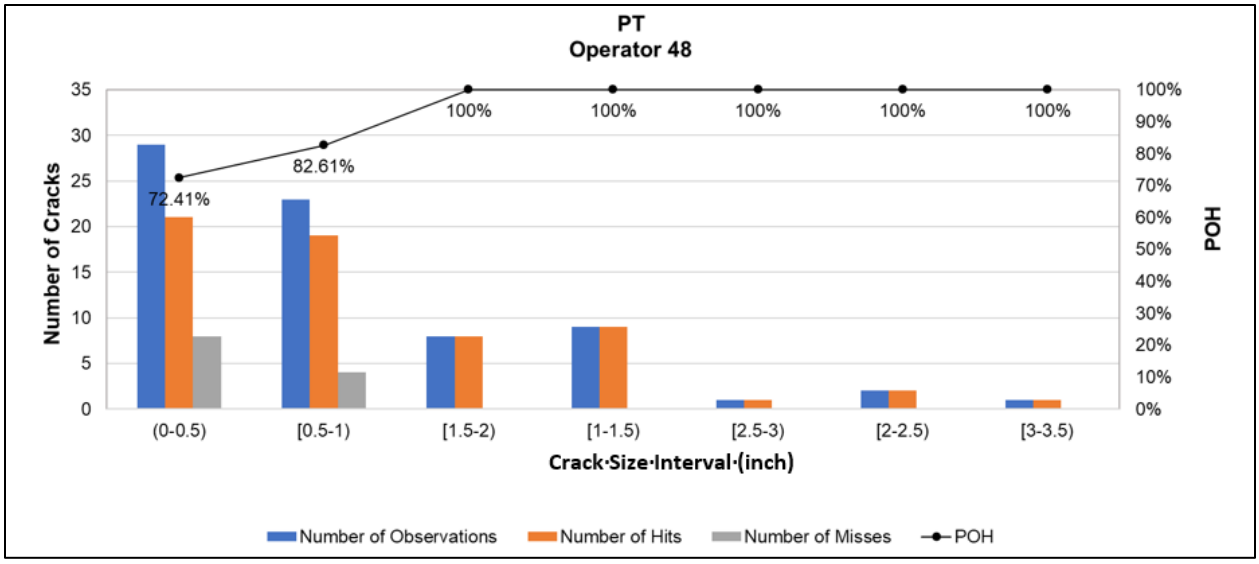

Figure 129. BW PT Distribution of Hits – Operator 48

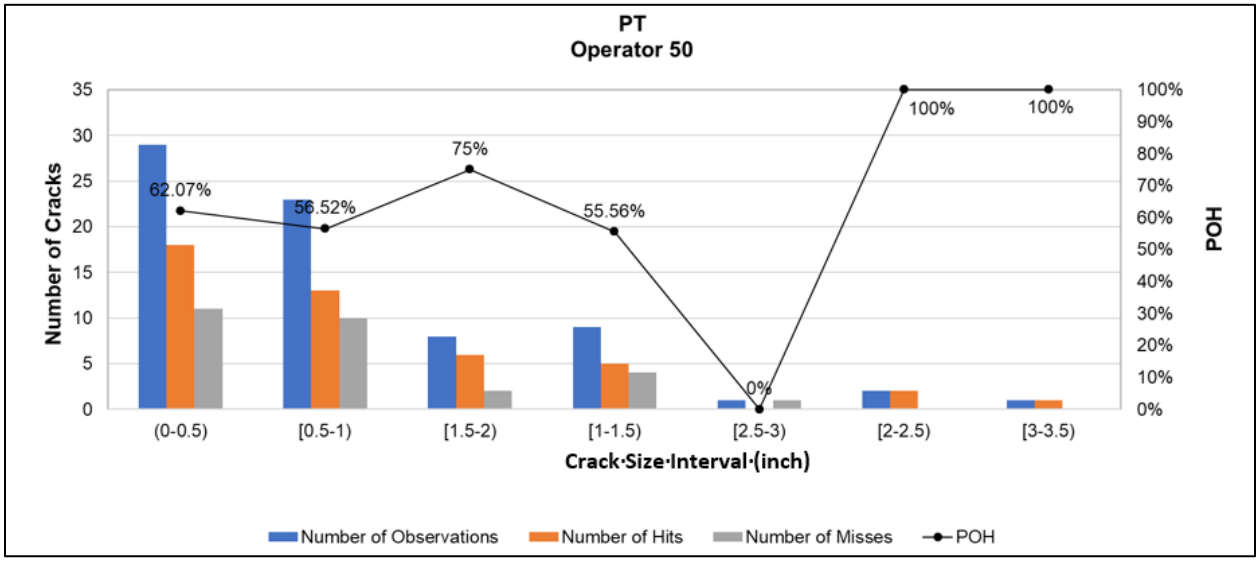

Figure 130. BW PT Distribution of Hits – Operator 50

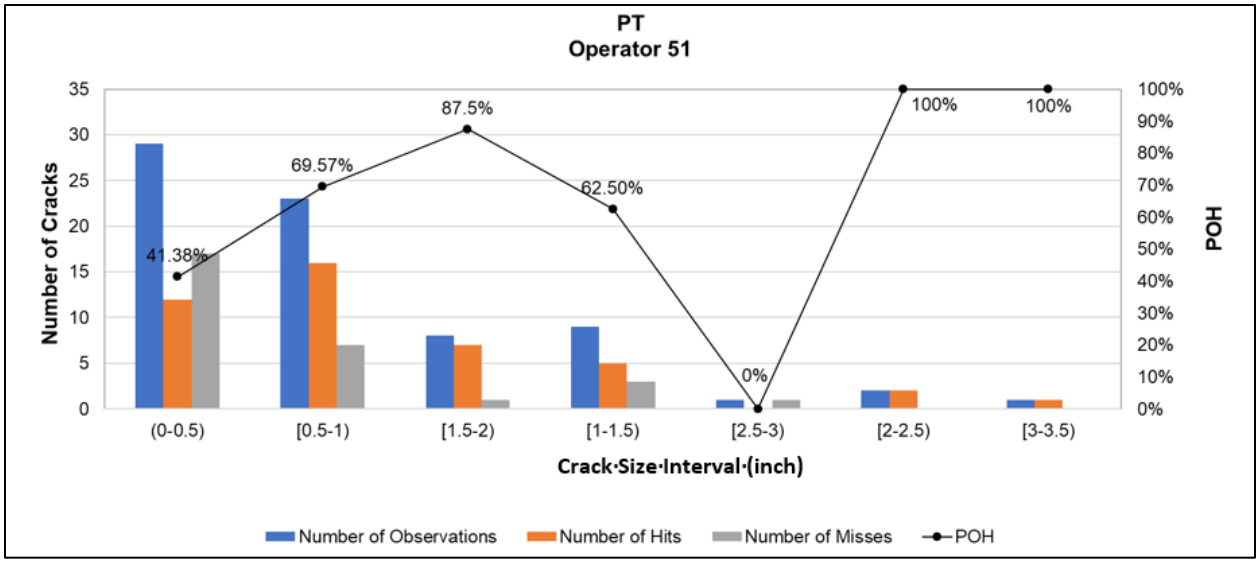

Figure 131. BW PT Distribution of Hits – Operator 51

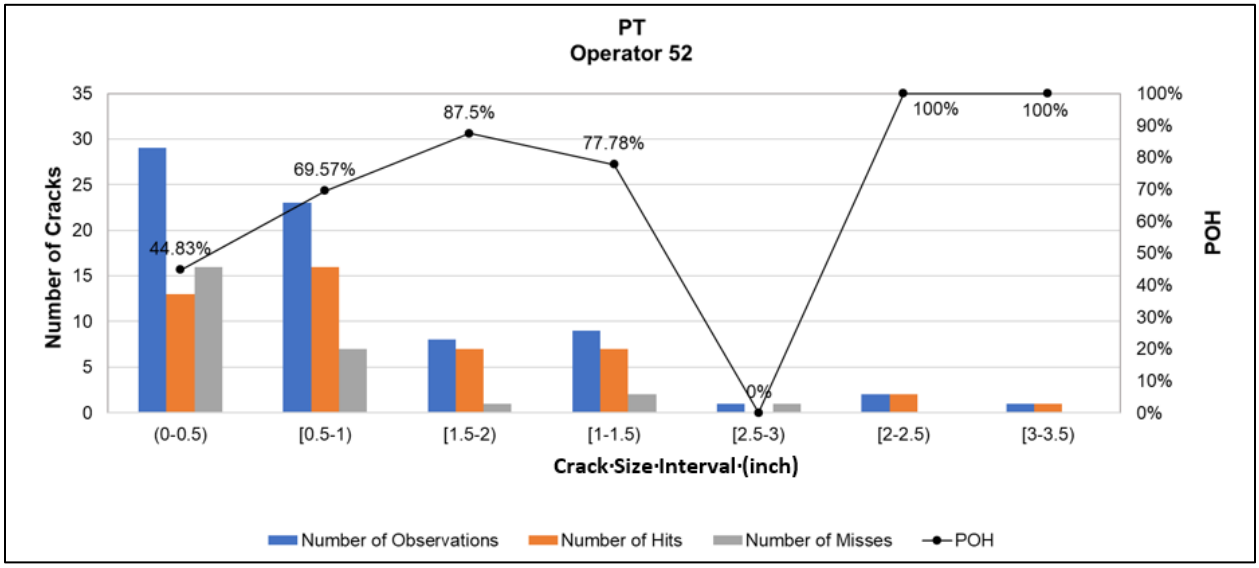

Figure 132. BW PT Distribution of Hits – Operator 52

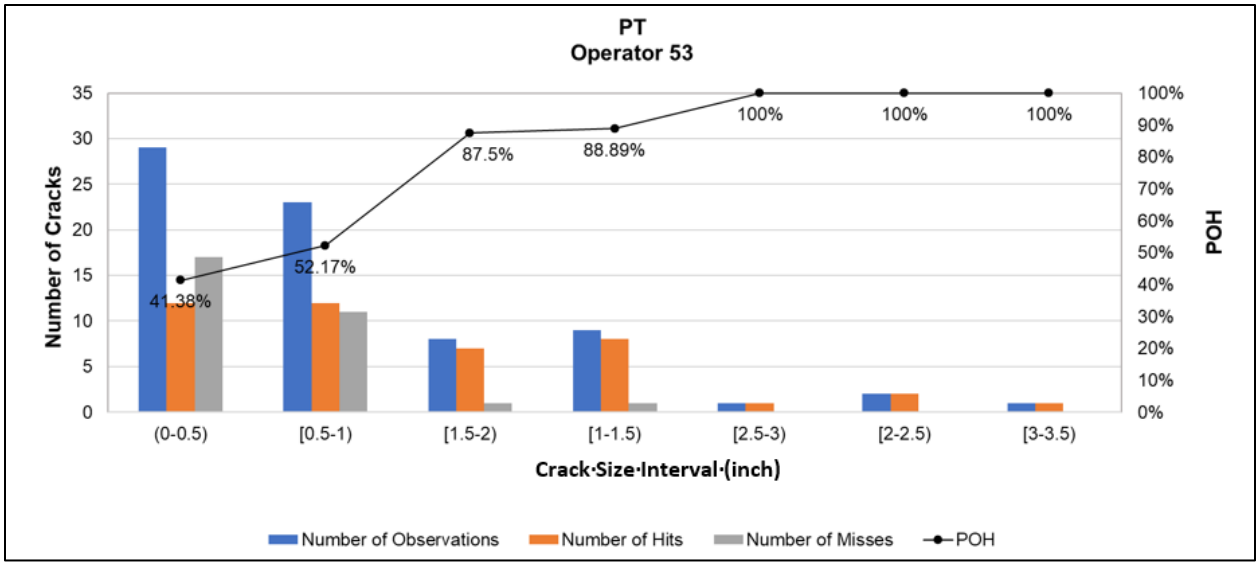

Figure 133. BW PT Distribution of Hits – Operator 53

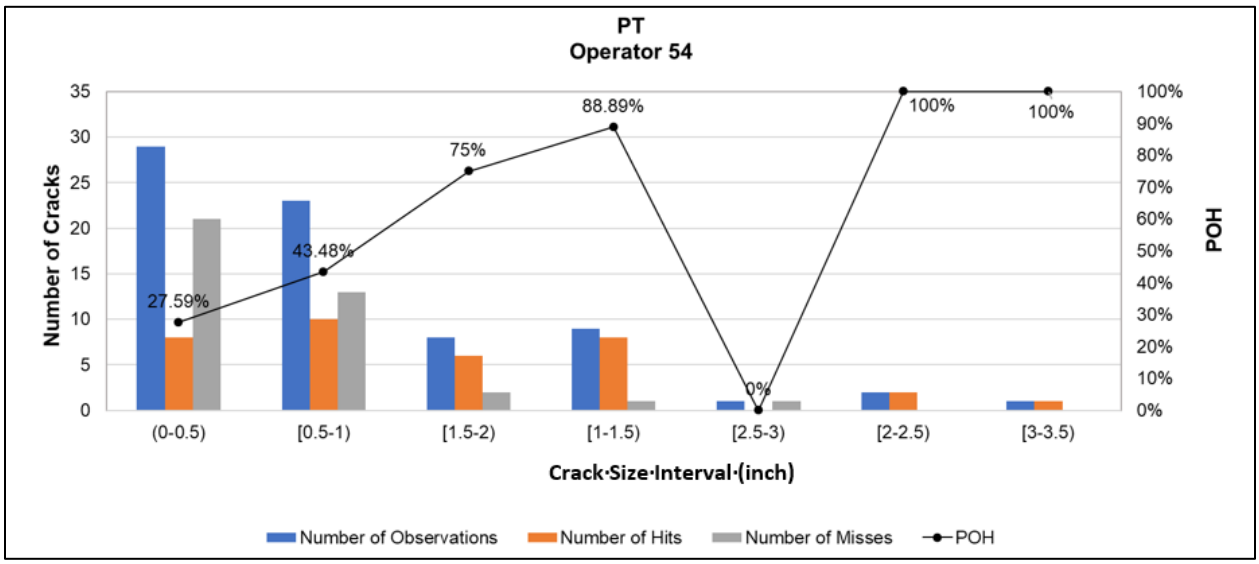

Figure 134. BW PT Distribution of Hits – Operator 54

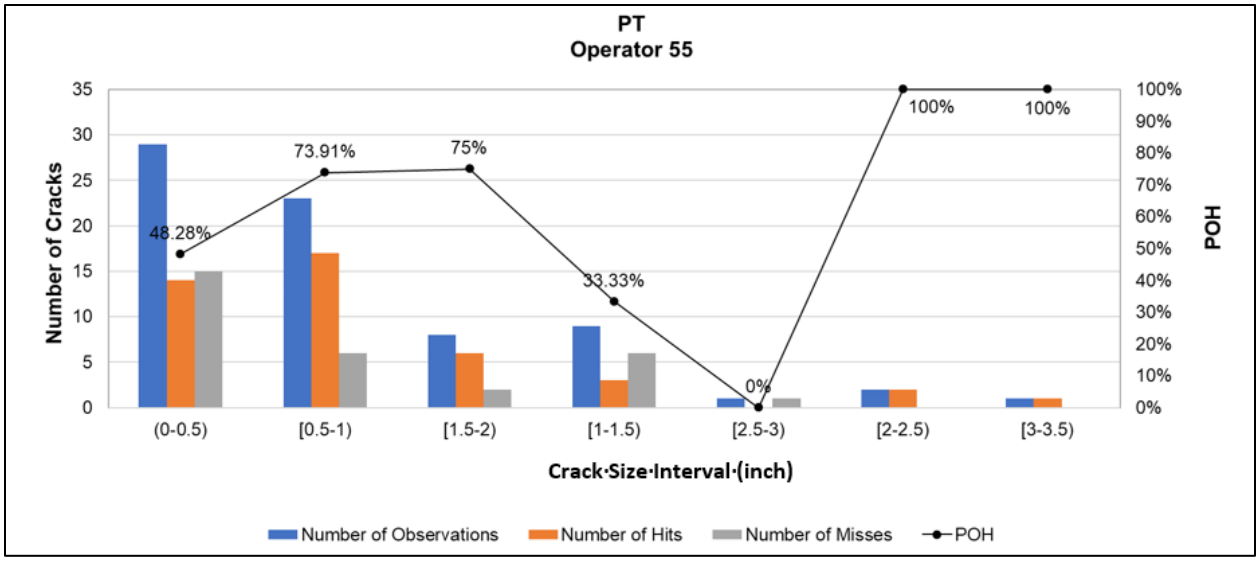

Figure 135. BW PT Distribution of Hits – Operator 55

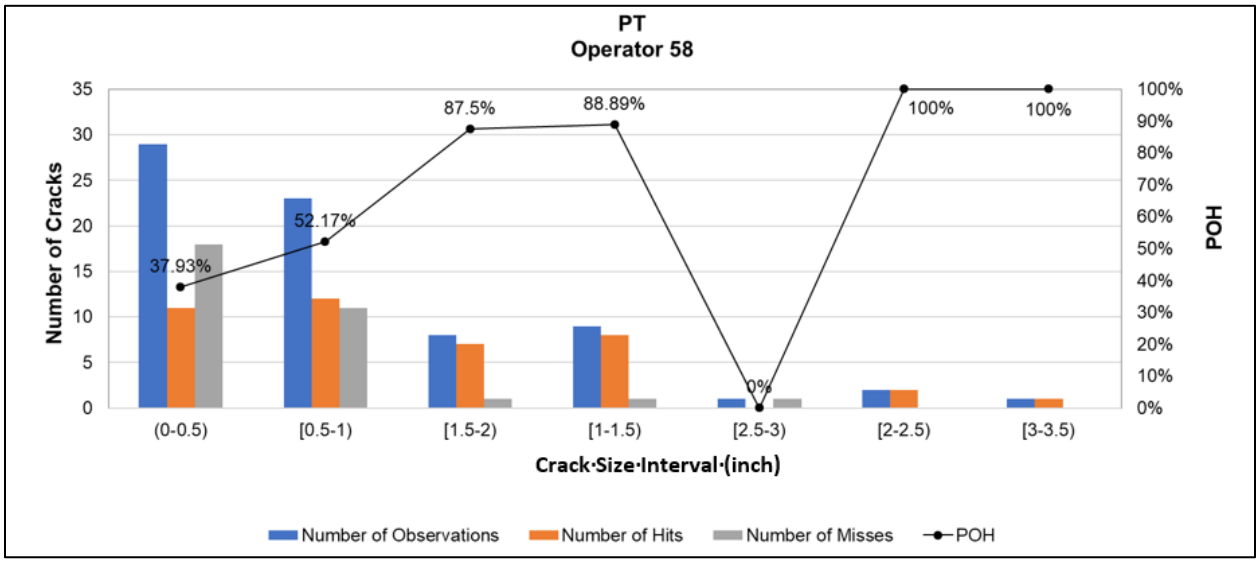

Figure 136. BW PT Distribution of Hits – Operator 58

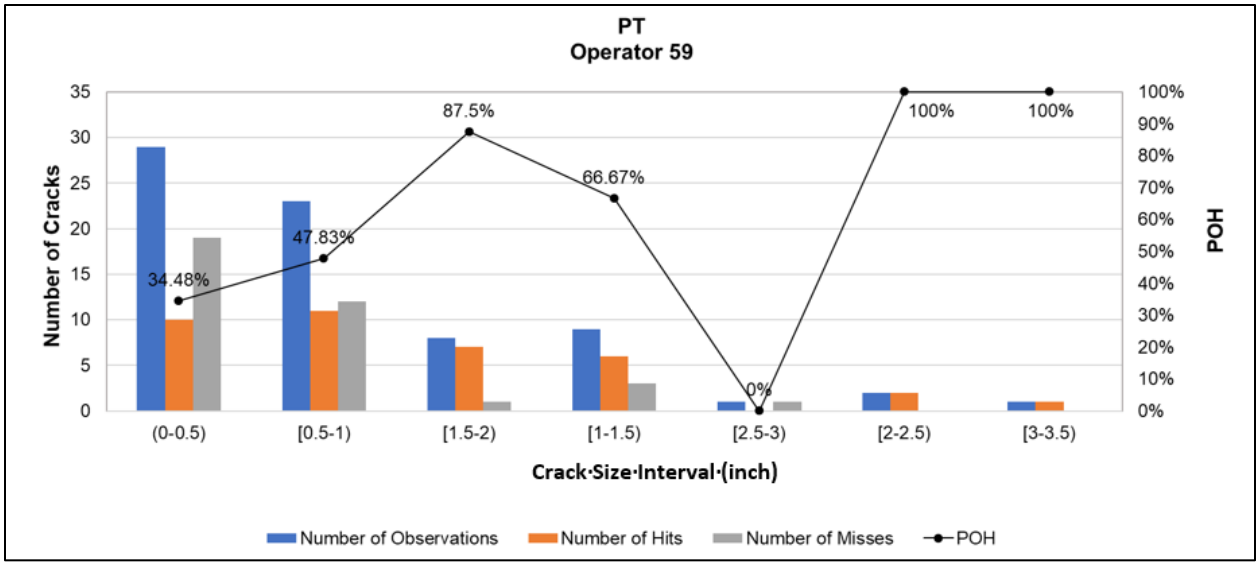

Figure 137. BW PT Distribution of Hits – Operator 59

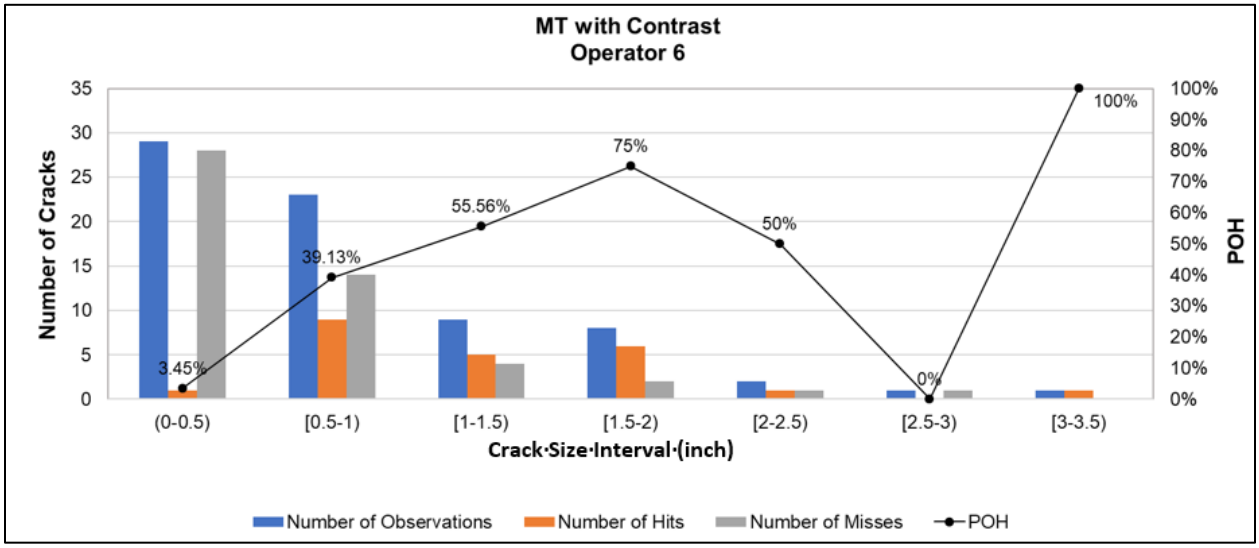

Figure 138. BW MT with Contrast Distribution of Hits – Operator 6

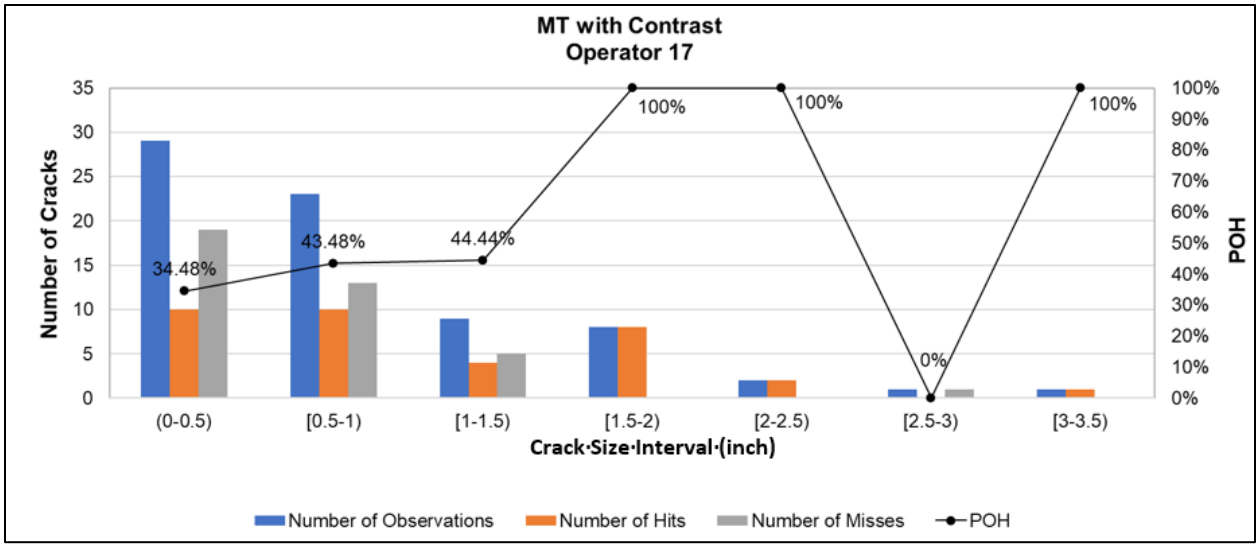

Figure 139. BW MT with Contrast Distribution of Hits – Operator 17

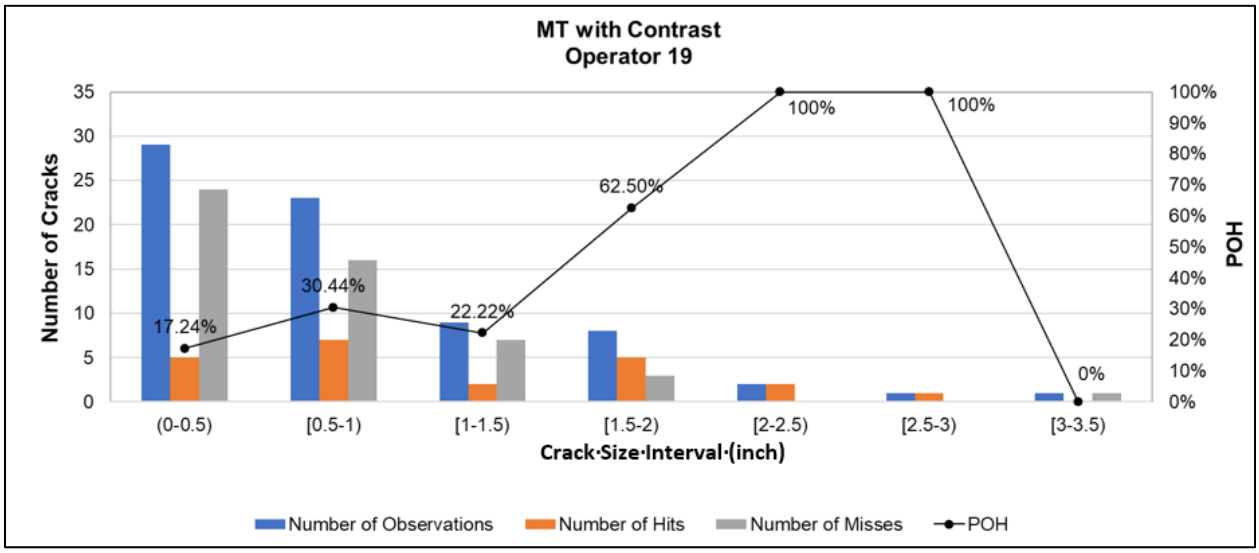

Figure 140. BW MT with Contrast Distribution of Hits – Operator 19

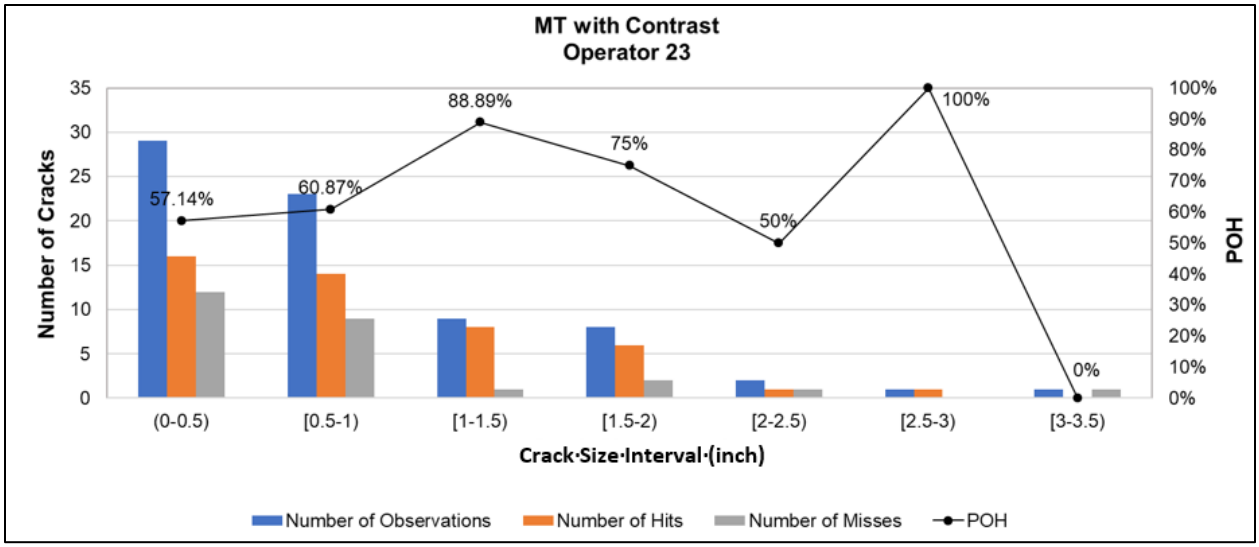

Figure 141. BW MT with Contrast Distribution of Hits – Operator 23

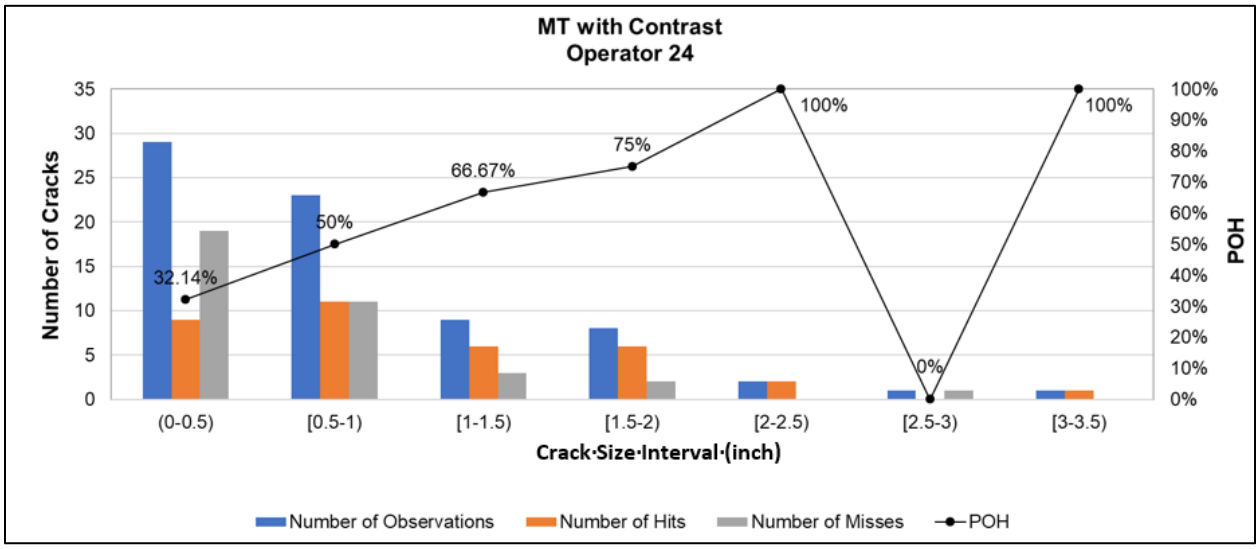

Figure 142. BW MT with Contrast Distribution of Hits – Operator 24

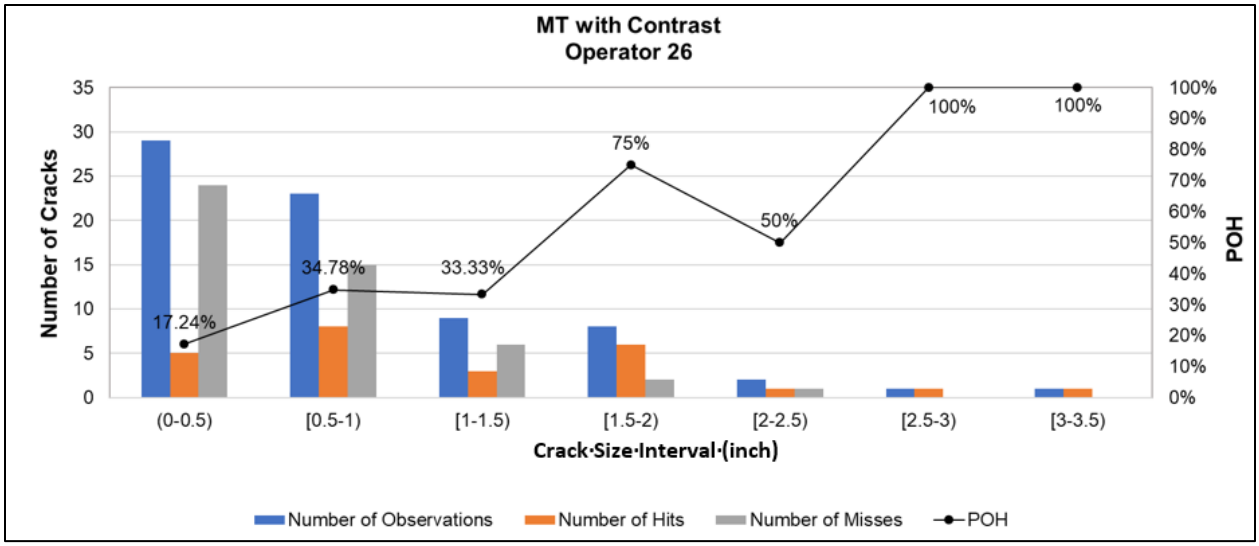

Figure 143. BW MT with Contrast Distribution of Hits – Operator 26

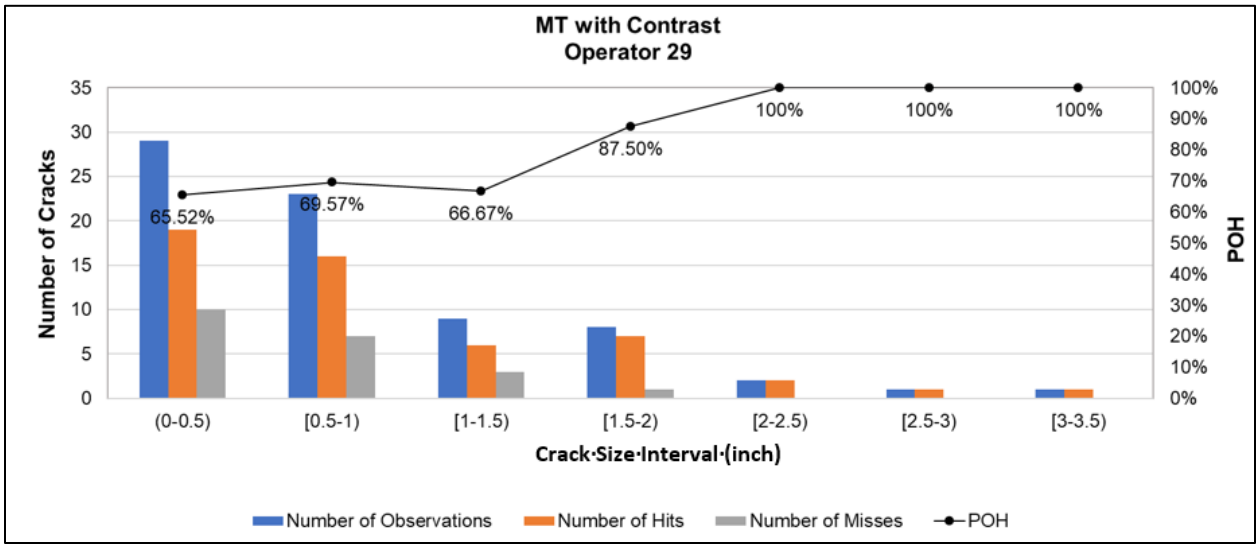

Figure 144. BW MT with Contrast Distribution of Hits – Operator 29

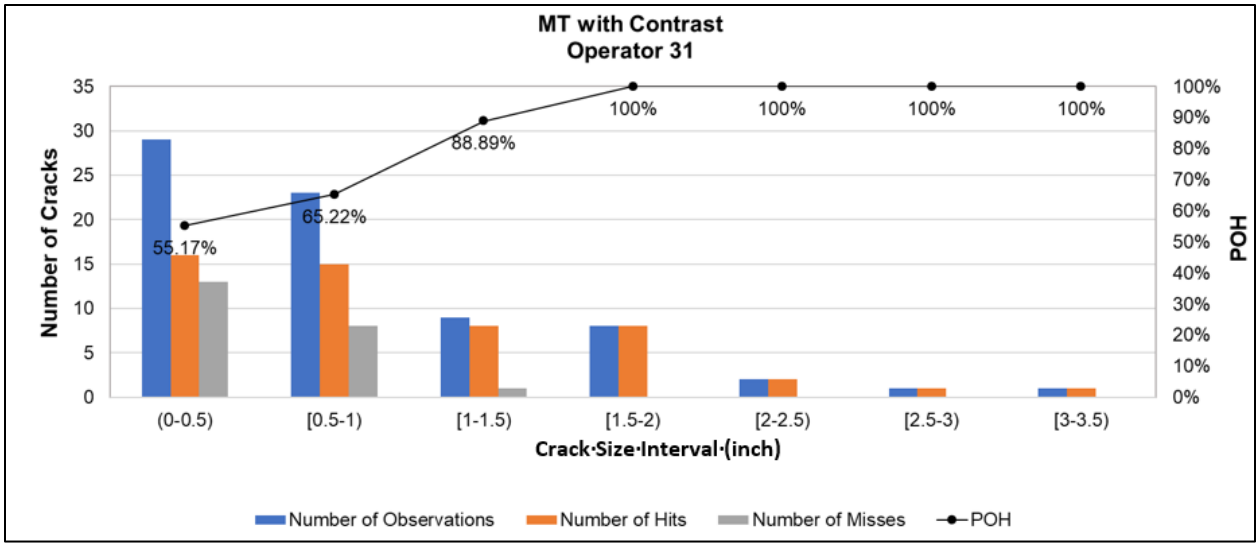

Figure 145. BW MT with Contrast Distribution of Hits – Operator 31

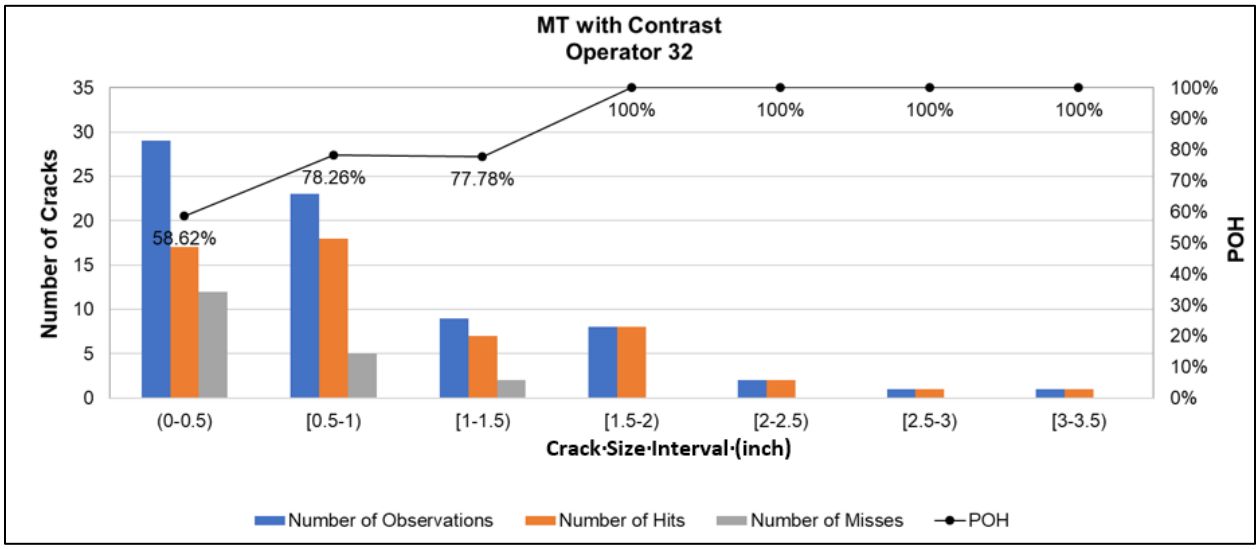

Figure 146. BW MT with Contrast Distribution of Hits – Operator 32

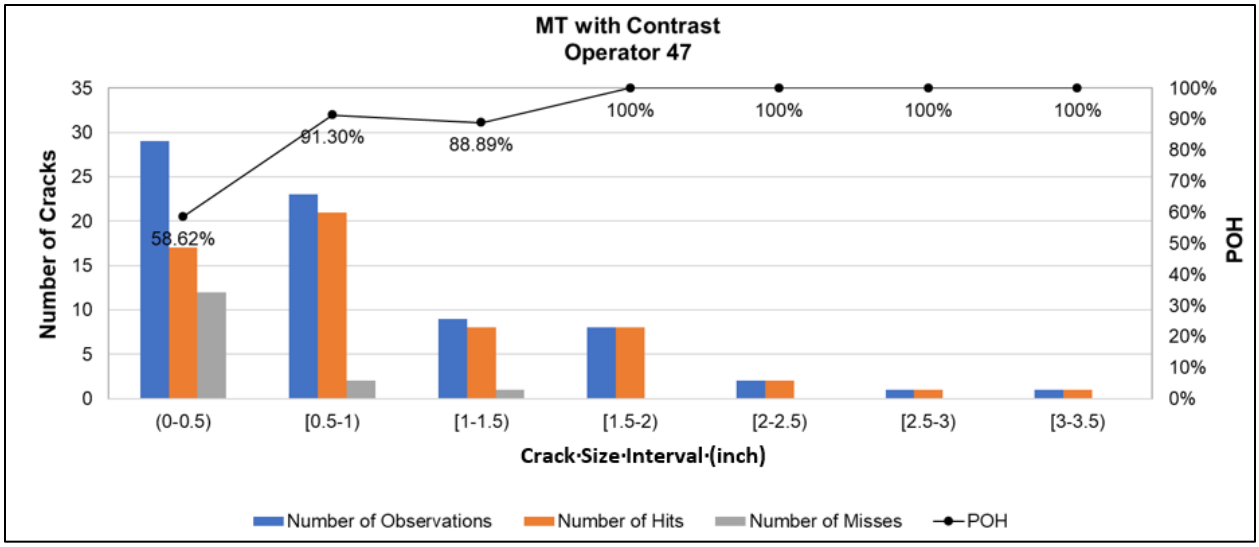

Figure 147. BW MT with Contrast Distribution of Hits – Operator 47

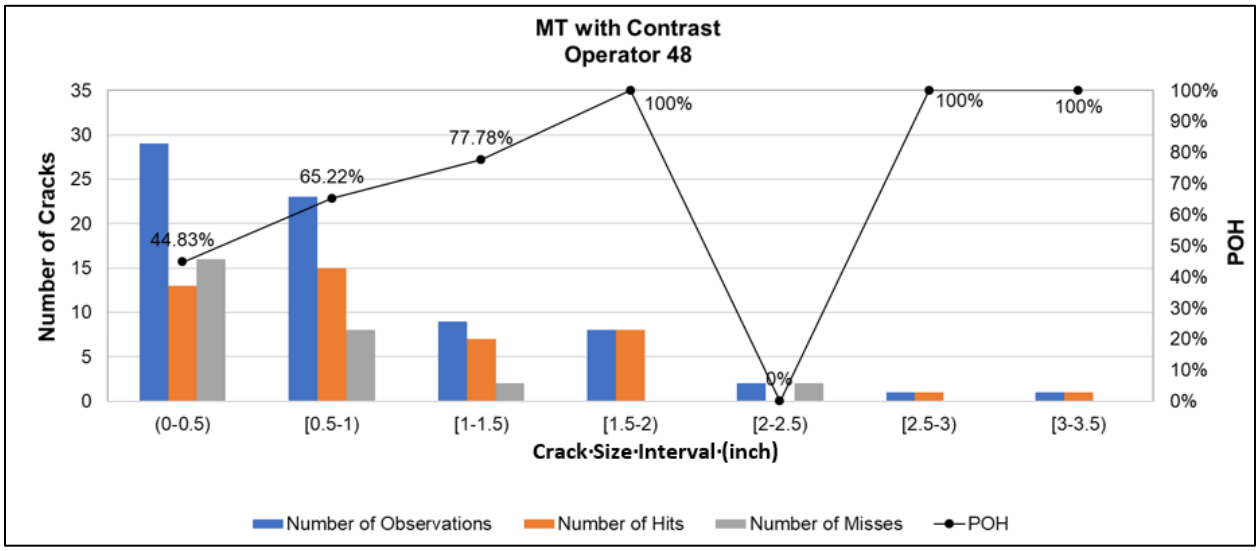

Figure 148. BW MT with Contrast Distribution of Hits – Operator 48

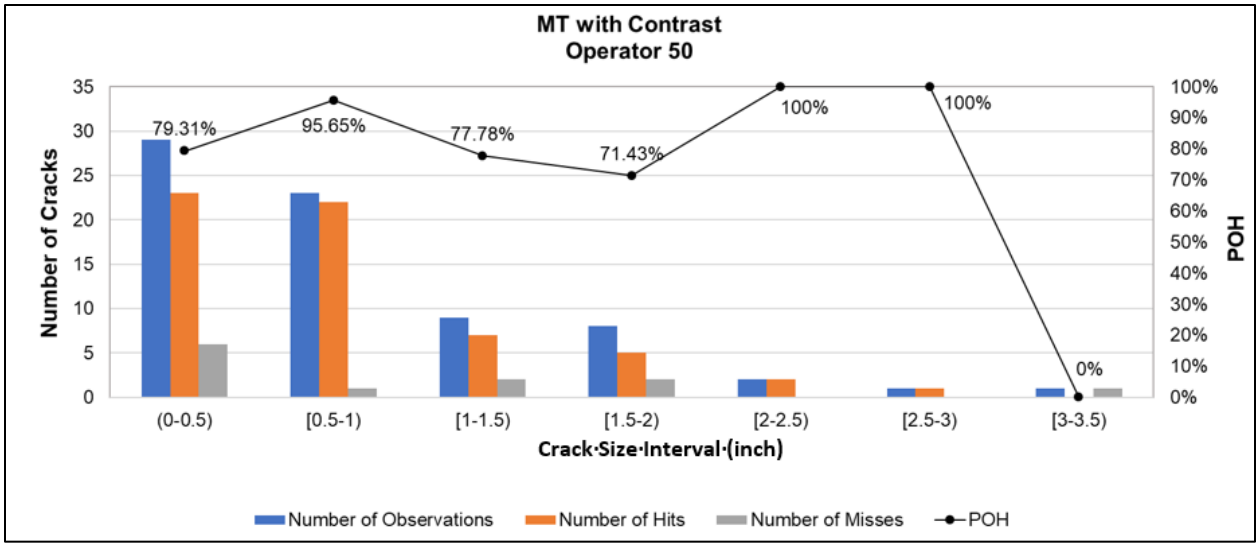

Figure 149. BW MT with Contrast Distribution of Hits – Operator 50

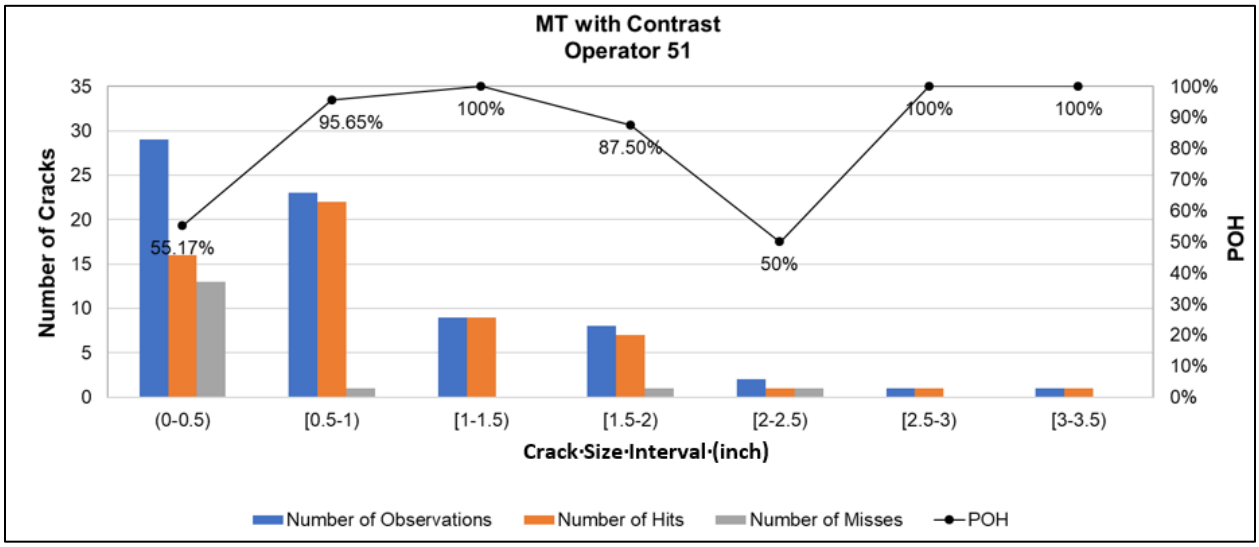

Figure 150. BW MT with Contrast Distribution of Hits – Operator 51

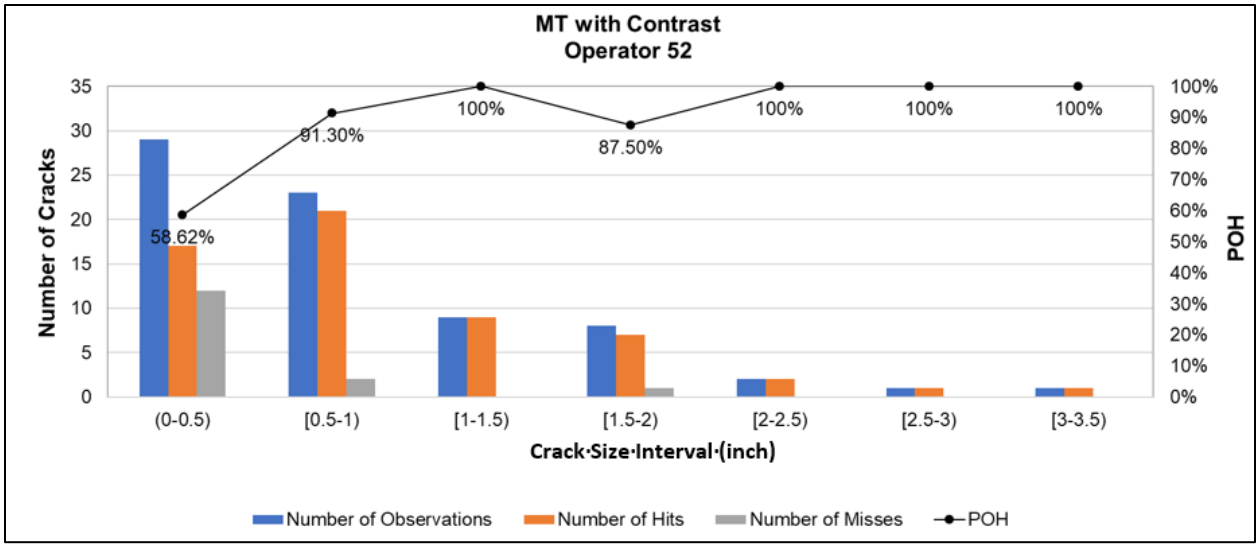

Figure 151. BW MT with Contrast Distribution of Hits – Operator 52

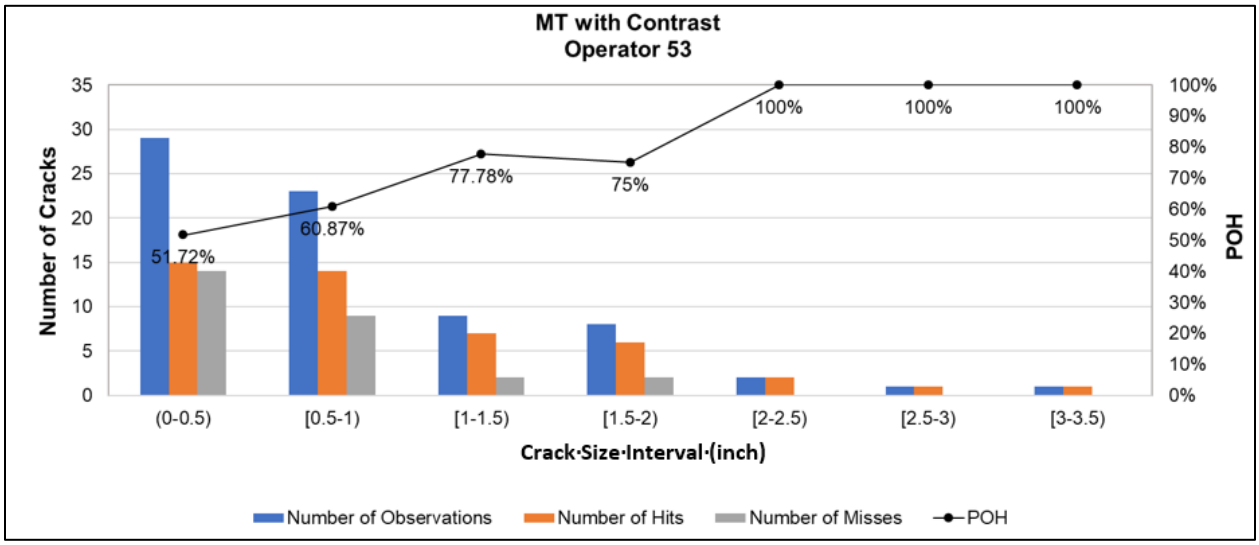

Figure 152. BW MT with Contrast Distribution of Hits – Operator 53

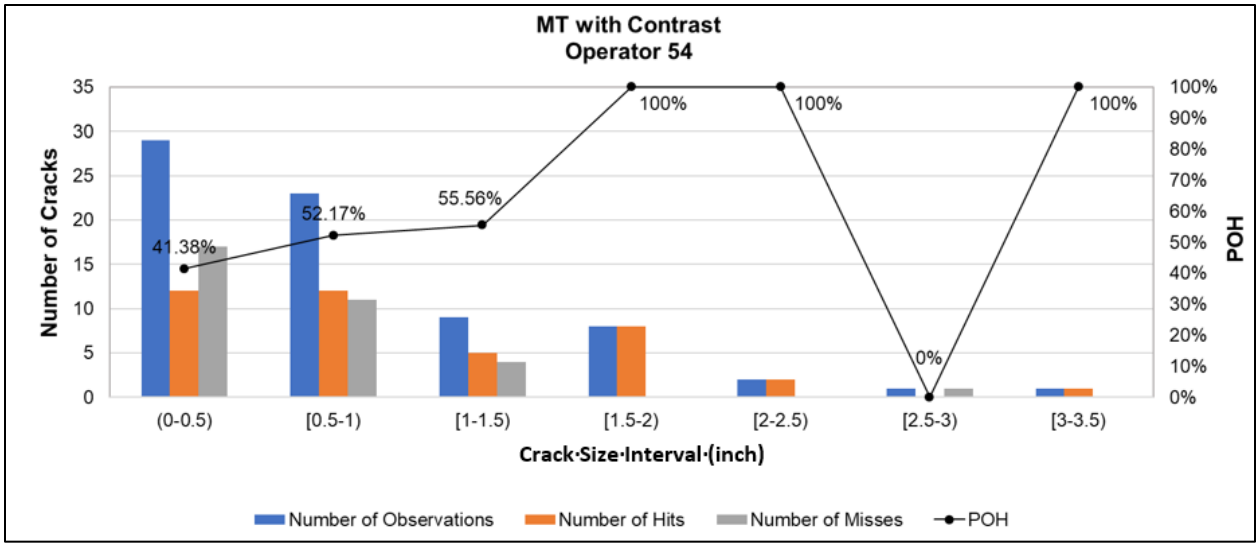

Figure 153. BW MT with Contrast Distribution of Hits – Operator 54

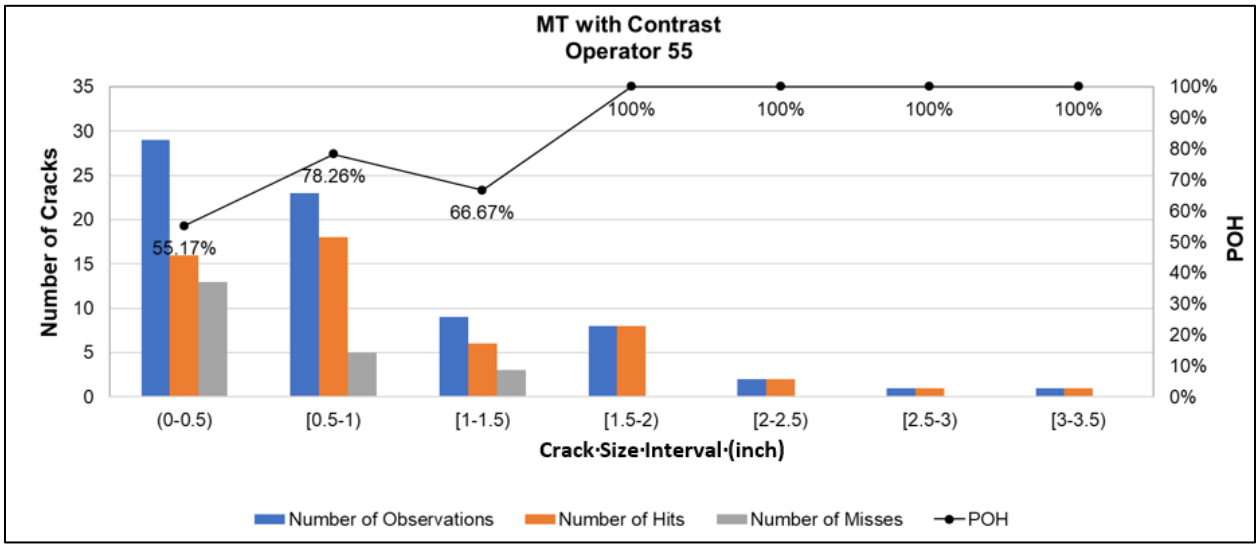

Figure 154. BW MT with Contrast Distribution of Hits – Operator 55

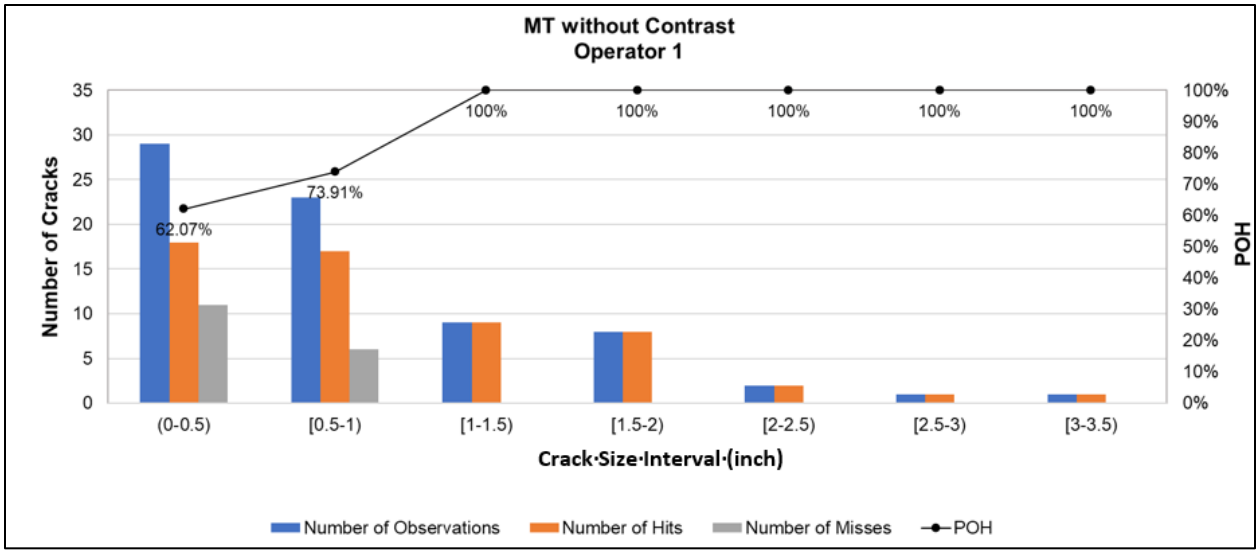

Figure 155. BW MT without Contrast Distribution of Hits – Operator 1

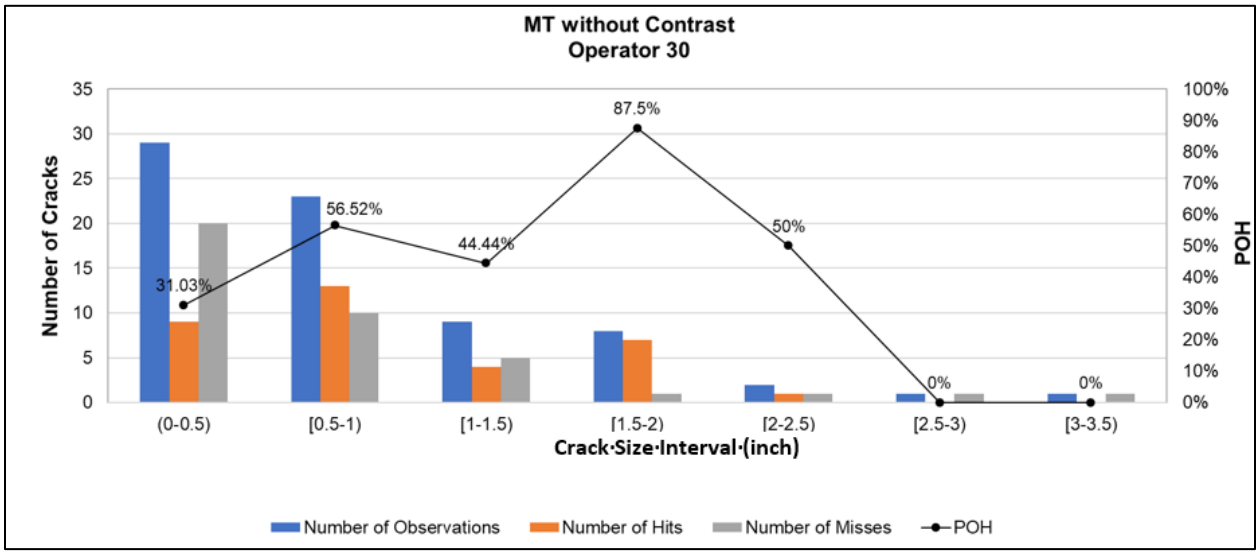

Figure 156. BW MT without Contrast Distribution of Hits – Operator 30

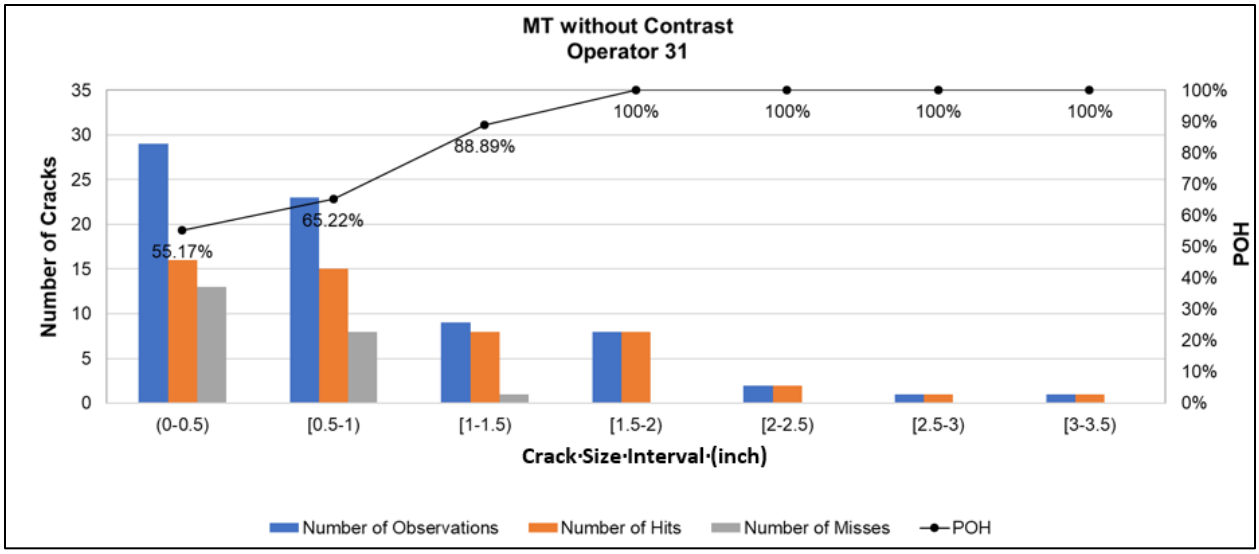

Figure 157. BW MT without Contrast Distribution of Hits – Operator 31

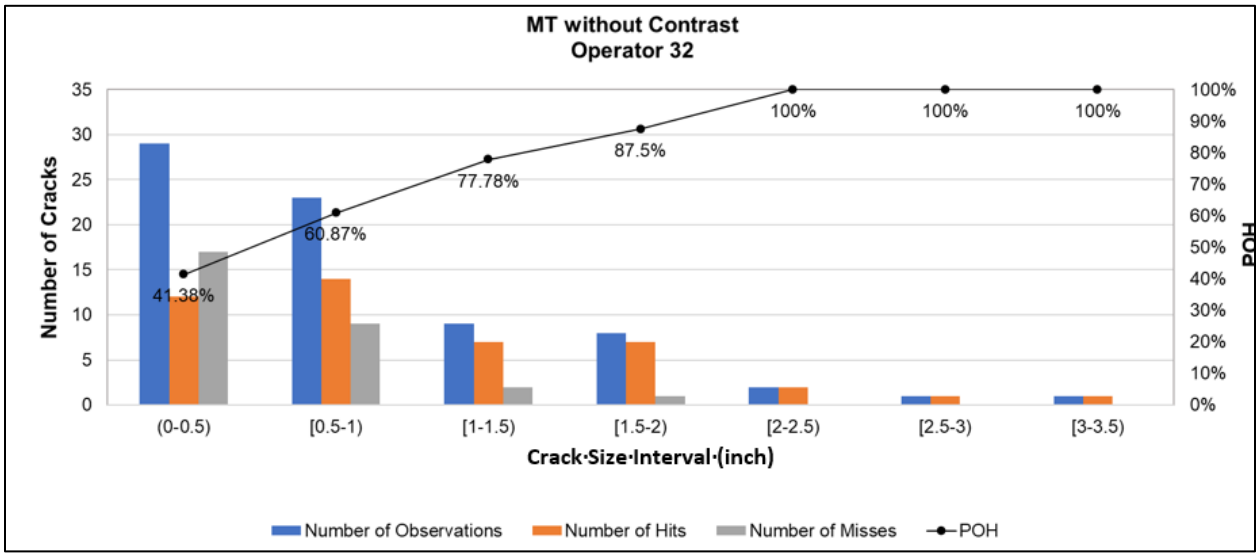

Figure 158. BW MT without Contrast Distribution of Hits – Operator 32

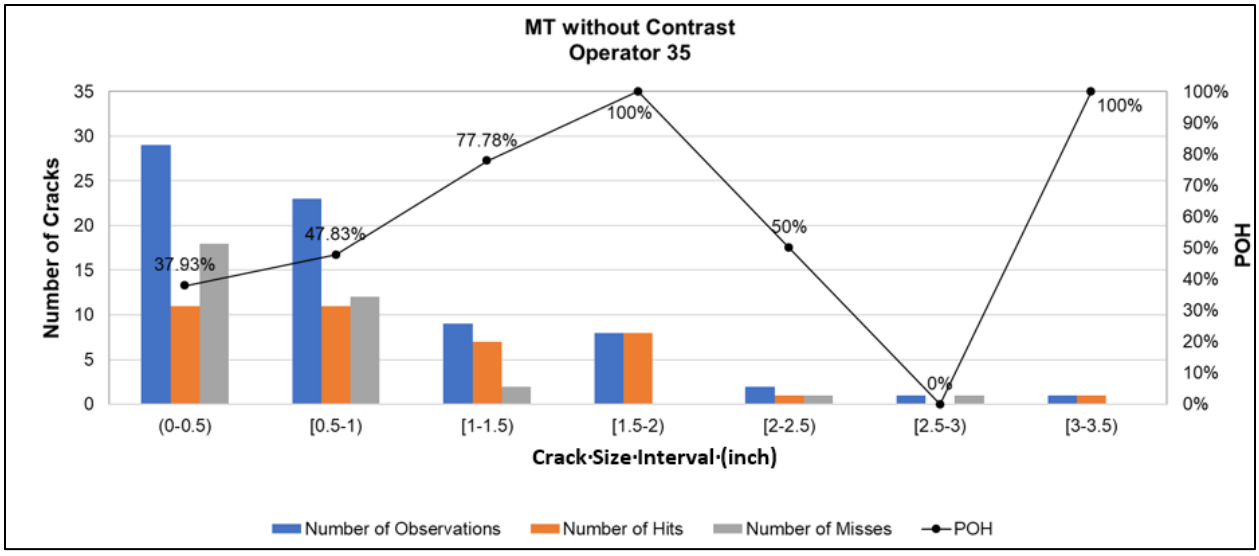

Figure 159. BW MT without Contrast Distribution of Hits – Operator 35

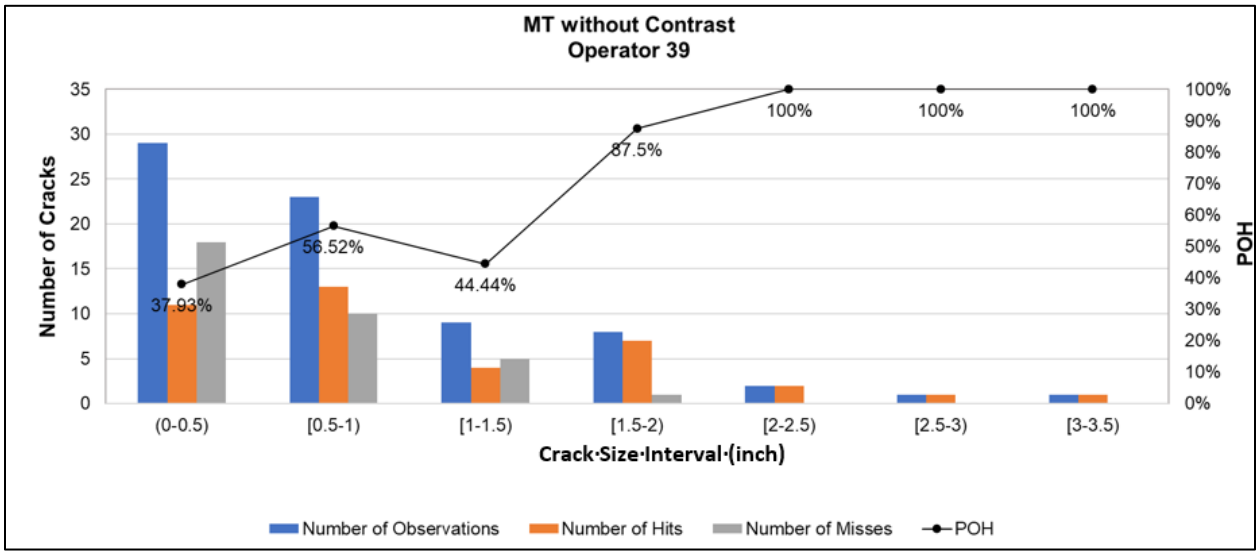

Figure 160. BW MT without Contrast Distribution of Hits – Operator 39

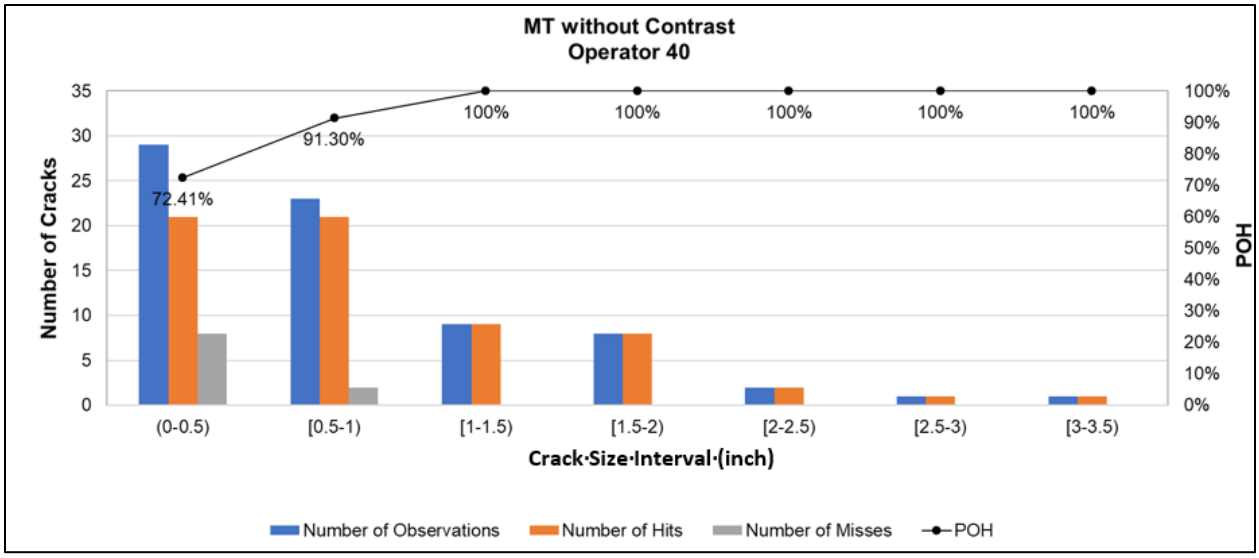

Figure 161. BW MT without Contrast Distribution of Hits – Operator 40

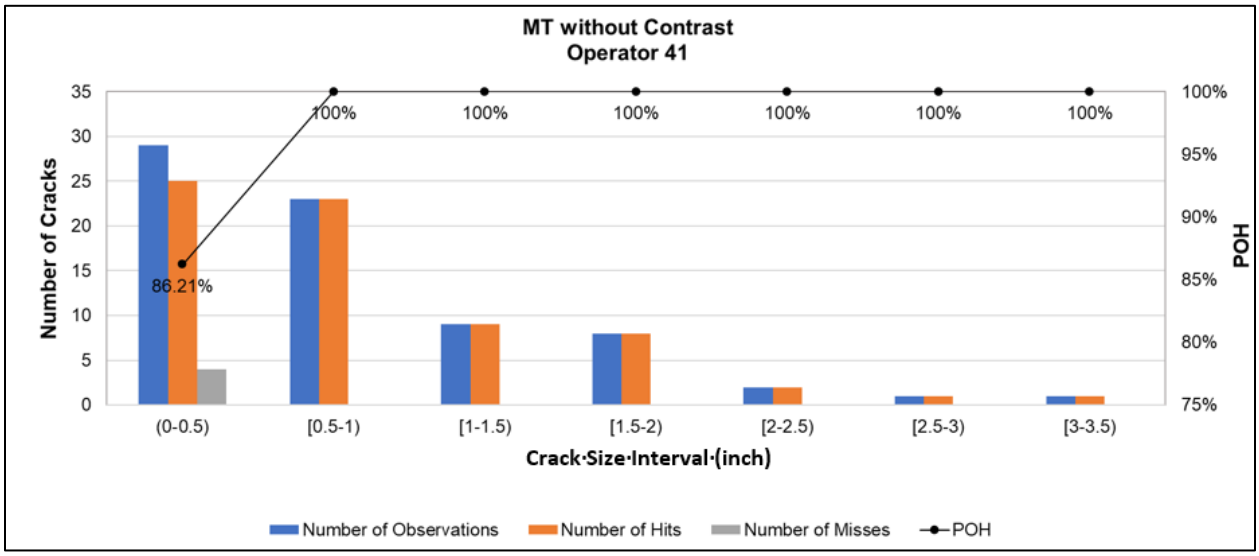

Figure 162. BW MT without Contrast Distribution of Hits – Operator 41

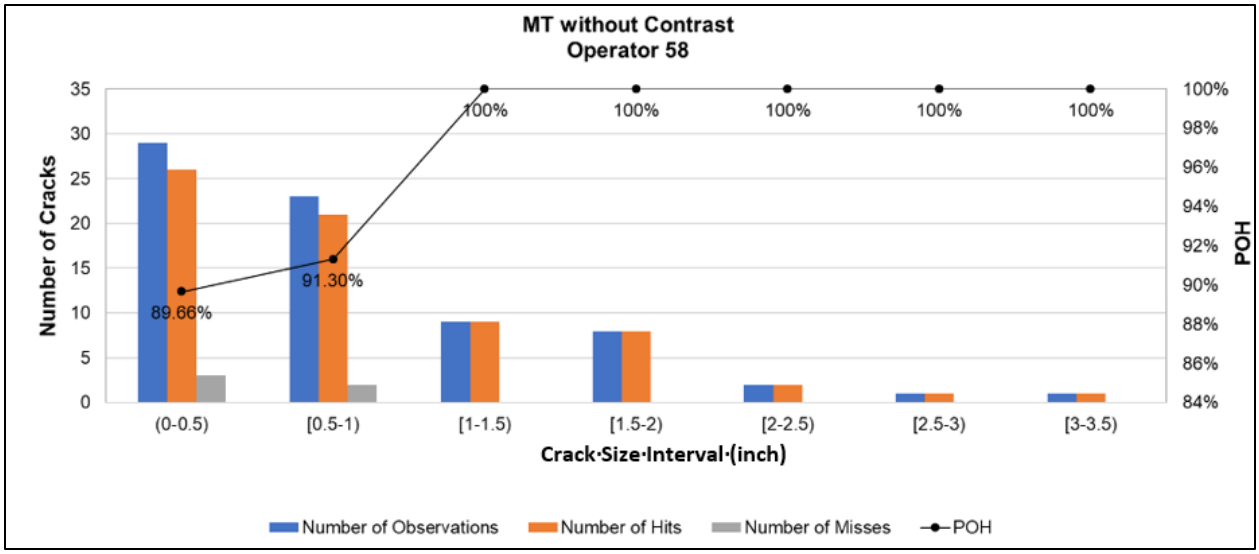

Figure 163. BW MT without Contrast Distribution of Hits – Operator 58

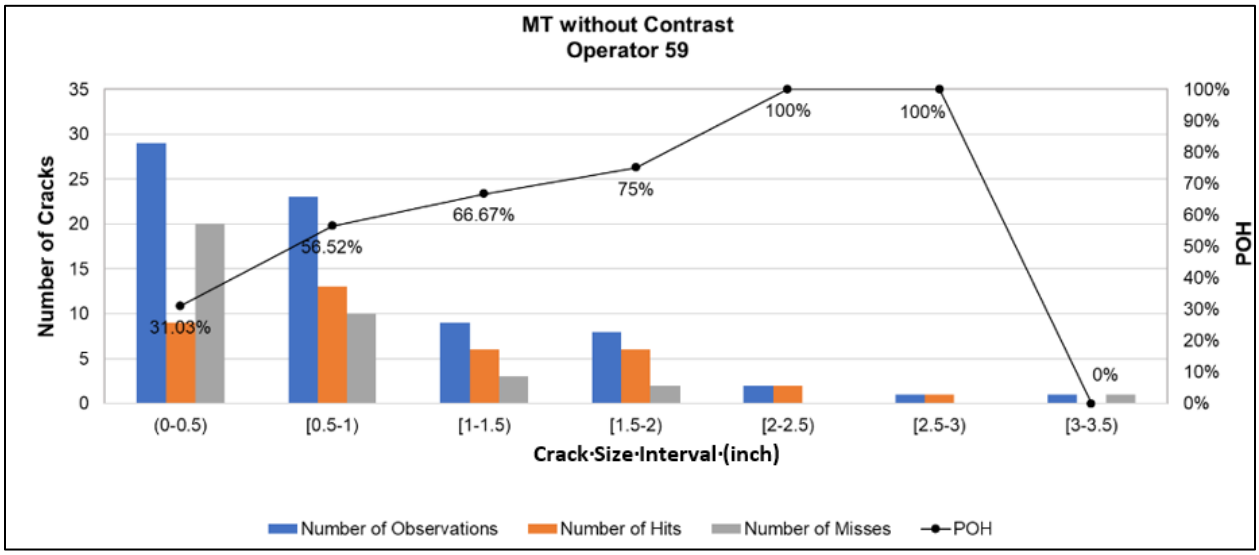

Figure 164. BW MT without Contrast Distribution of Hits – Operator 59

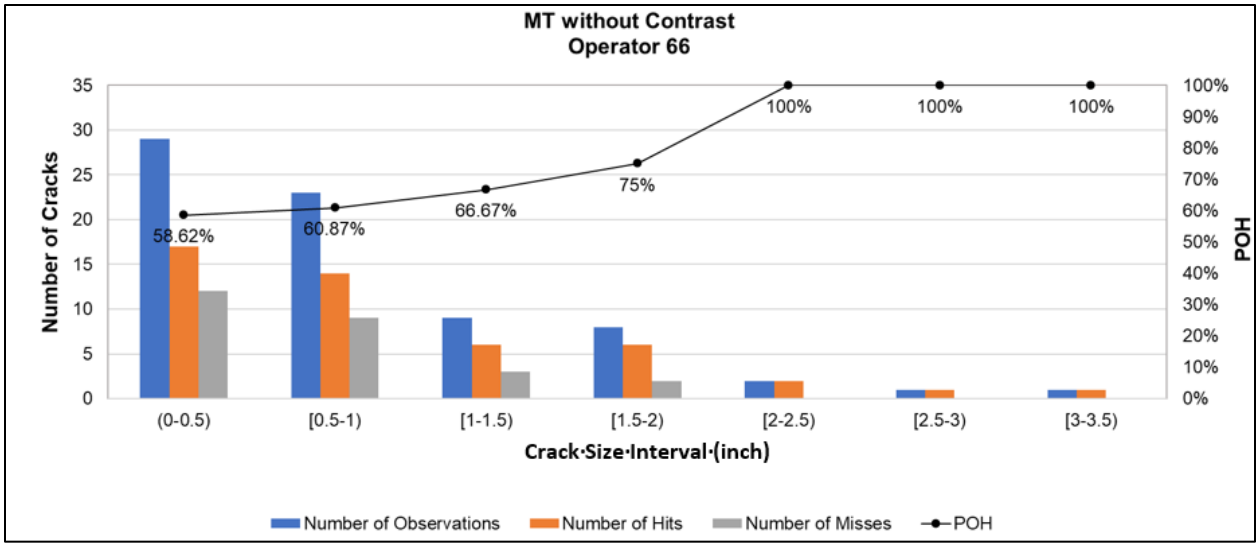

Figure 165. BW MT without Contrast Distribution of Hits – Operator 66

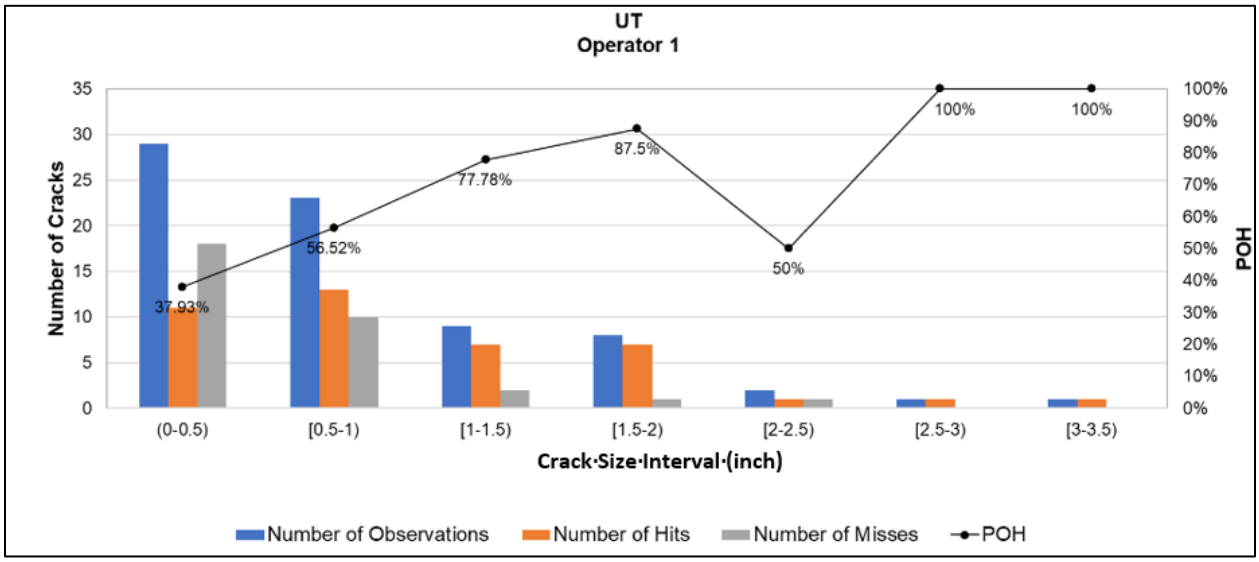

Figure 166. BW UT Distribution of Hits – Operator 1

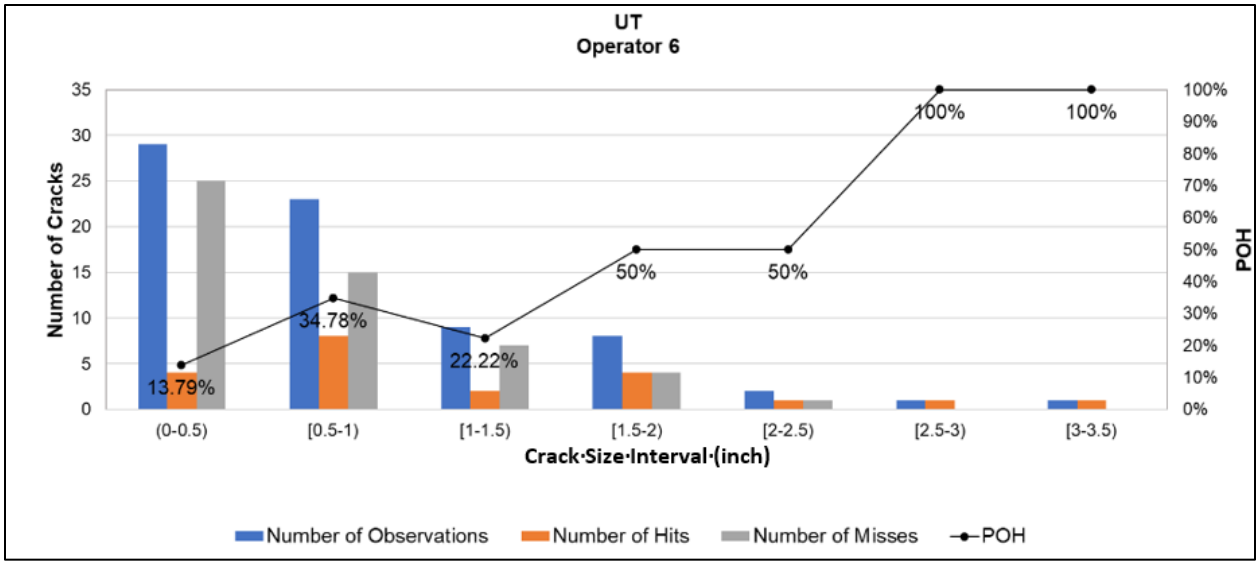

Figure 167. BW UT Distribution of Hits – Operator 6

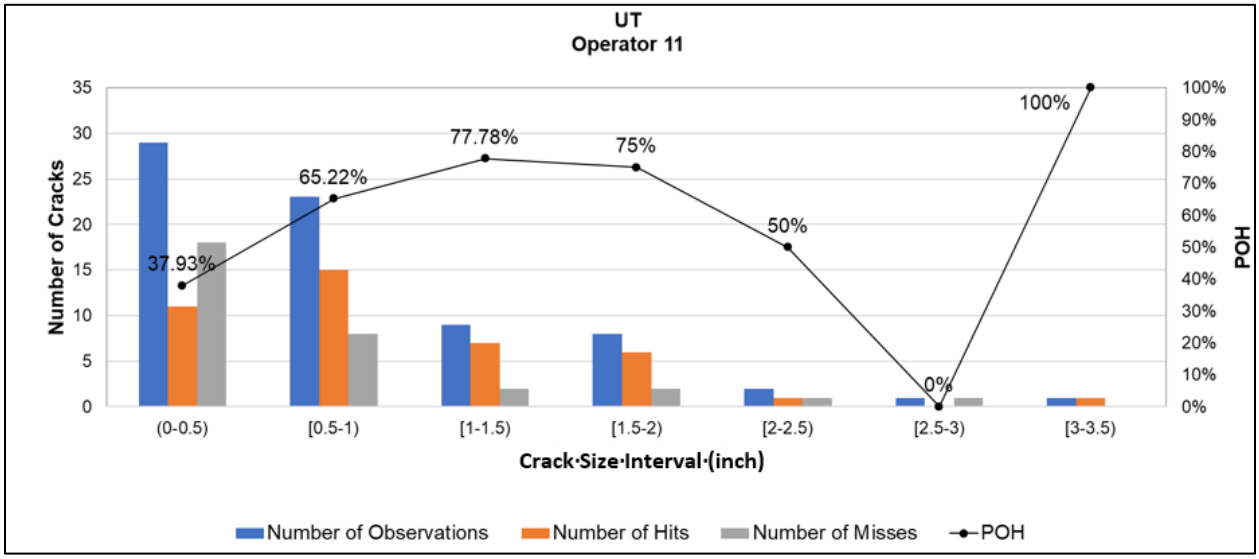

Figure 168. BW UT Distribution of Hits – Operator 11

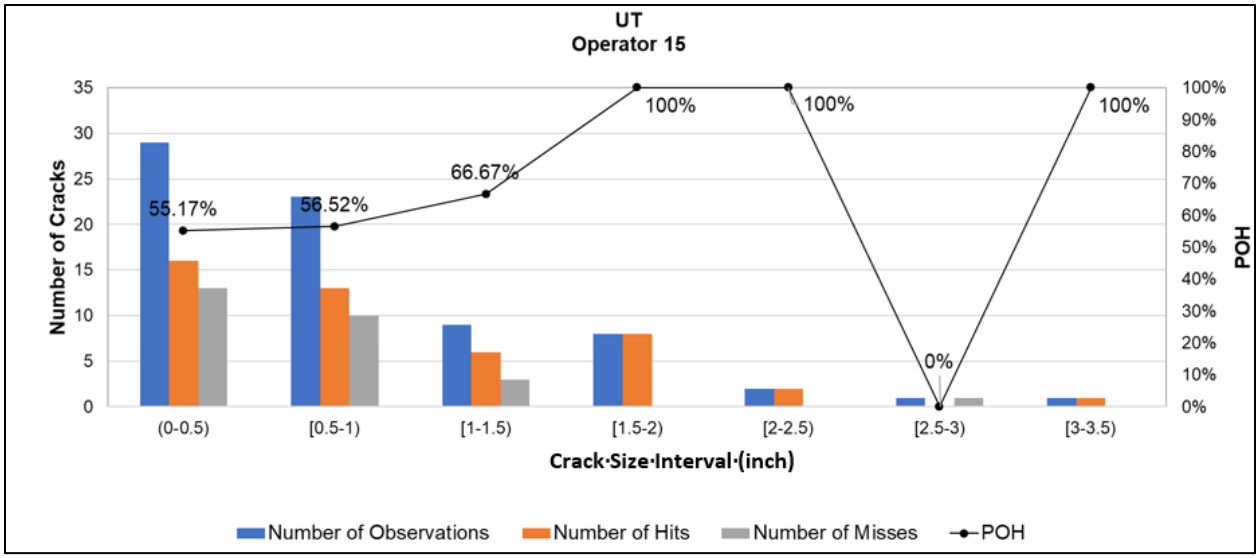

Figure 169. BW UT Distribution of Hits – Operator 15

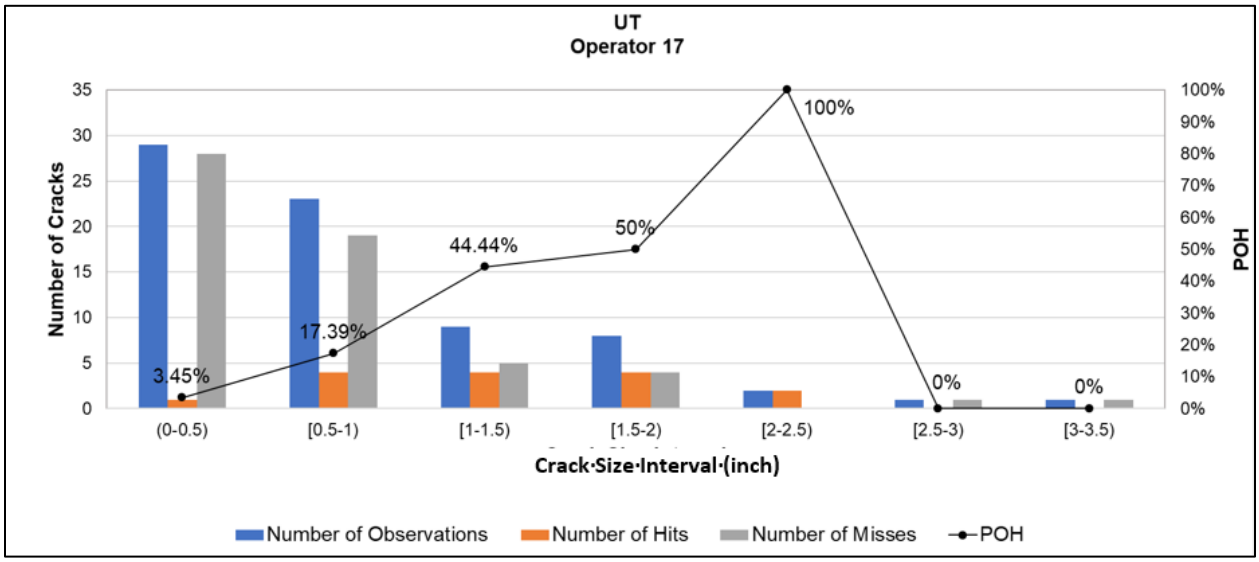

Figure 170. BW UT Distribution of Hits – Operator 17

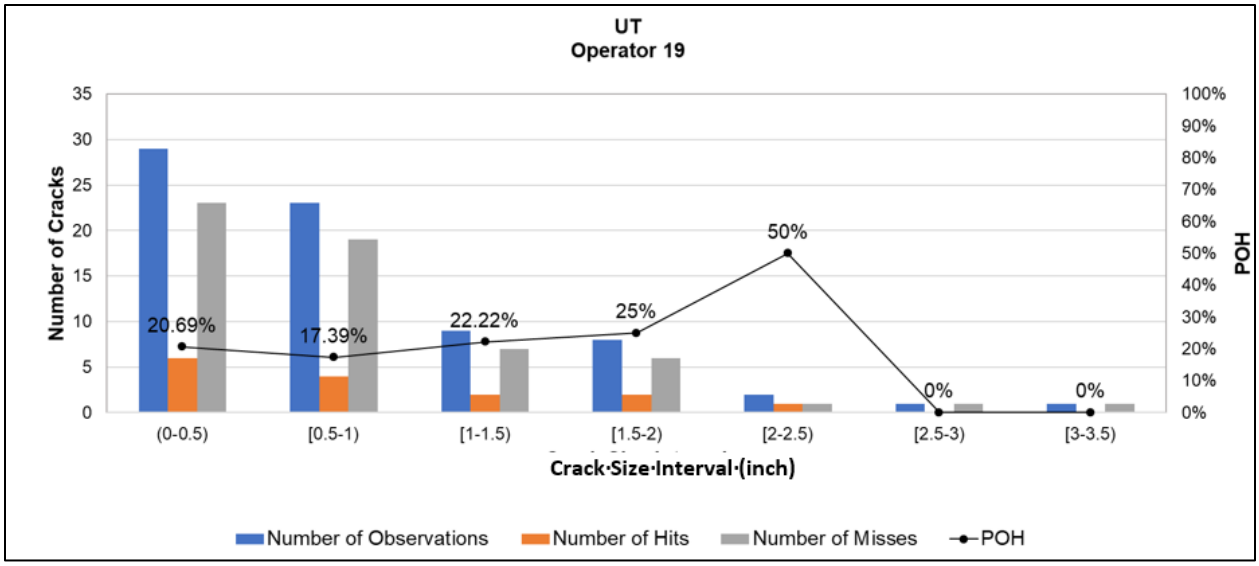

Figure 171. BW UT Distribution of Hits – Operator 19

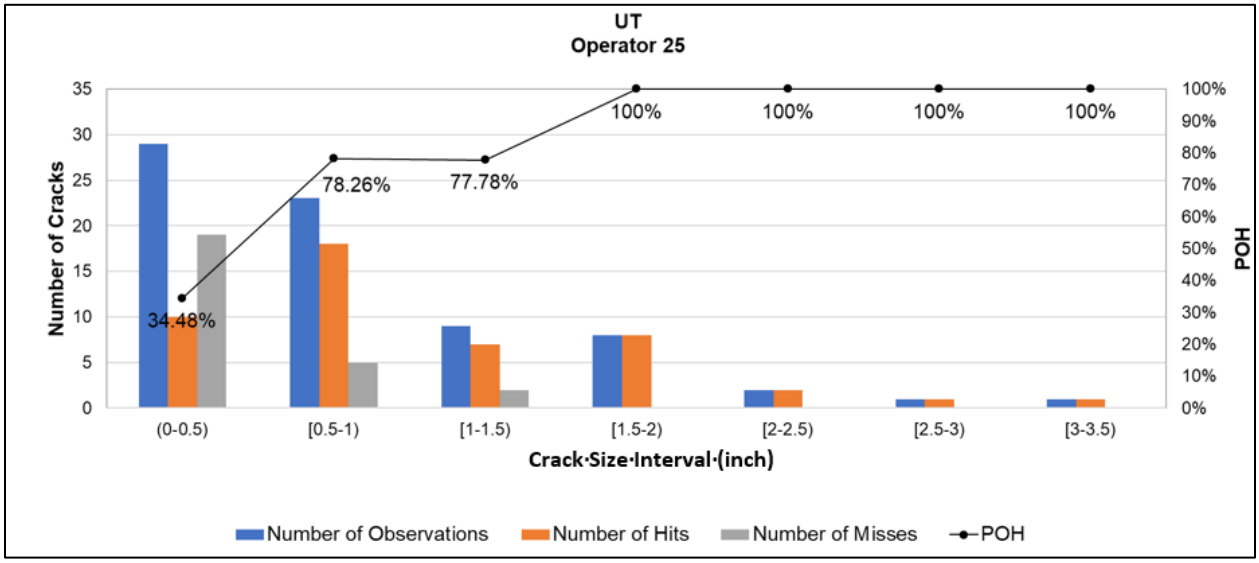

Figure 172. BW UT Distribution of Hits – Operator 25

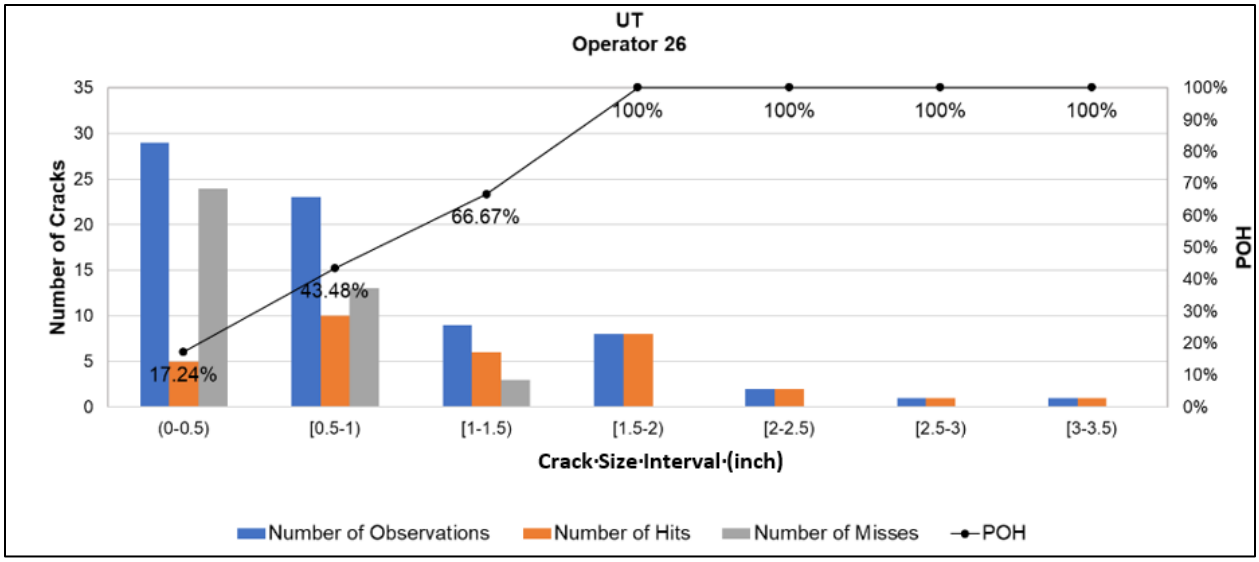

Figure 173. BW UT Distribution of Hits – Operator 26

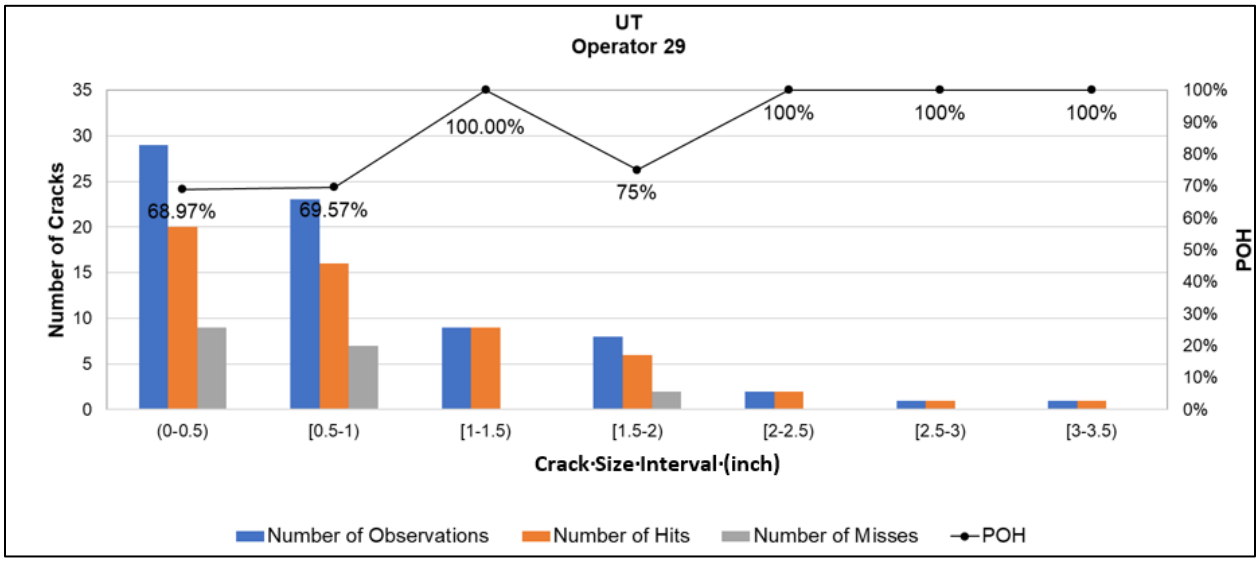

Figure 174. BW UT Distribution of Hits – Operator 29

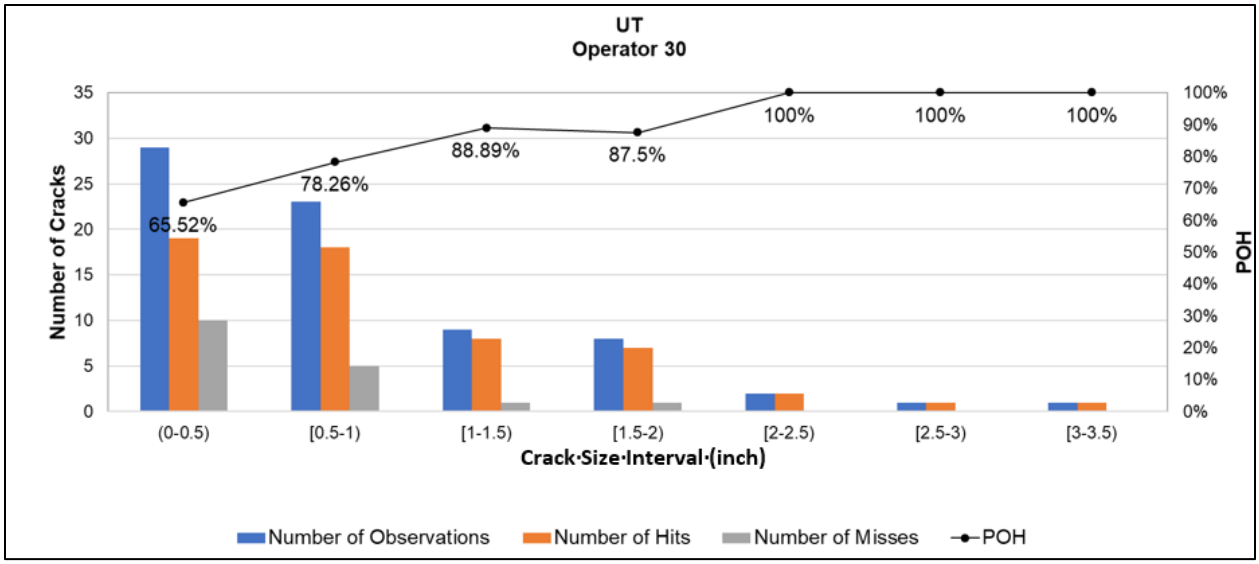

Figure 175. BW UT Distribution of Hits – Operator 30

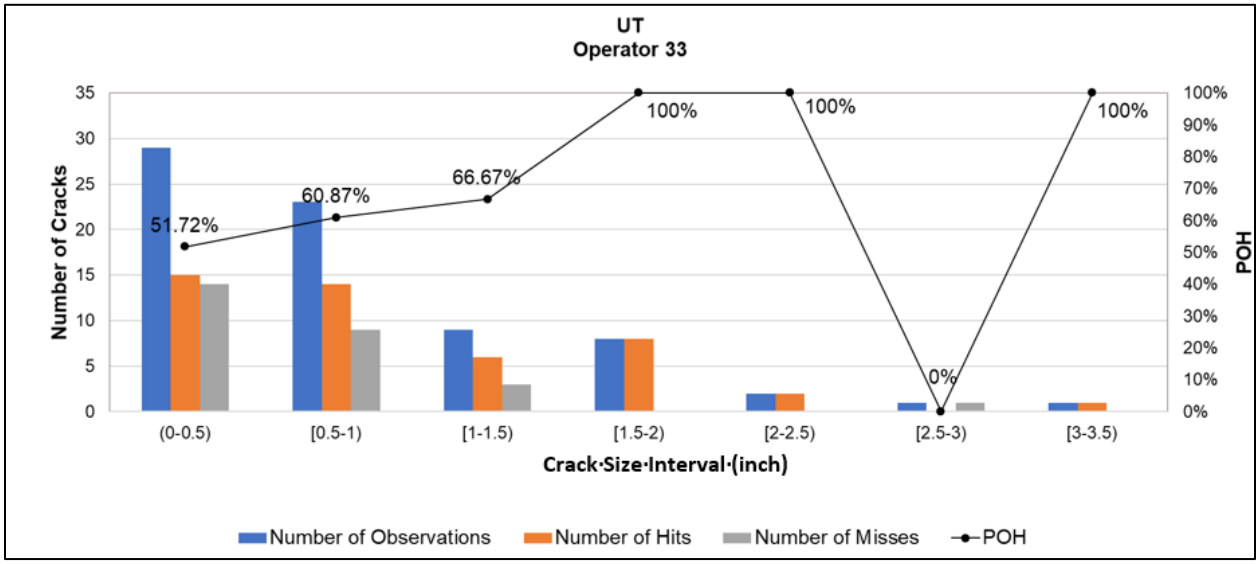

Figure 176. BW UT Distribution of Hits – Operator 33

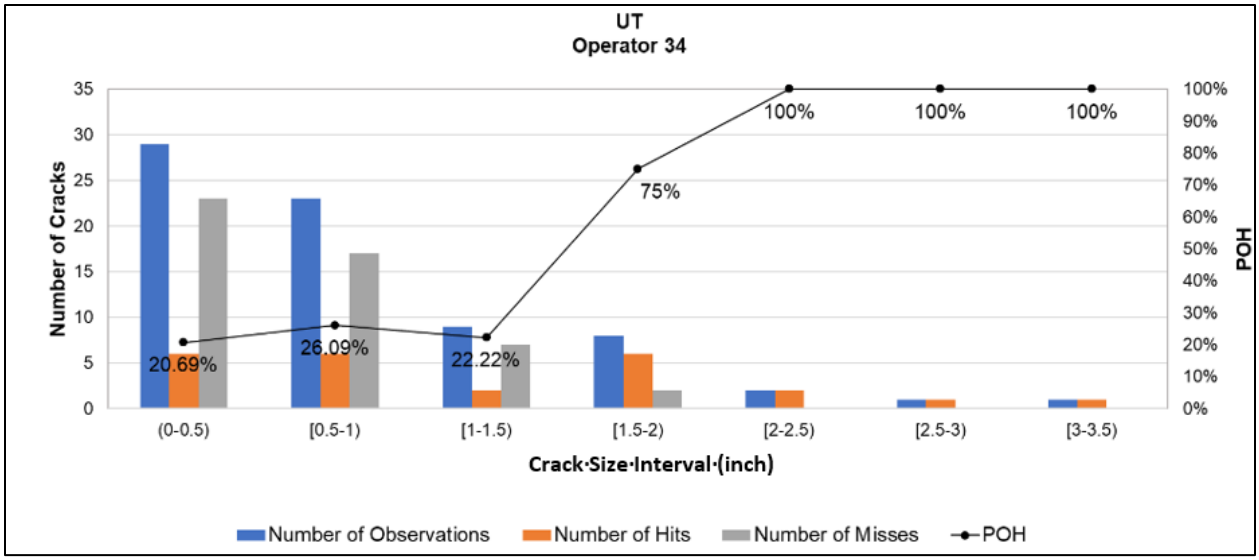

Figure 177. BW UT Distribution of Hits – Operator 34

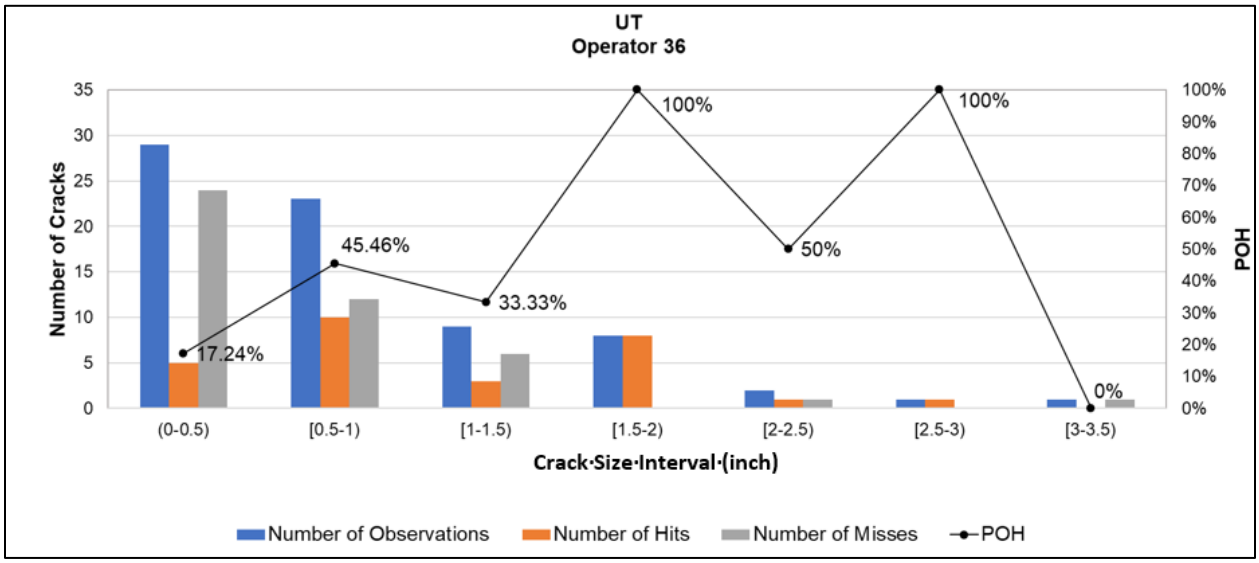

Figure 178. BW UT Distribution of Hits – Operator 36

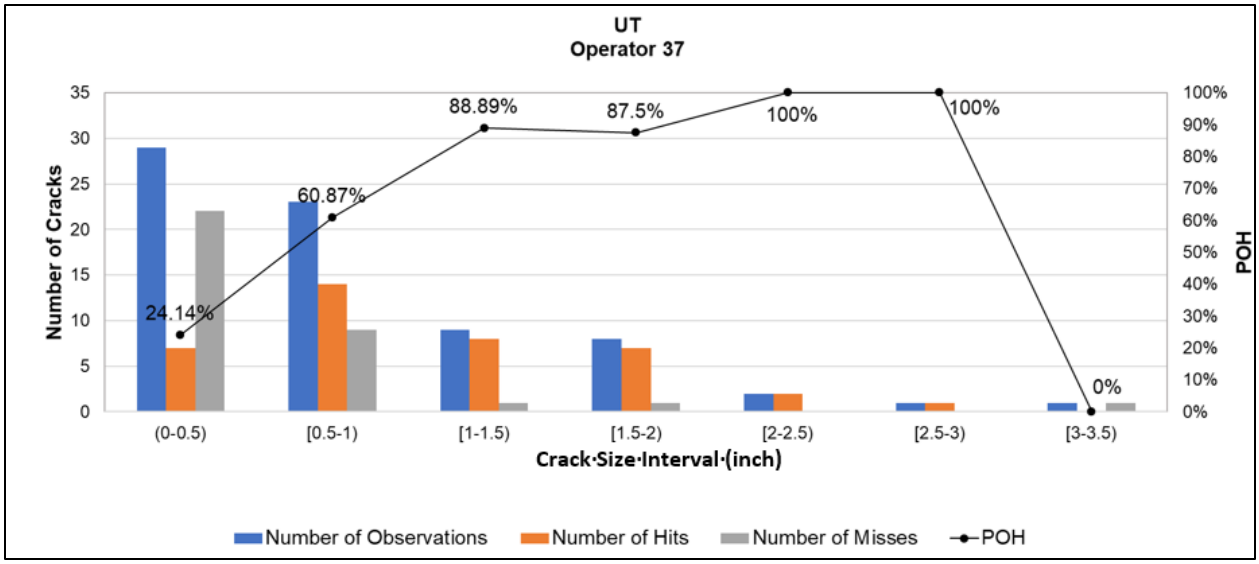

Figure 179. BW UT Distribution of Hits – Operator 37

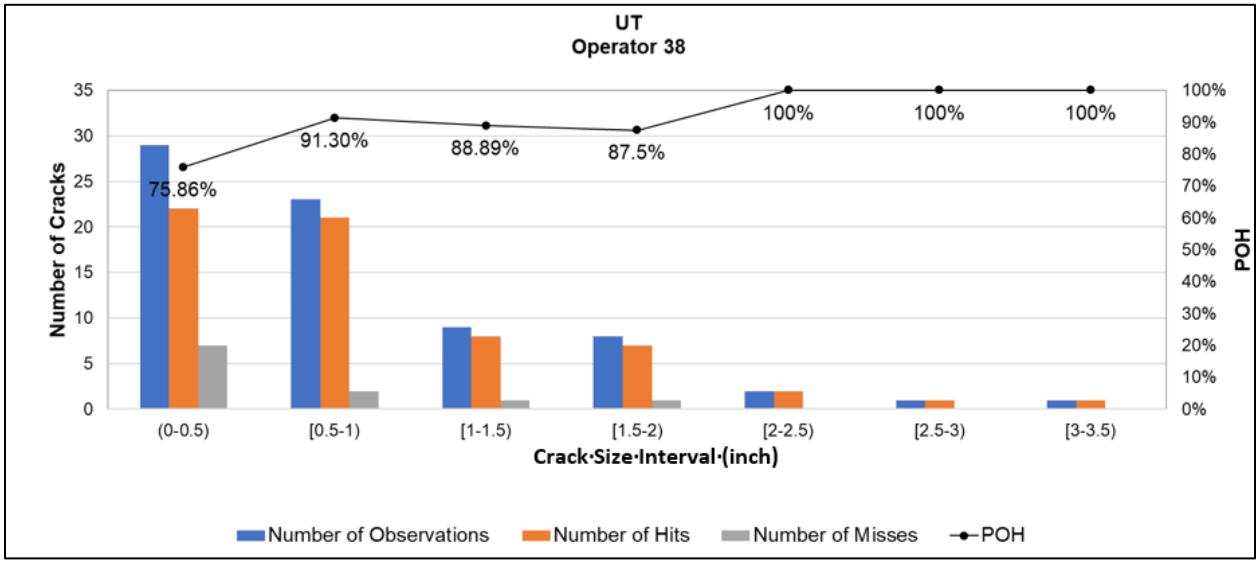

Figure 180. BW UT Distribution of Hits – Operator 38

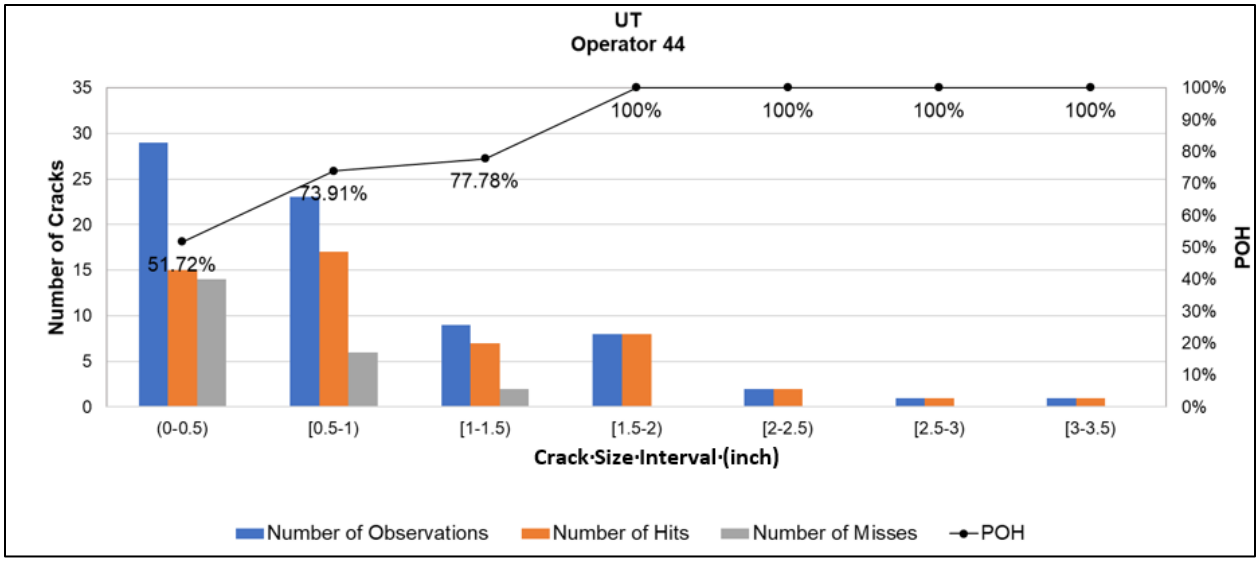

Figure 181. BW UT Distribution of Hits – Operator 44

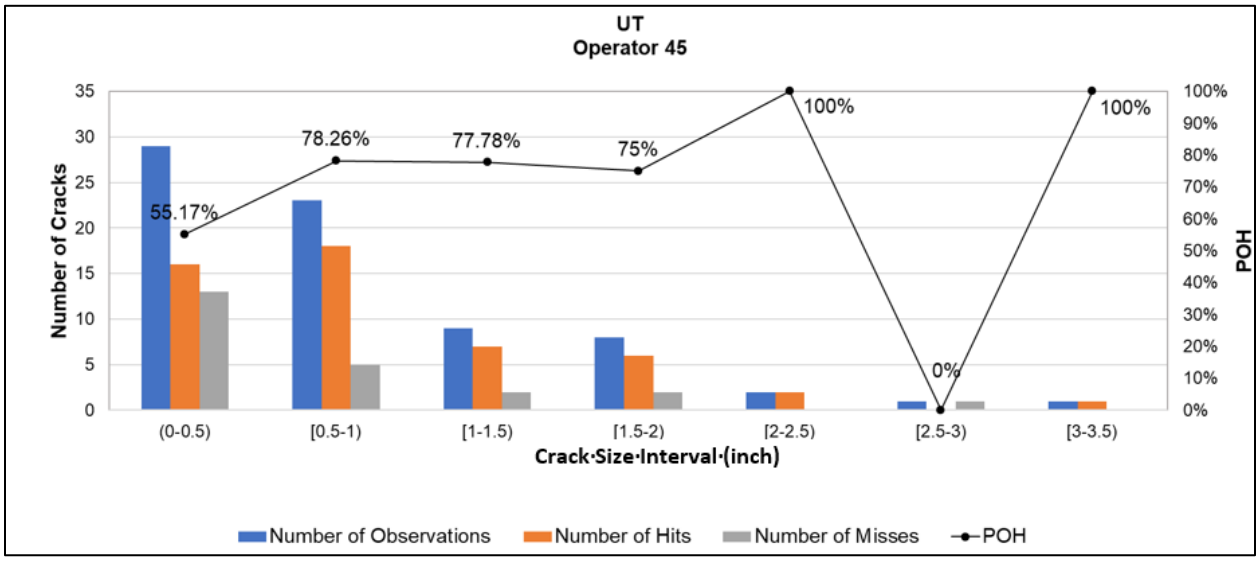

Figure 182. BW UT Distribution of Hits – Operator 45

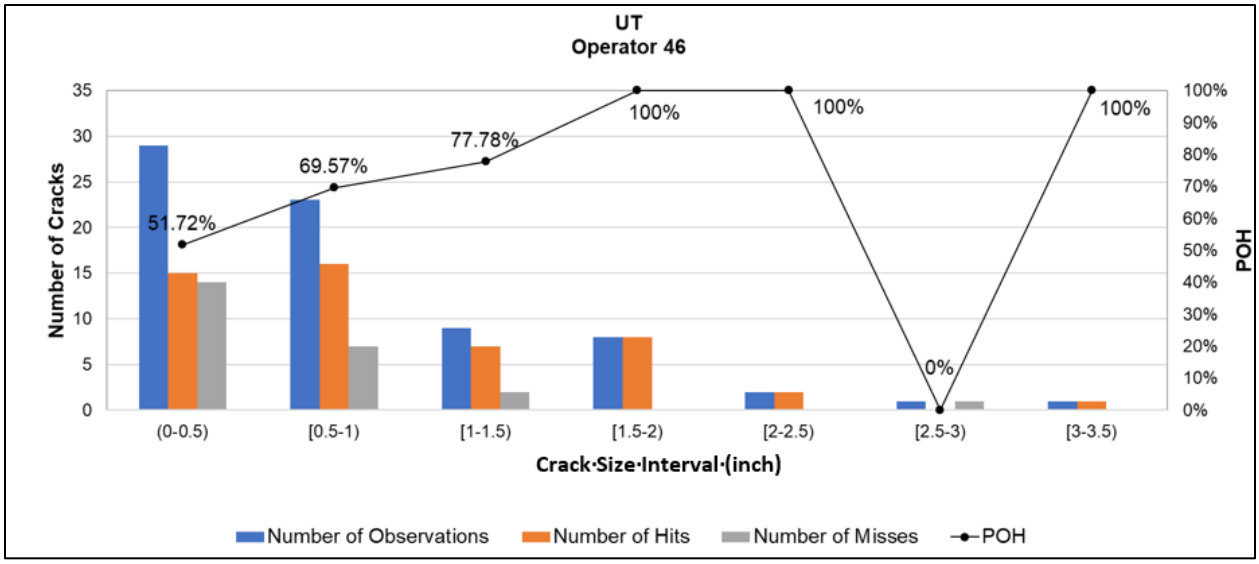

Figure 183. BW UT Distribution of Hits – Operator 46

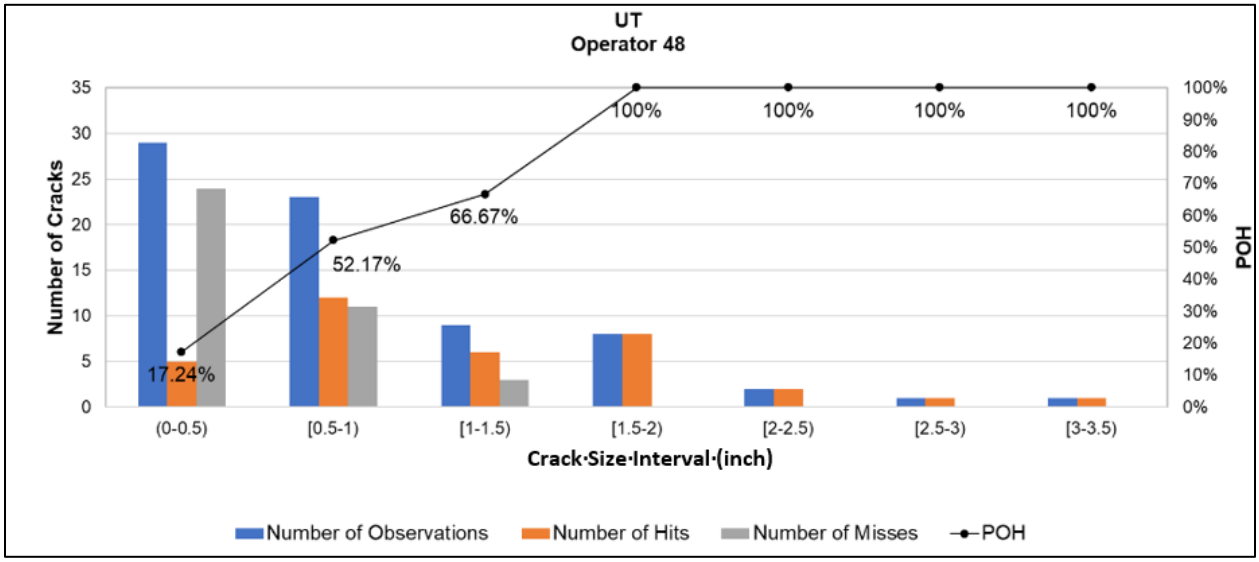

Figure 184. BW UT Distribution of Hits – Operator 48

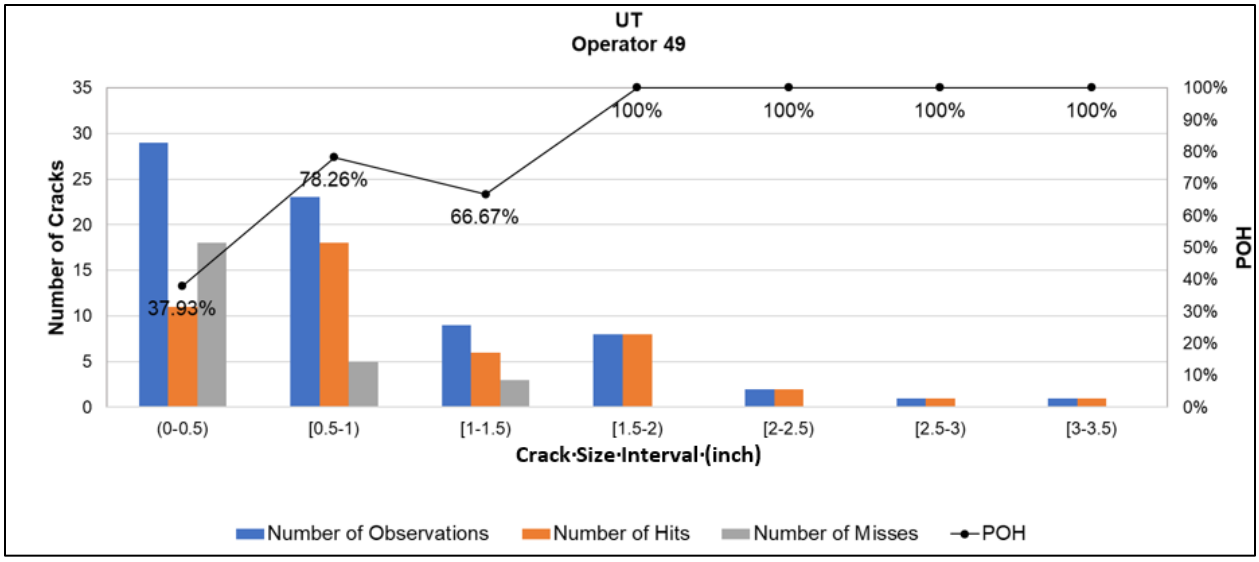

Figure 185. BW UT Distribution of Hits – Operator 49

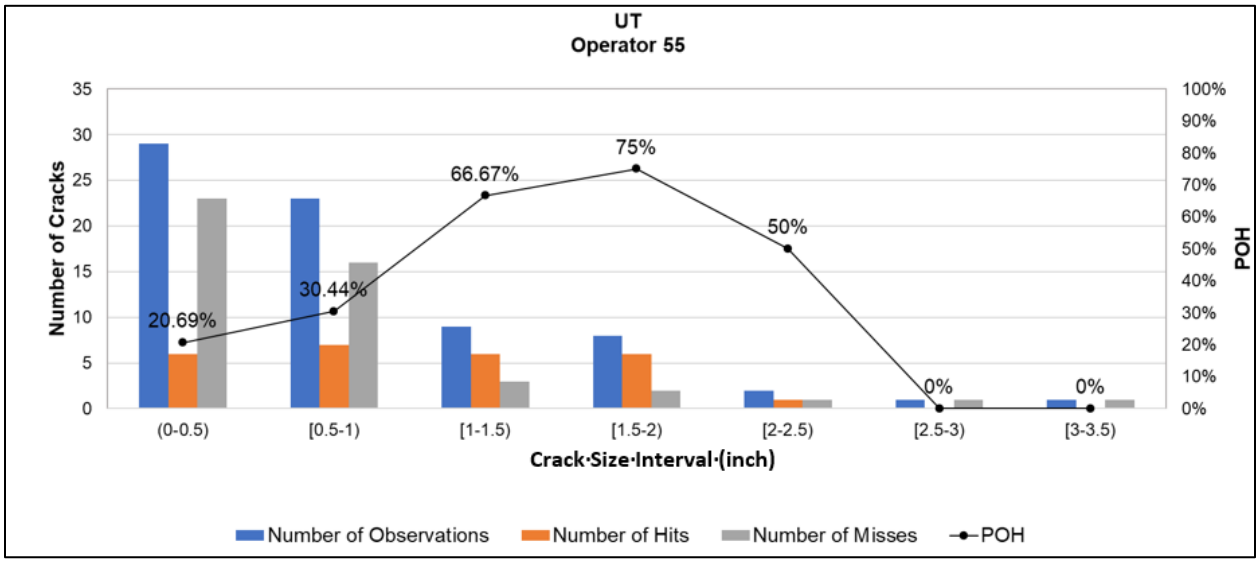

Figure 186. BW UT Distribution of Hits – Operator 55

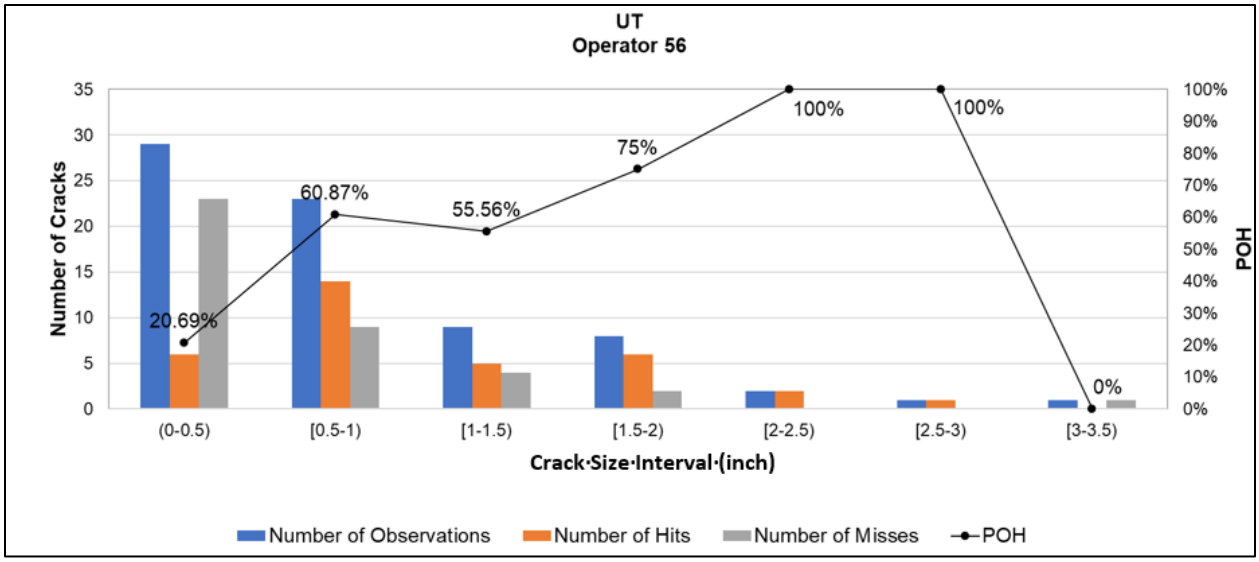

Figure 187. BW UT Distribution of Hits – Operator 56

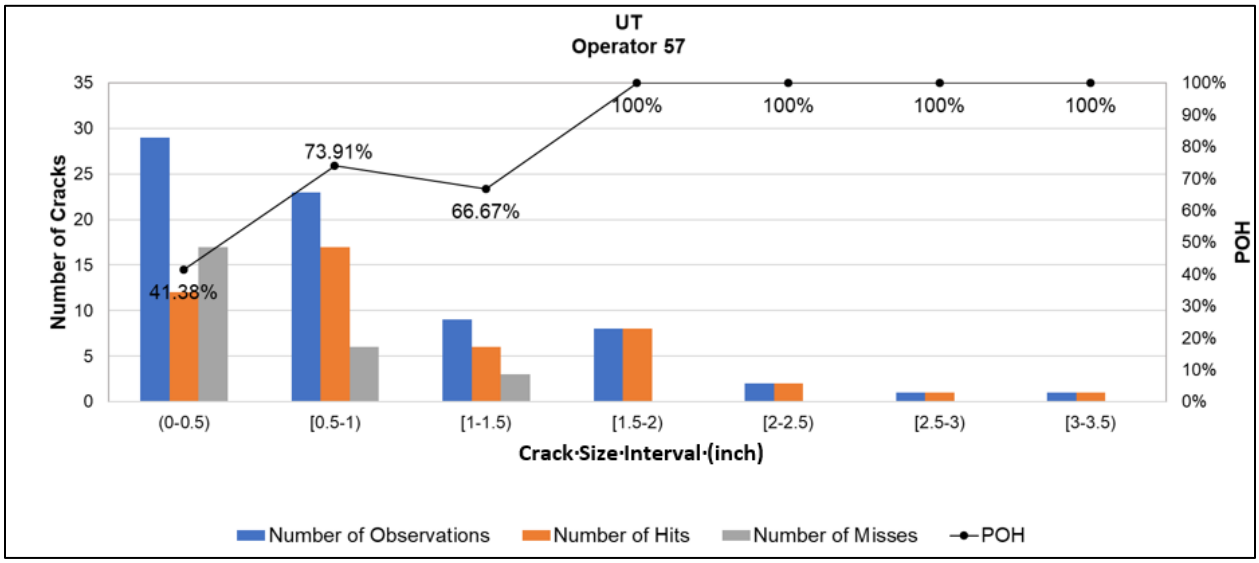

Figure 188. BW UT Distribution of Hits – Operator 57

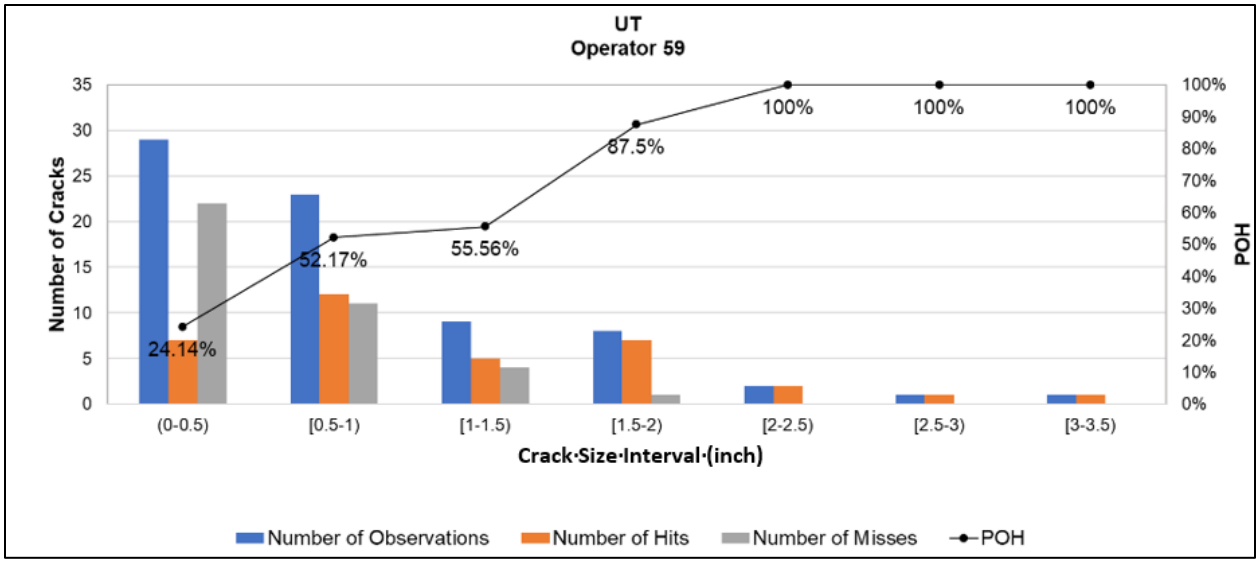

Figure 189. BW UT Distribution of Hits – Operator 59

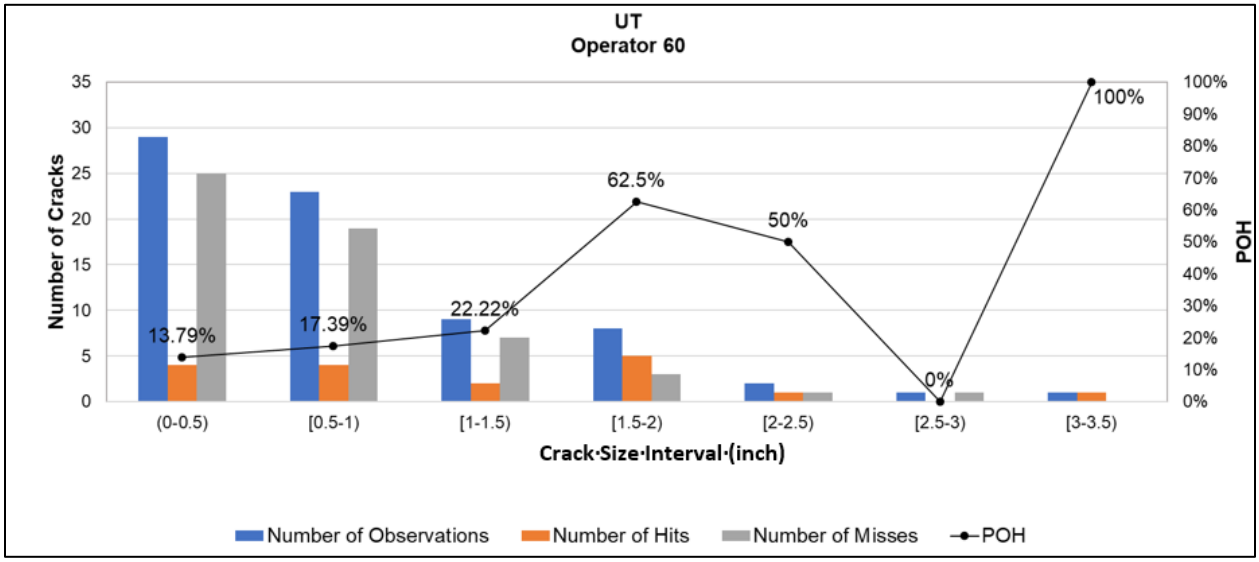

Figure 190. BW UT Distribution of Hits – Operator 60

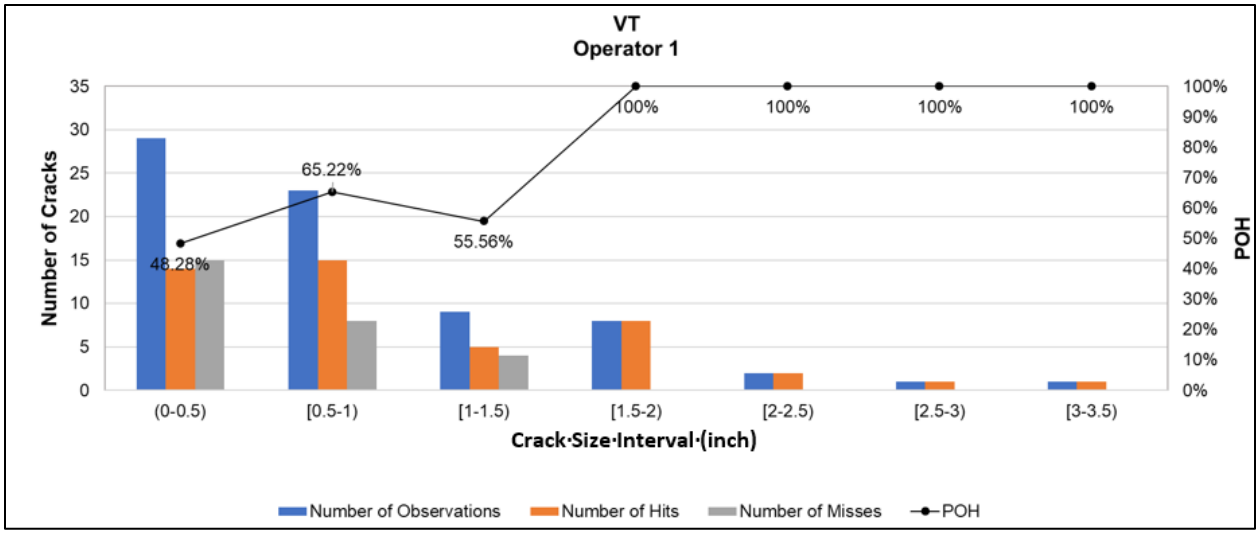

Figure 191. BW VT Distribution of Hits – Operator 1

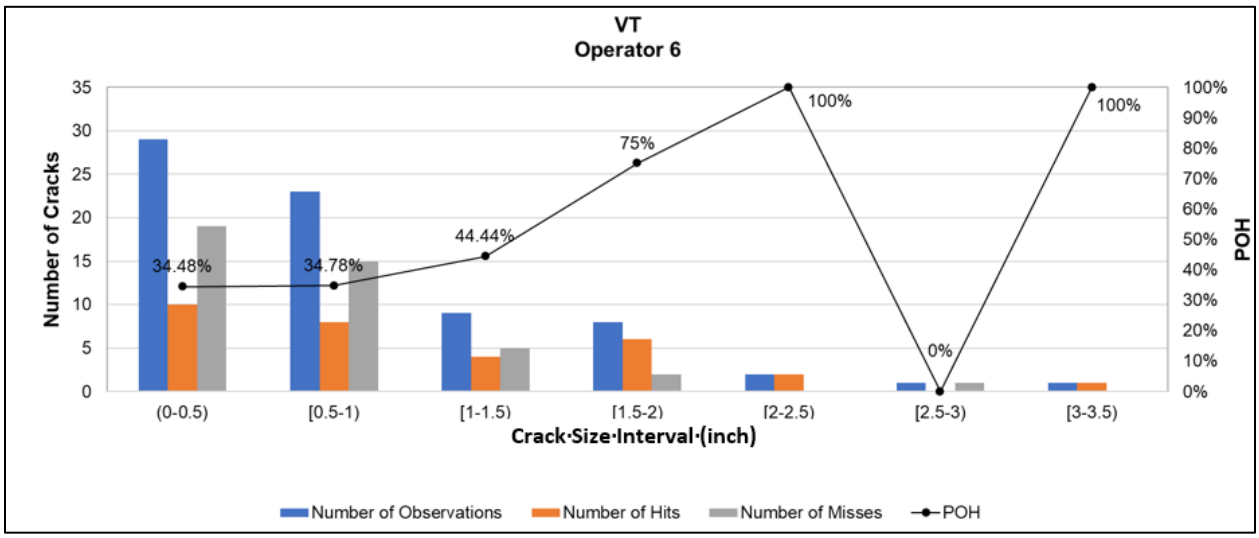

Figure 192. BW VT Distribution of Hits – Operator 6

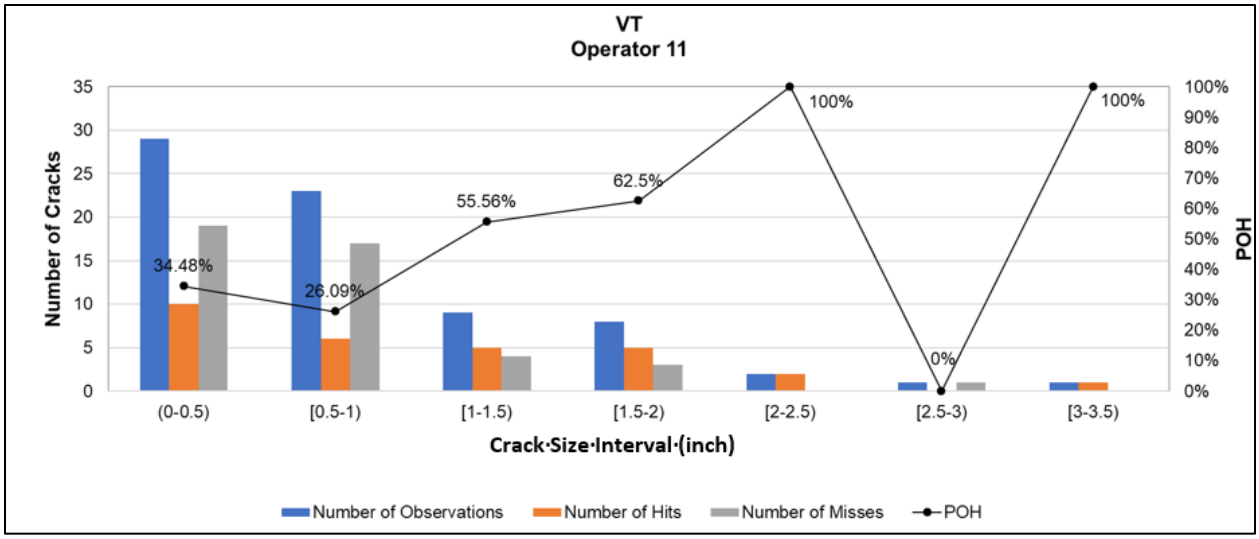

Figure 193. BW VT Distribution of Hits – Operator 11

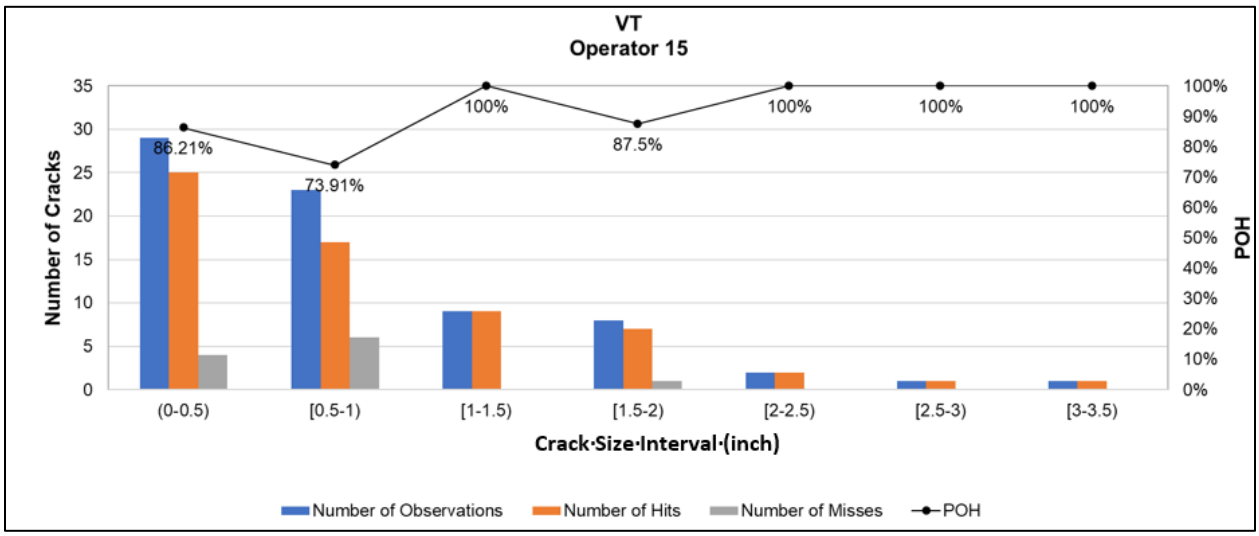

Figure 194. BW VT Distribution of Hits – Operator 15

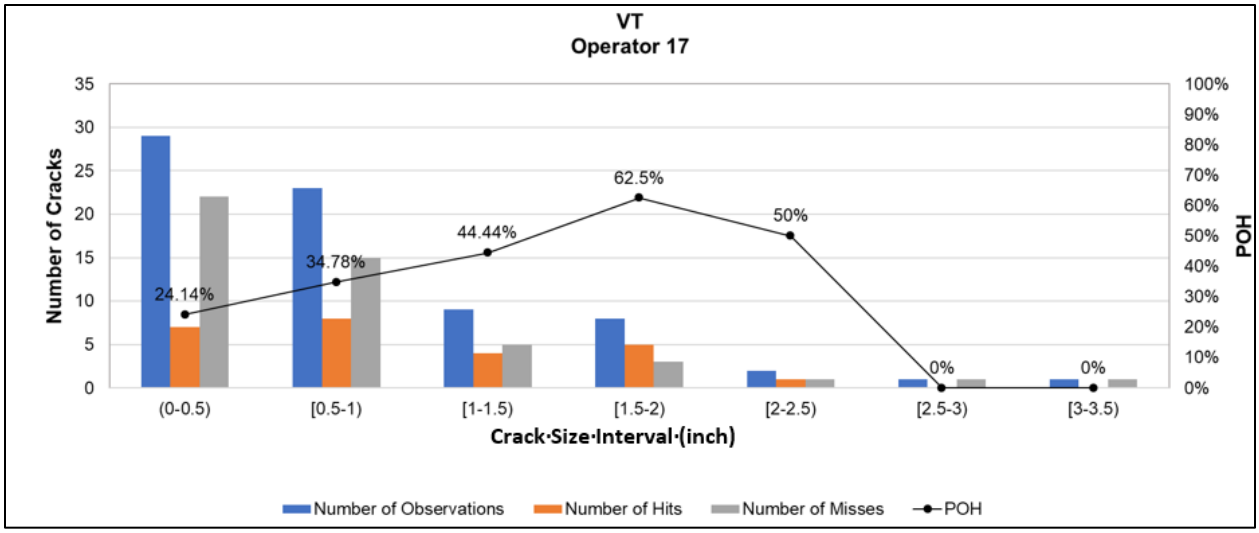

Figure 195. BW VT Distribution of Hits – Operator 17

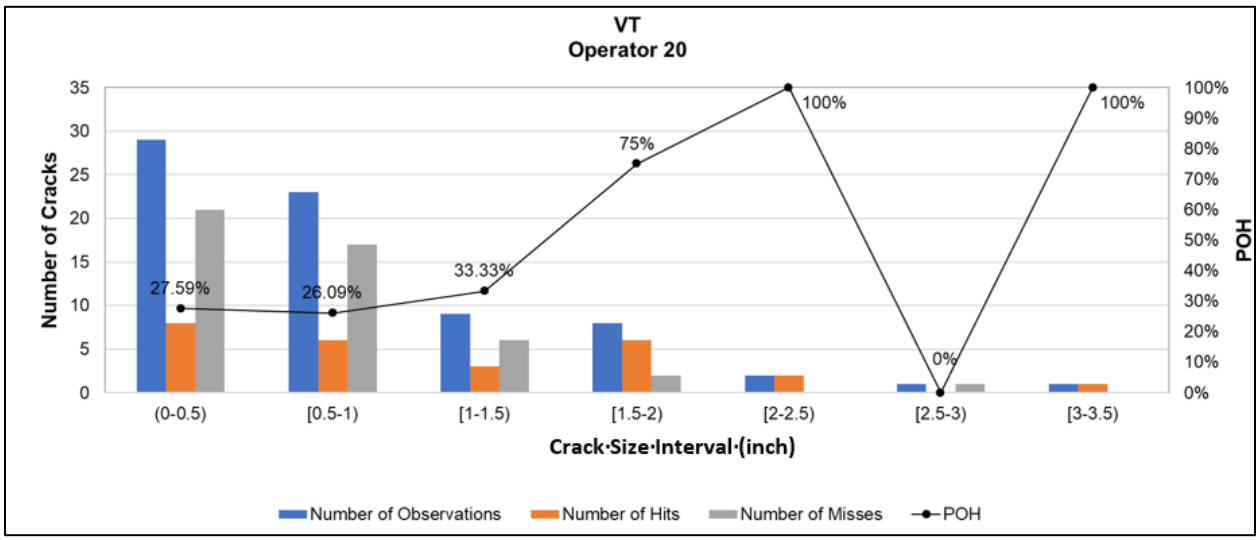

Figure 196. BW VT Distribution of Hits – Operator 20

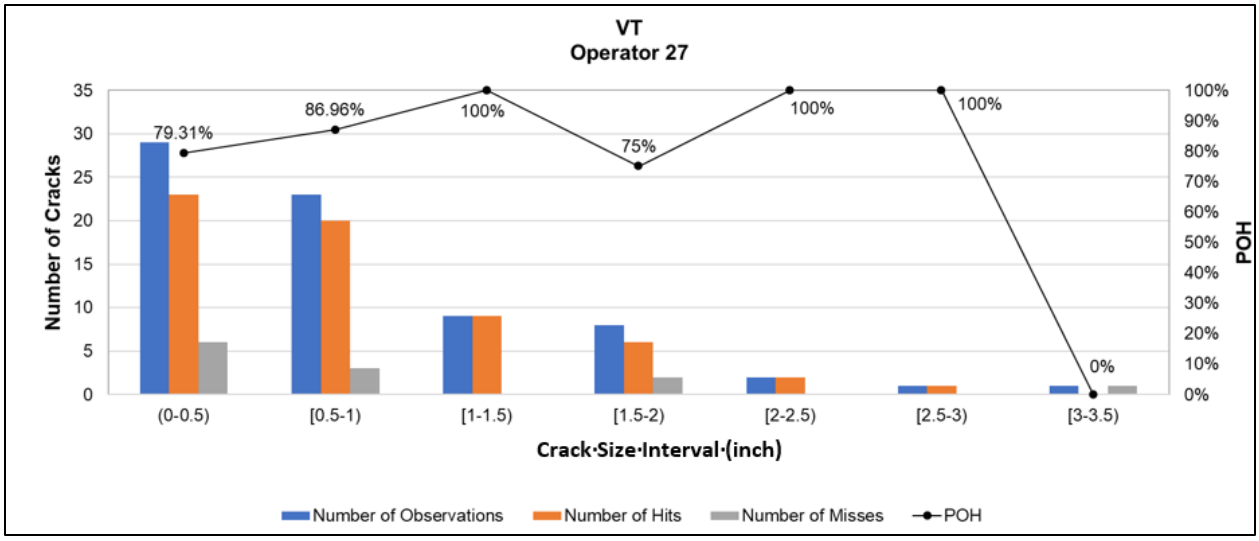

Figure 197. BW VT Distribution of Hits – Operator 27

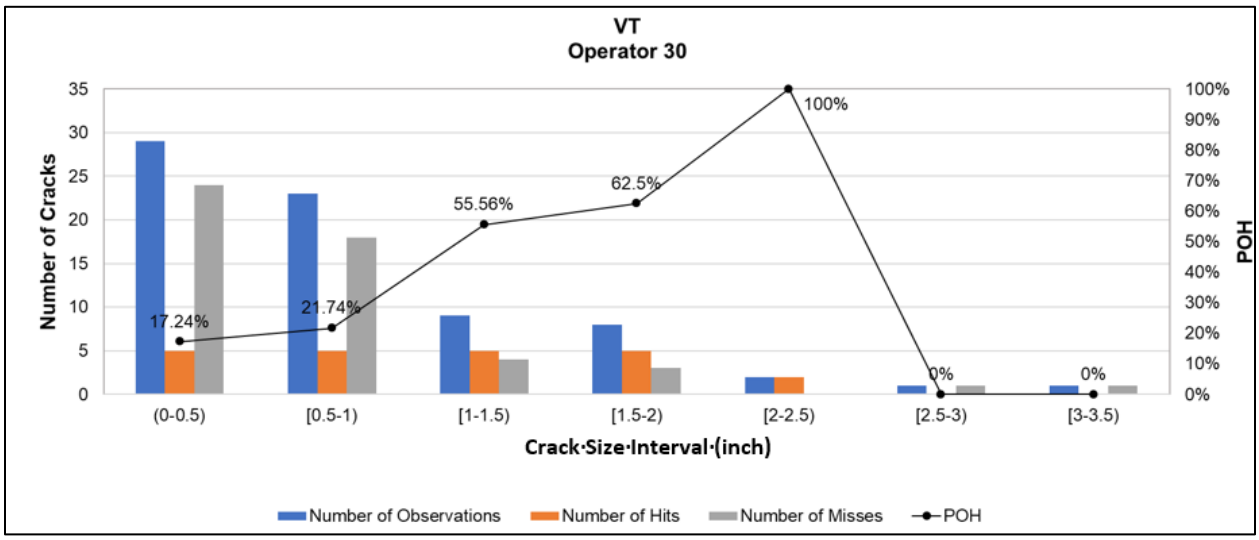

Figure 198. BW VT Distribution of Hits – Operator 30

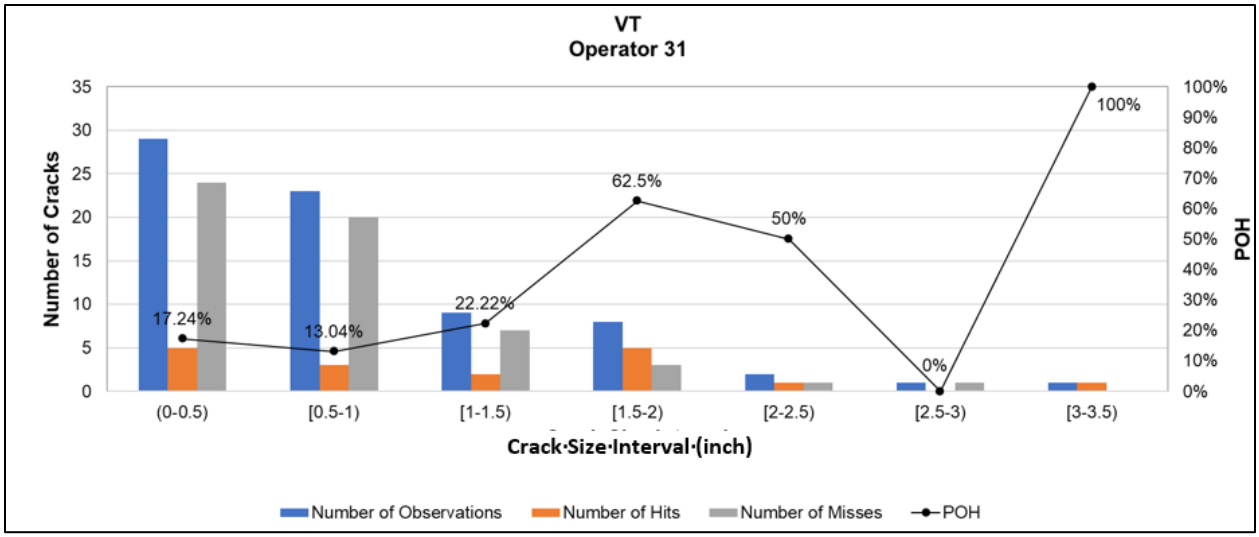

Figure 199. BW VT Distribution of Hits – Operator 31

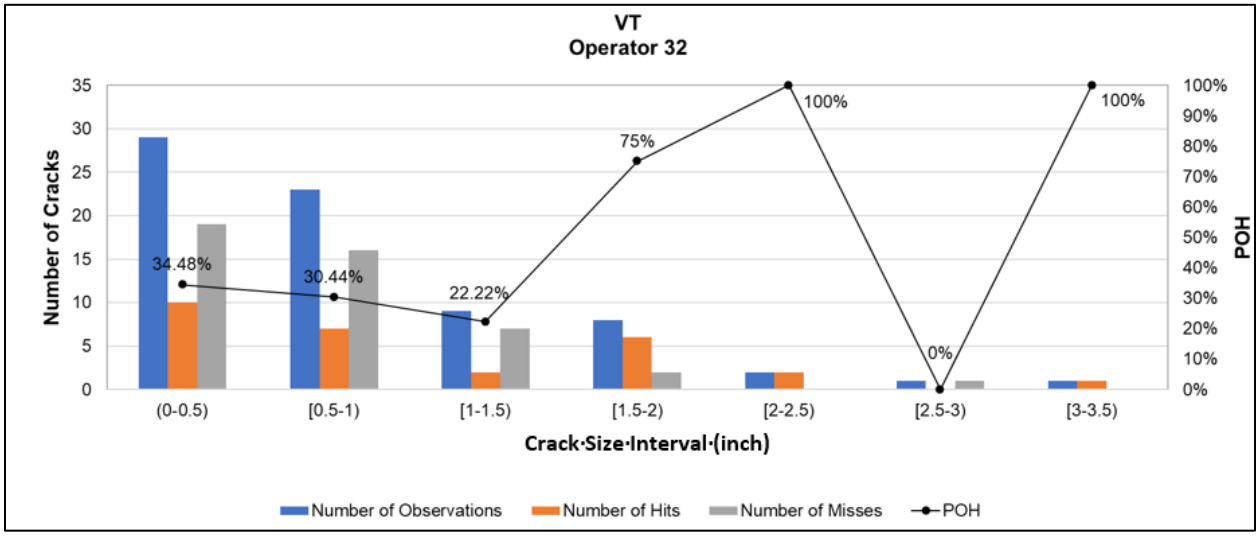

Figure 200. BW VT Distribution of Hits – Operator 32

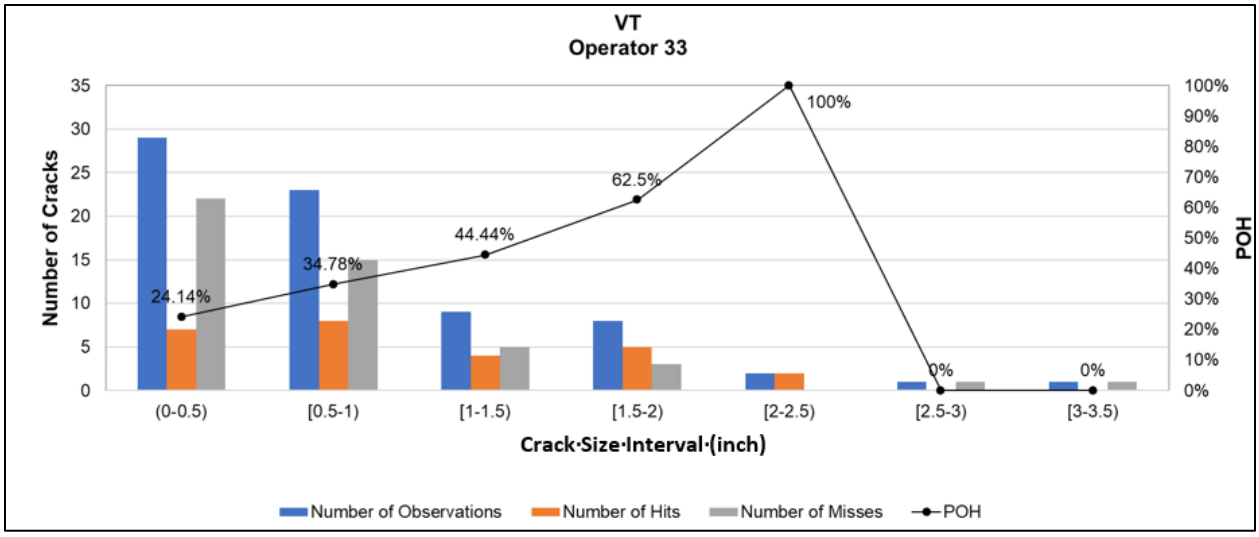

Figure 201. BW VT Distribution of Hits – Operator 33

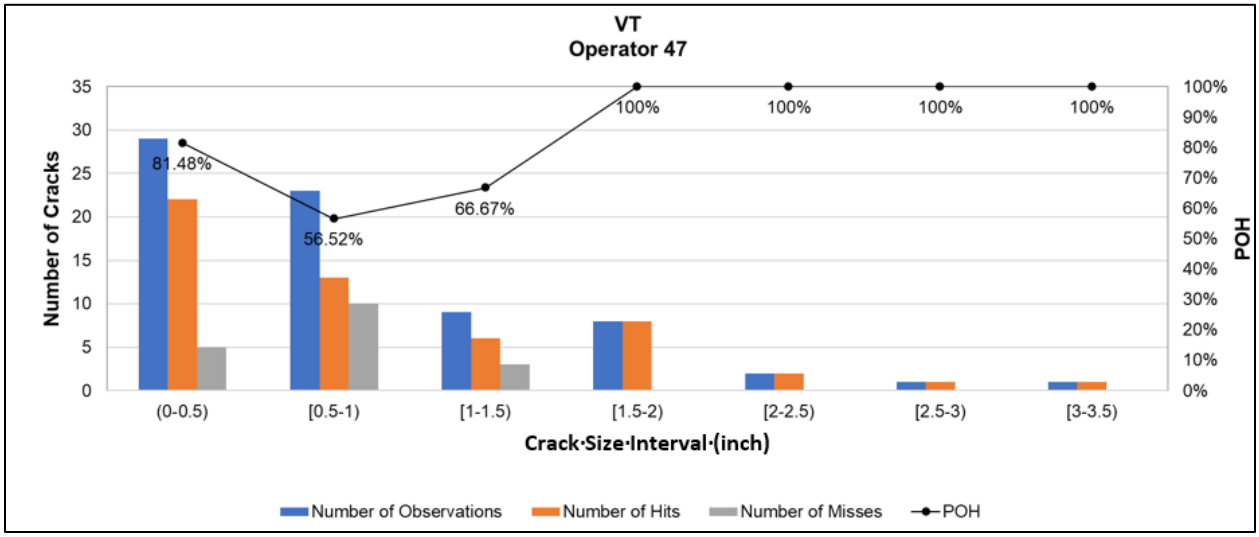

Figure 202. BW VT Distribution of Hits – Operator 47

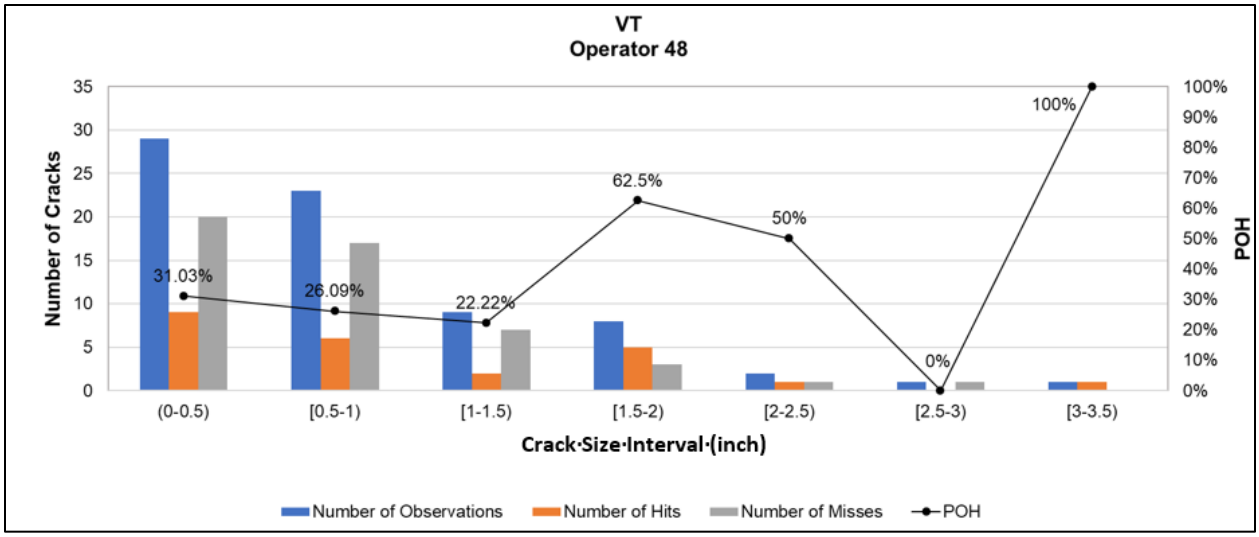

Figure 203. BW VT Distribution of Hits – Operator 48

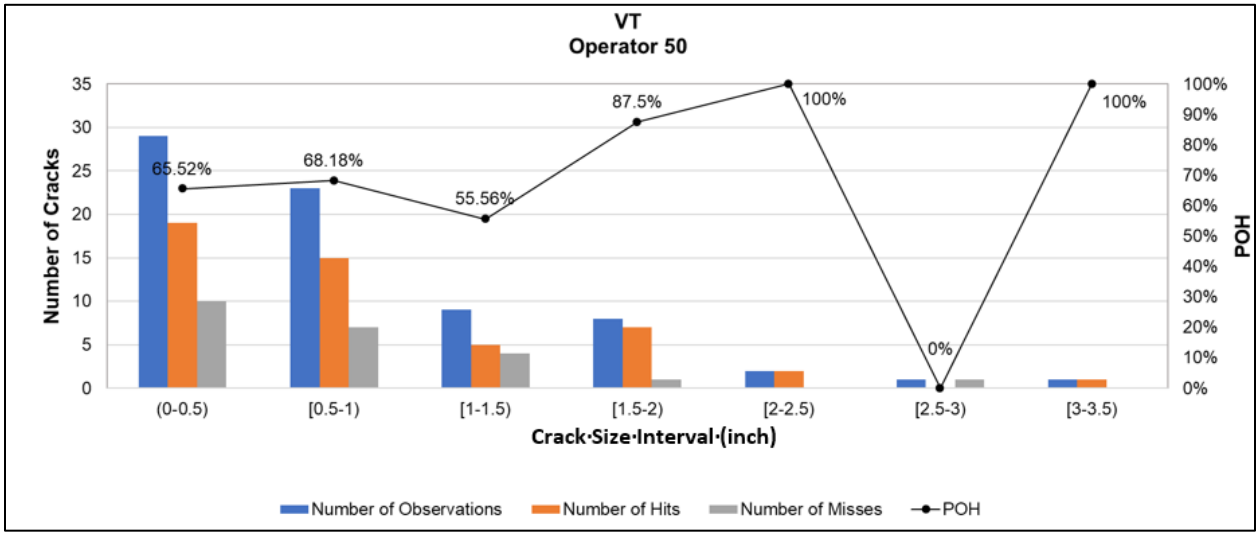

Figure 204. BW VT Distribution of Hits – Operator 50

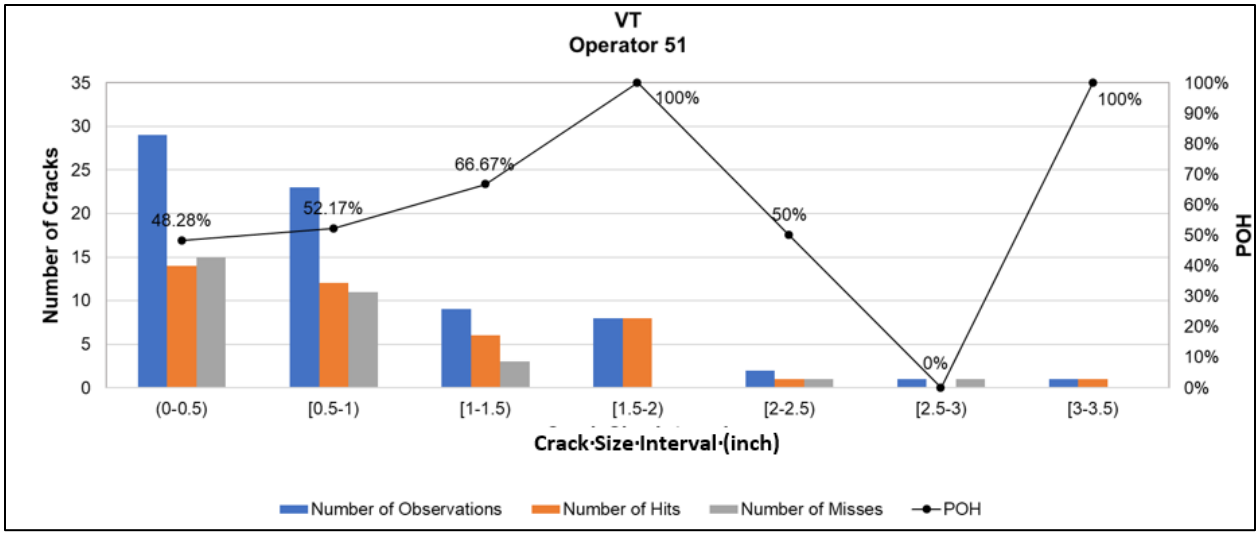

Figure 205. BW VT Distribution of Hits – Operator 51

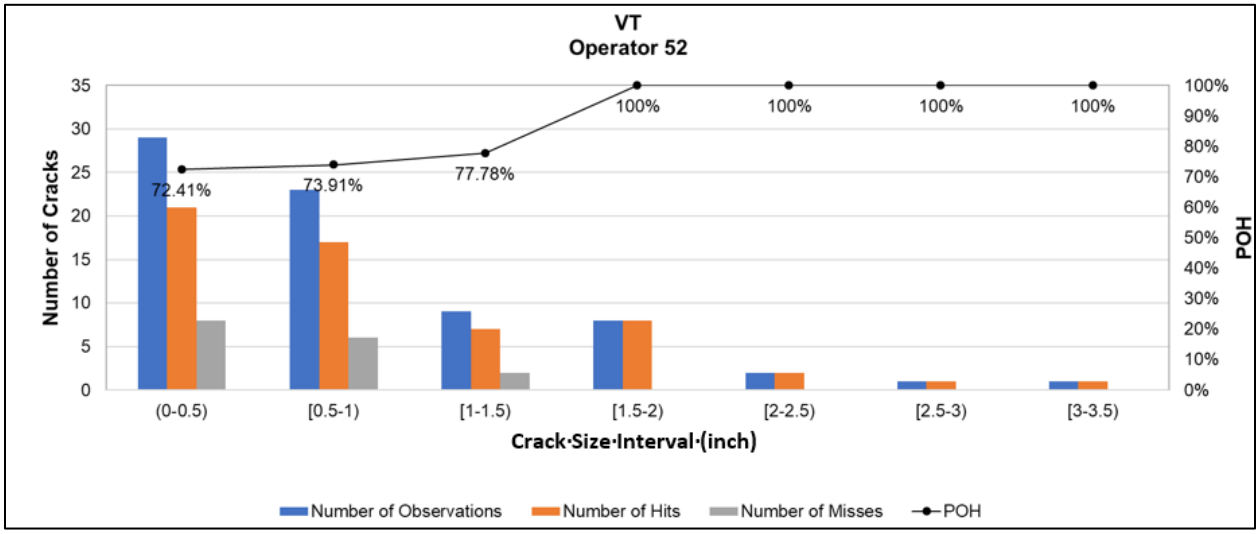

Figure 206. BW VT Distribution of Hits – Operator 52

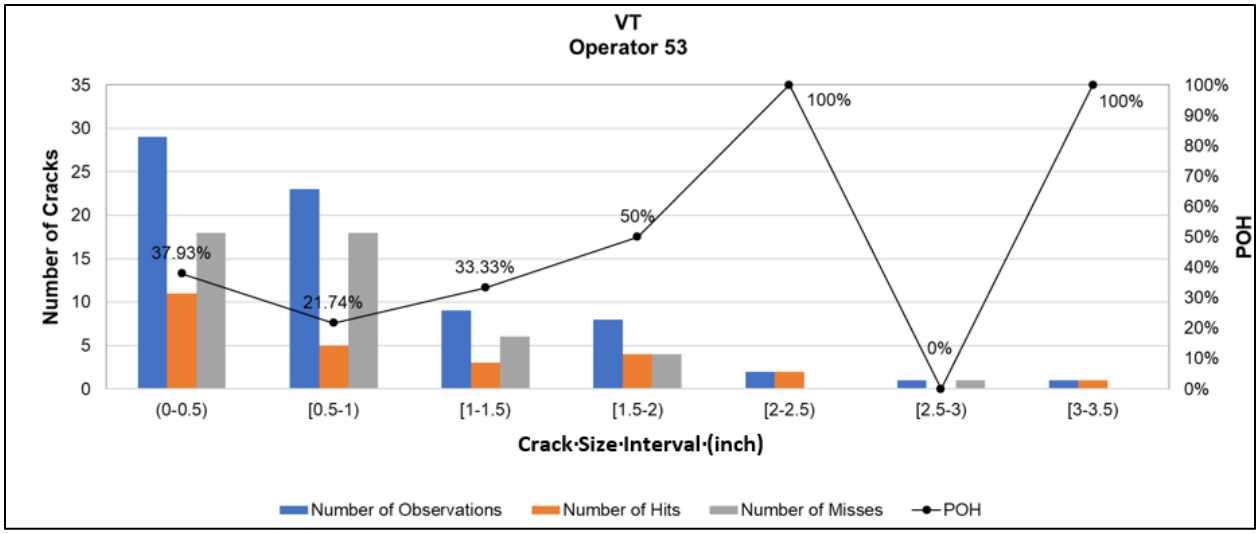

Figure 207. BW VT Distribution of Hits – Operator 53

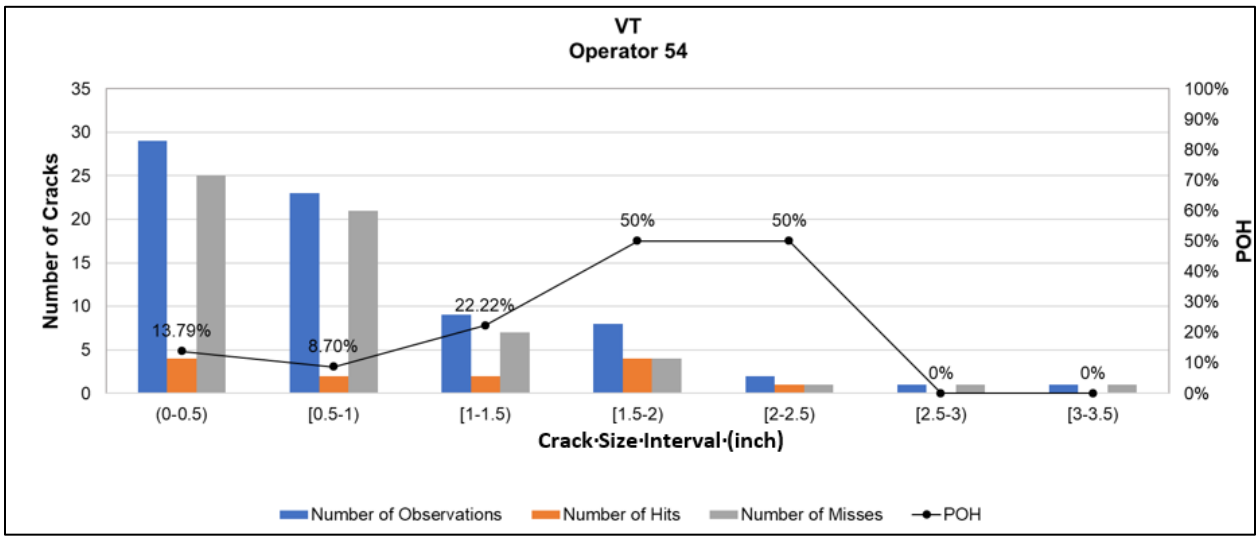

Figure 208. BW VT Distribution of Hits – Operator 54

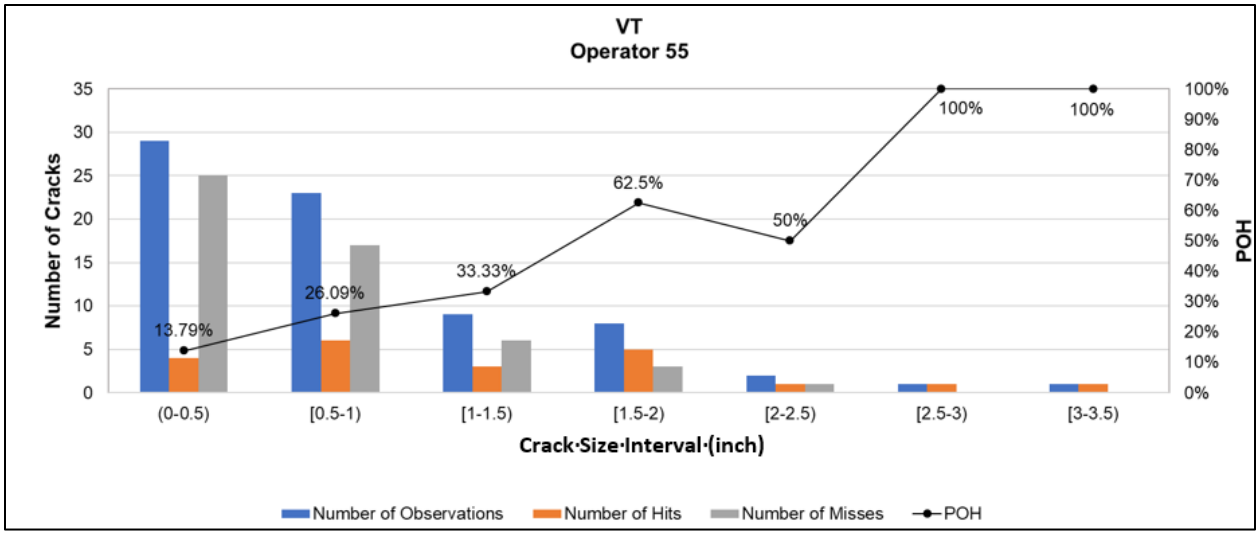

Figure 209. BW VT Distribution of Hits – Operator 55

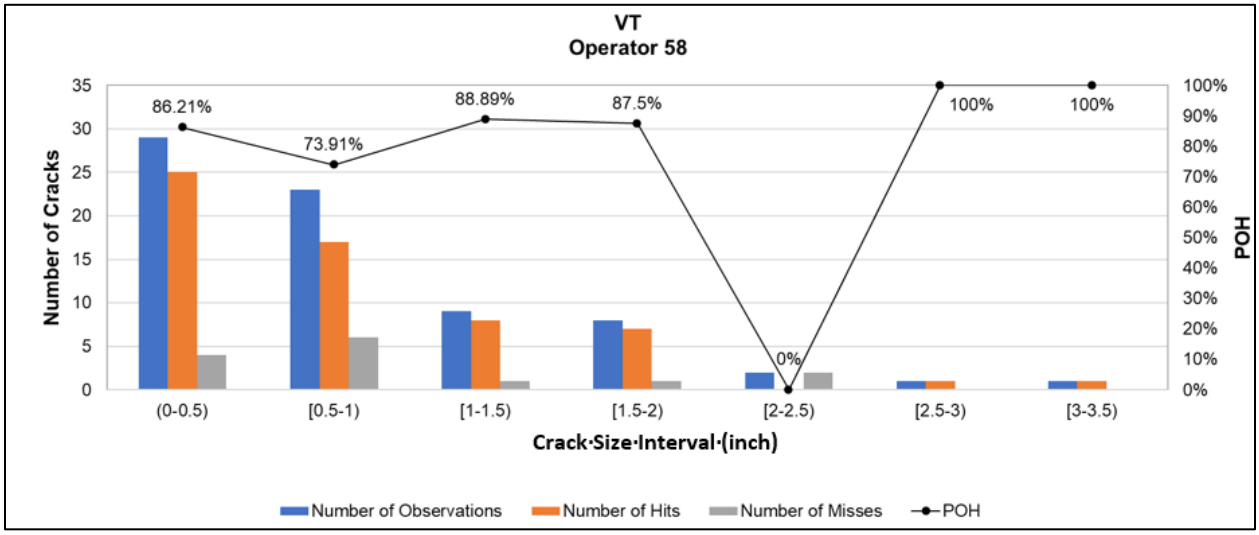

Figure 210. BW VT Distribution of Hits – Operator 58

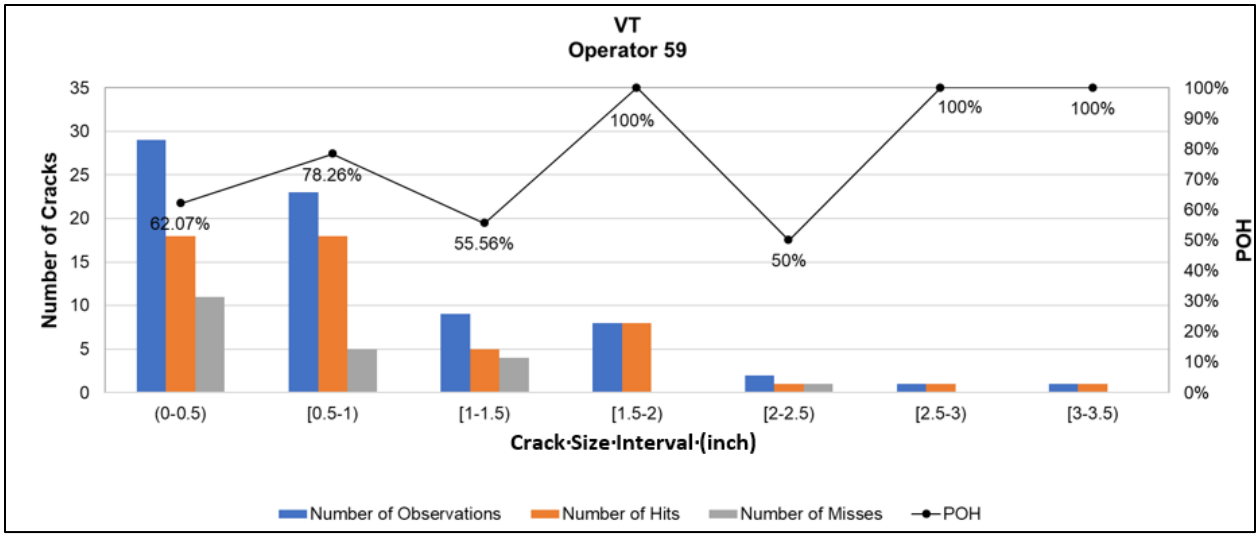

Figure 211. BW VT Distribution of Hits – Operator 59

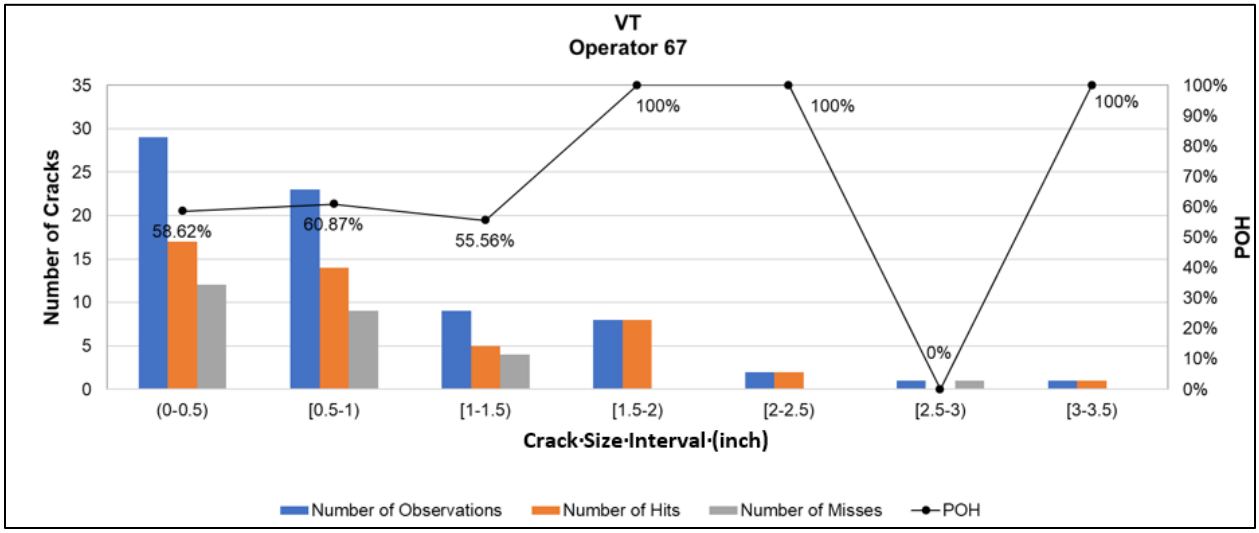

Figure 212. BW VT Distribution of Hits – Operator 67

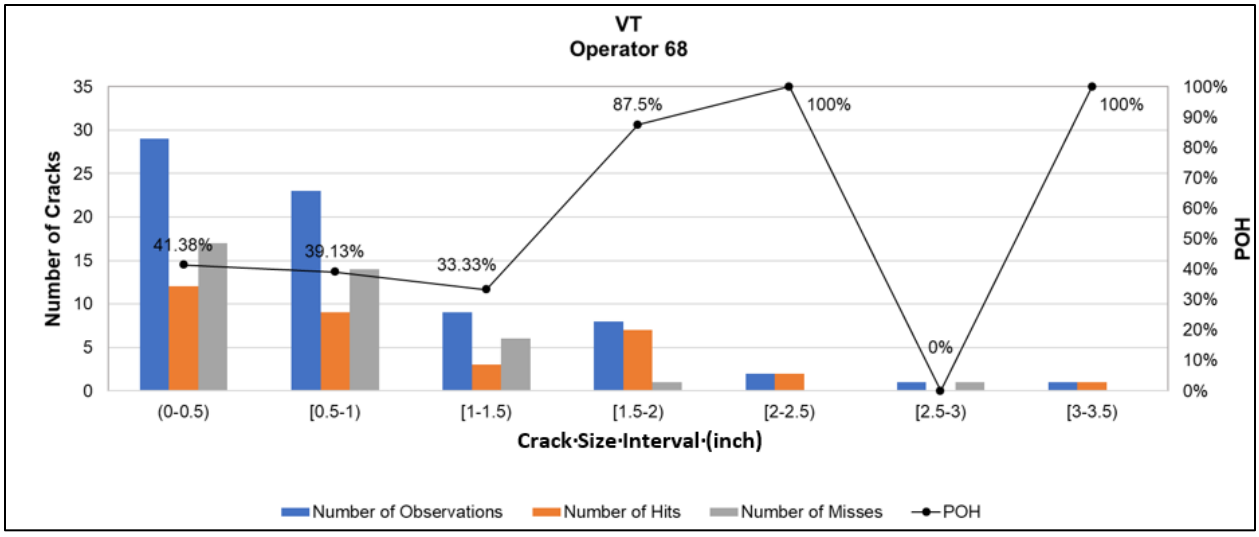

Figure 213. BW VT Distribution of Hits – Operator 68

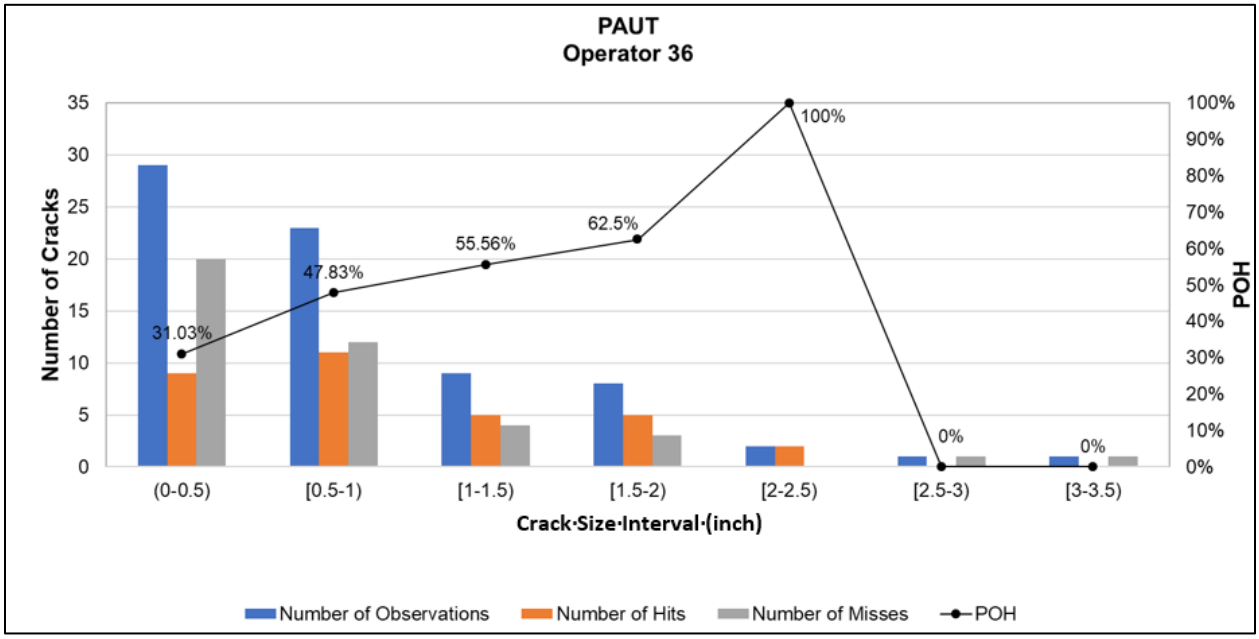

Figure 214. BW PAUT Distribution of Hits – Operator 36

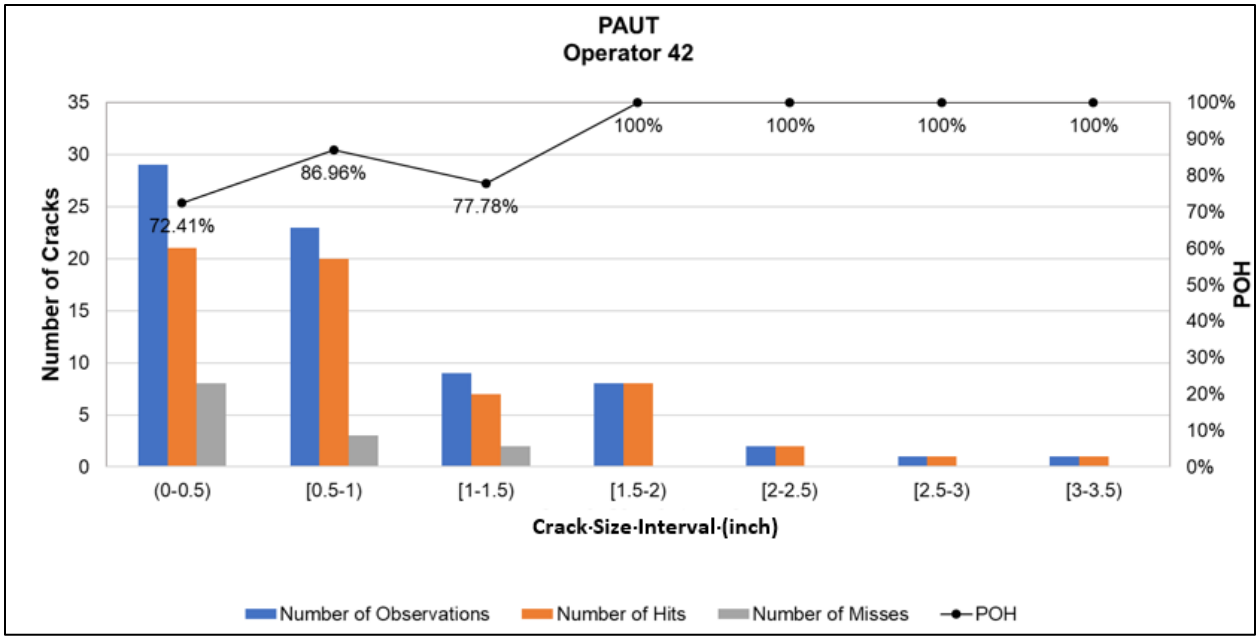

Figure 215. BW PAUT Distribution of Hits – Operator 42

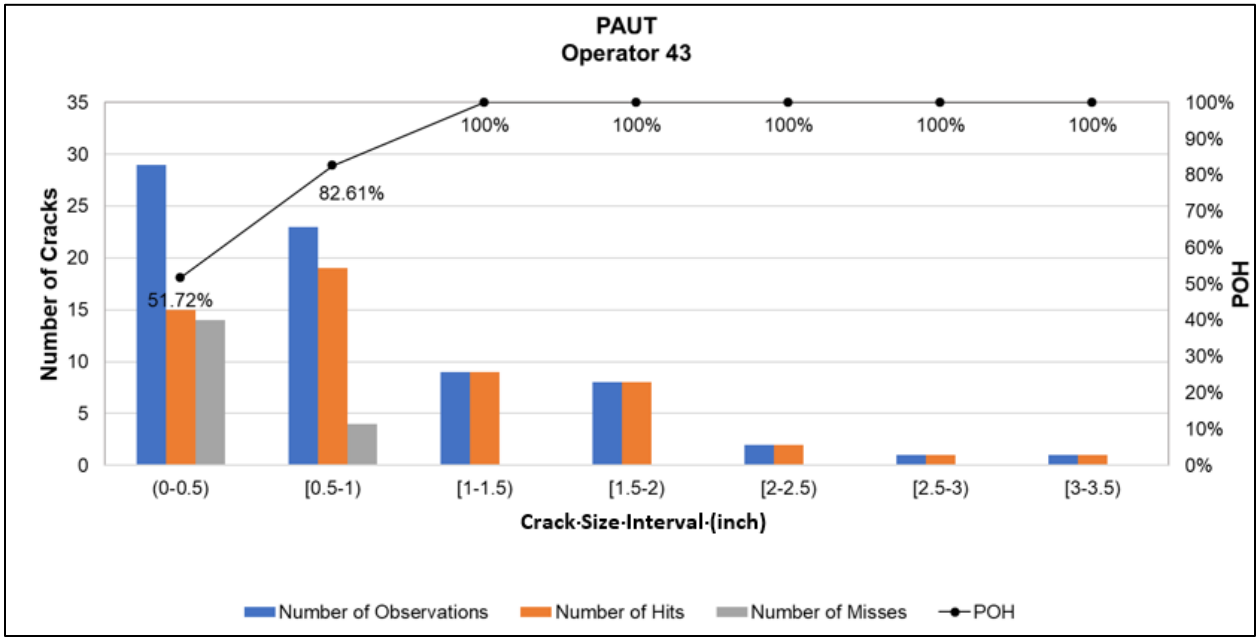

Figure 216. BW PAUT Distribution of Hits – Operator 43

Appendix E.
DOEPOD Plots – Fillet Welds

This appendix illustrates DOEPOD plot-fillet welds in Figure 217 through Figure 306.

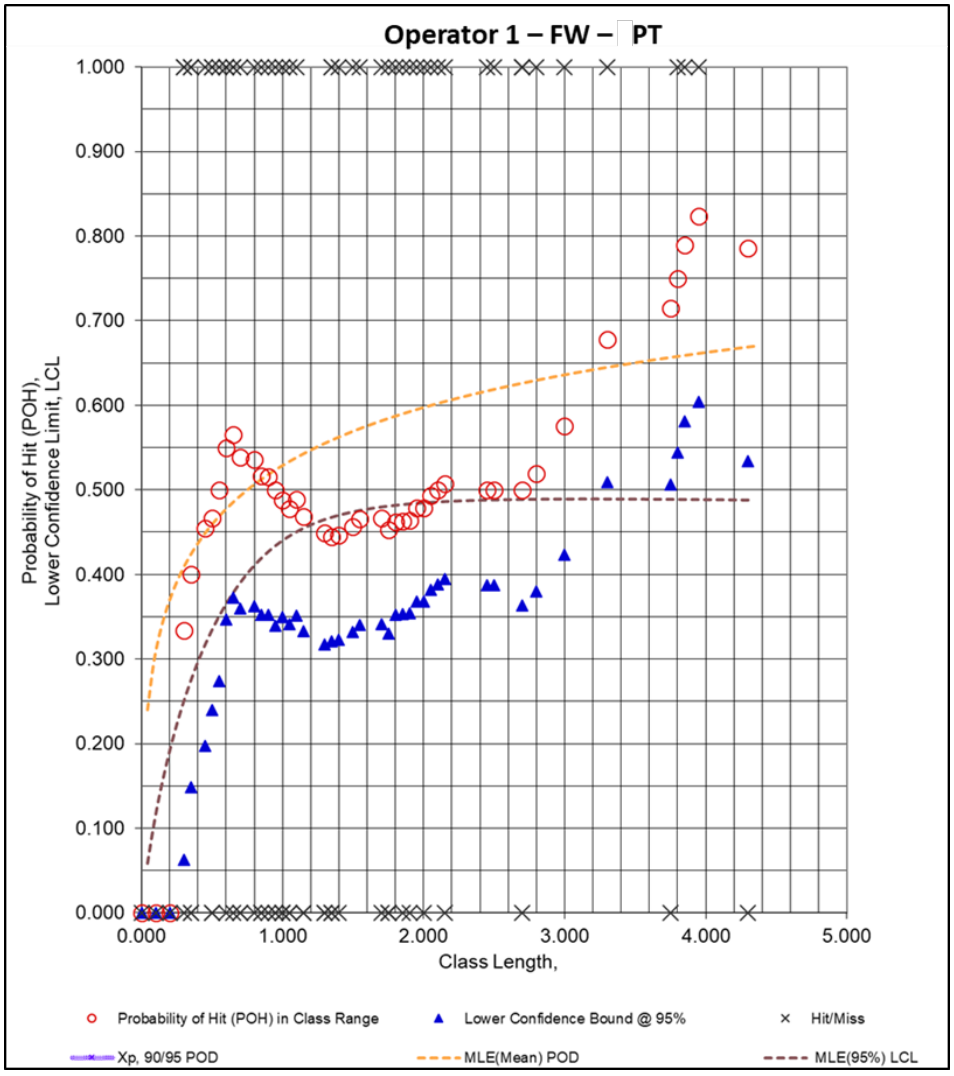

Figure 217. DOEPOD – FW – PT – Operator 1

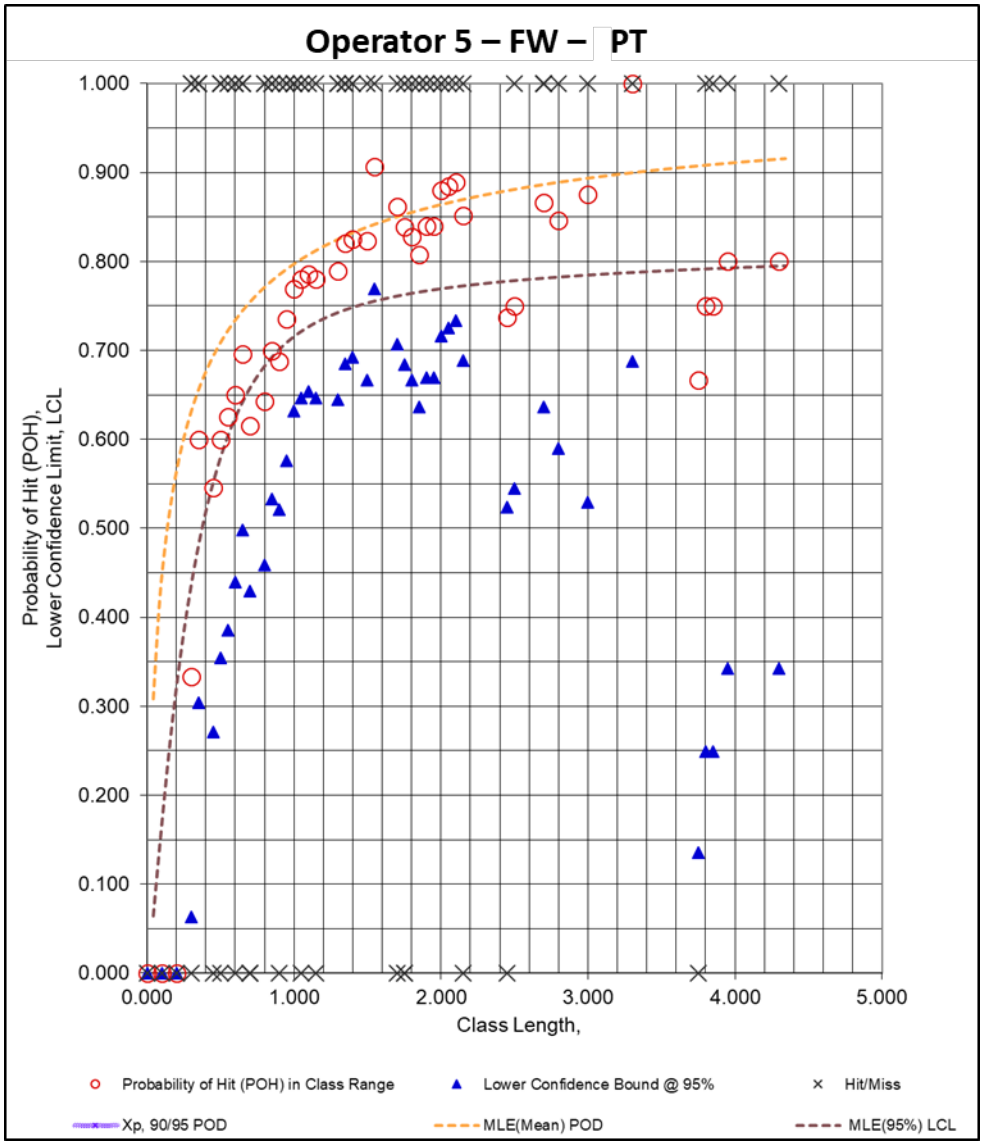

Figure 218. DOEPOD – FW – PT – Operator 5

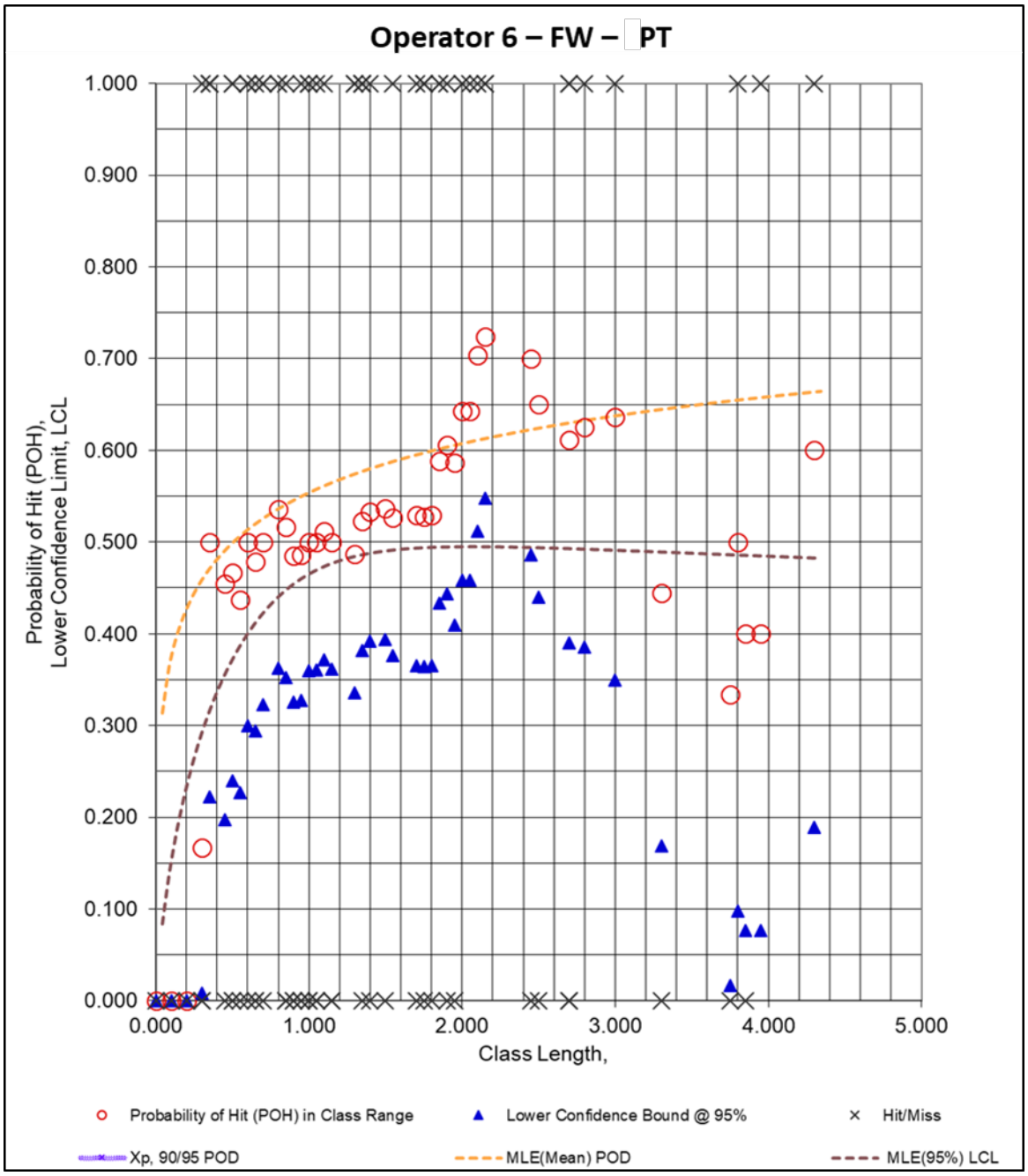

Figure 219. DOEPOD – FW – PT – Operator 6

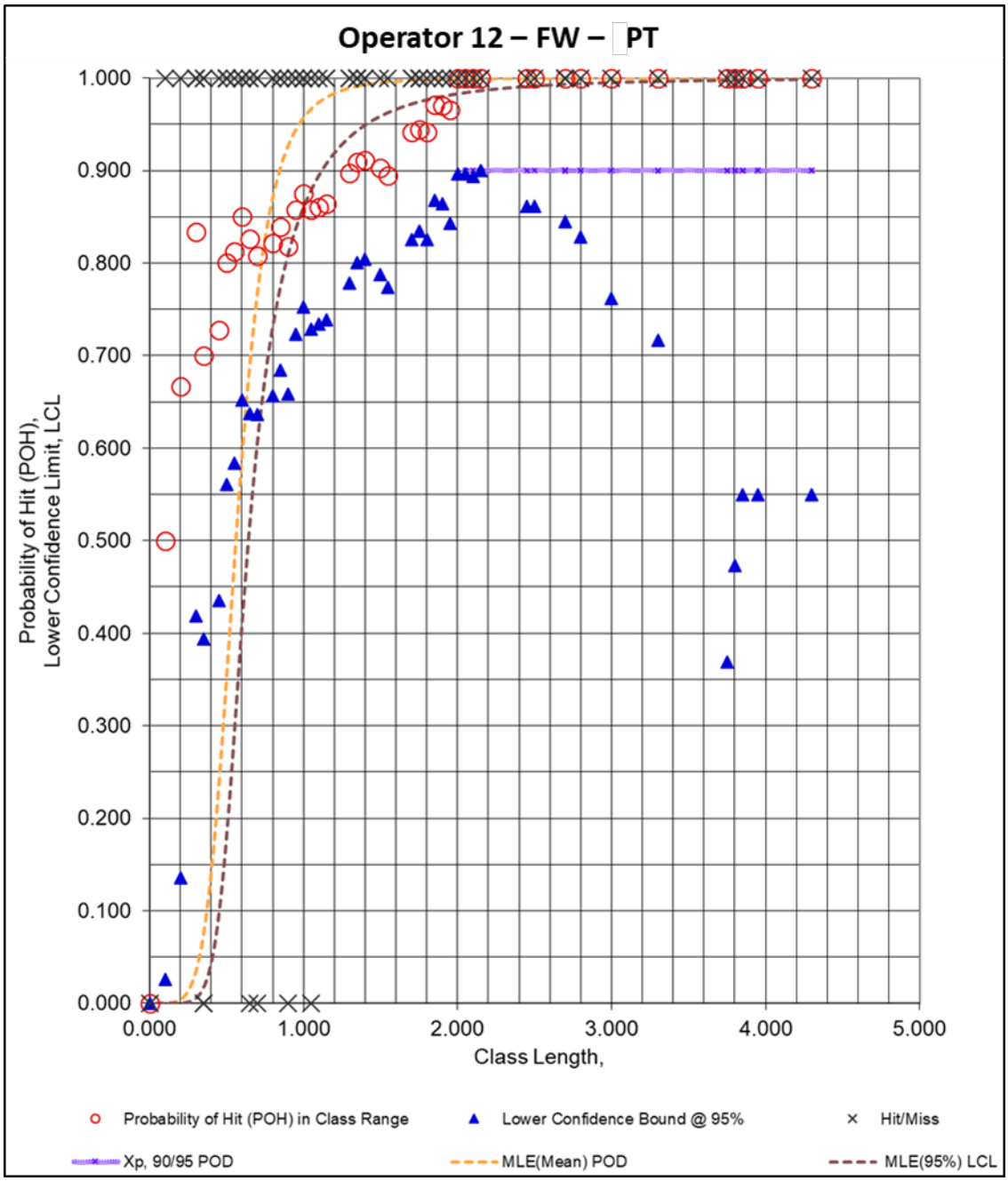

Figure 220. DOEPOD – FW – PT – Operator 12

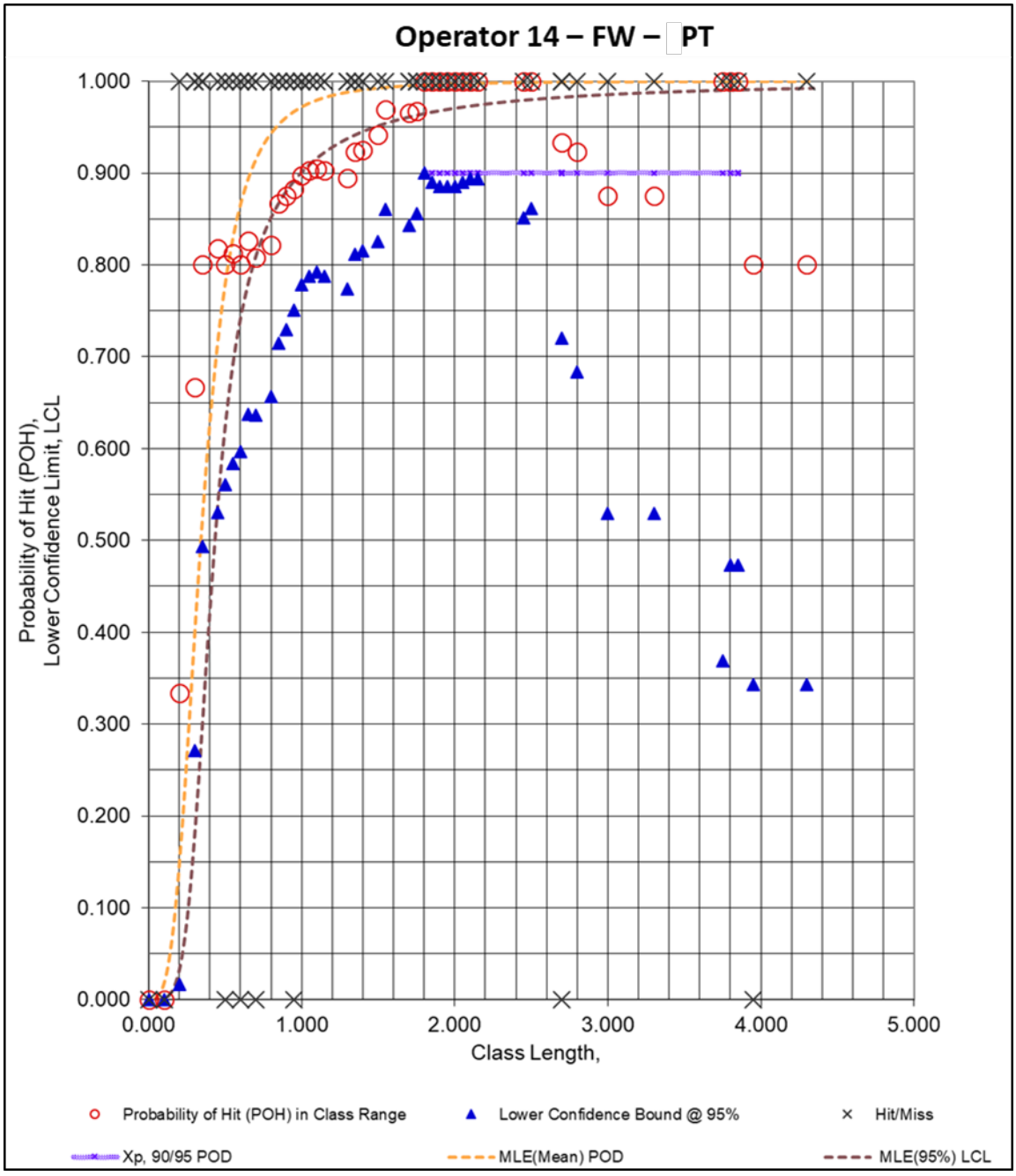

Figure 221. DOEPOD – FW – PT – Operator 14

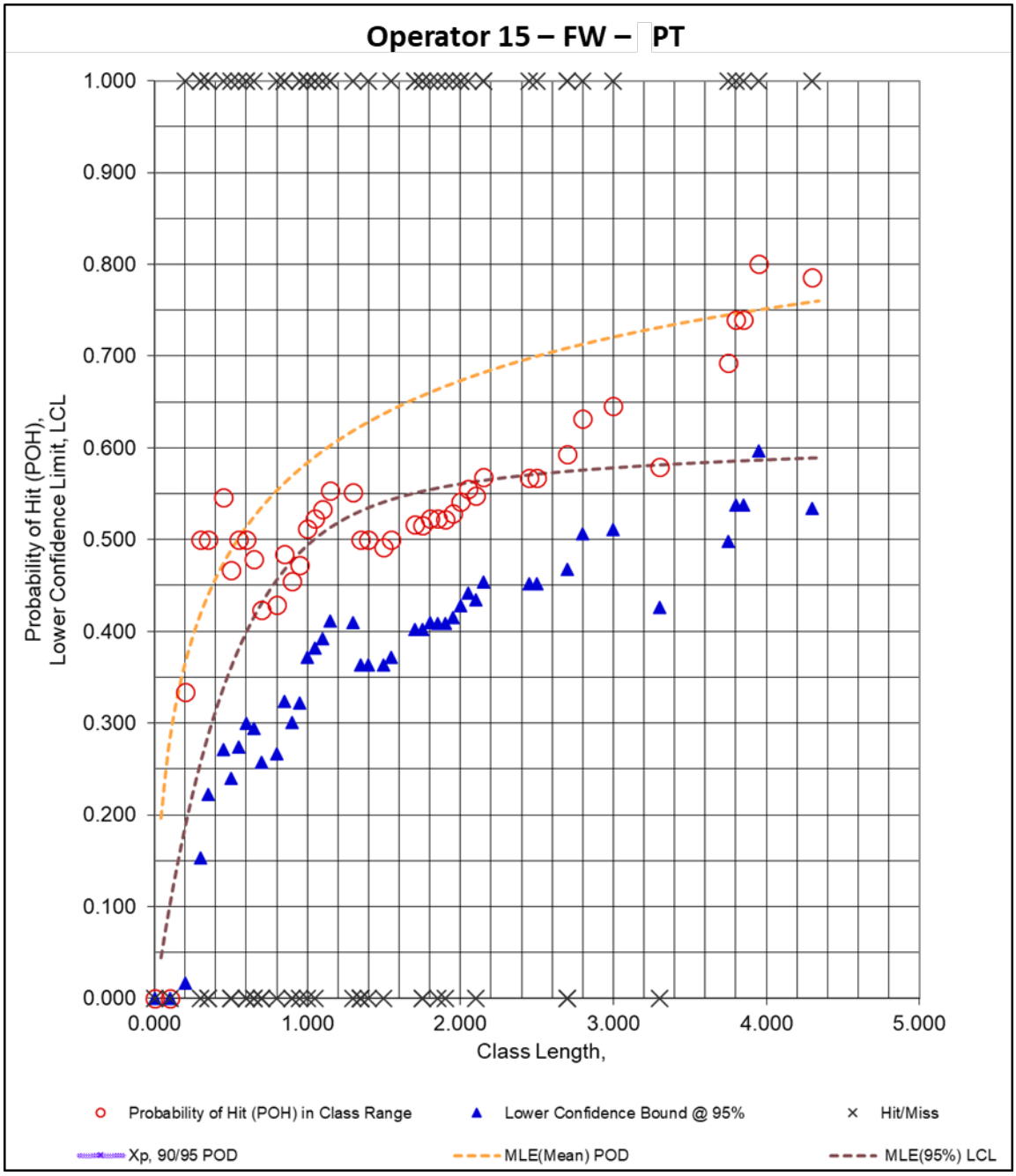

Figure 222. DOEPOD – FW – PT – Operator 15

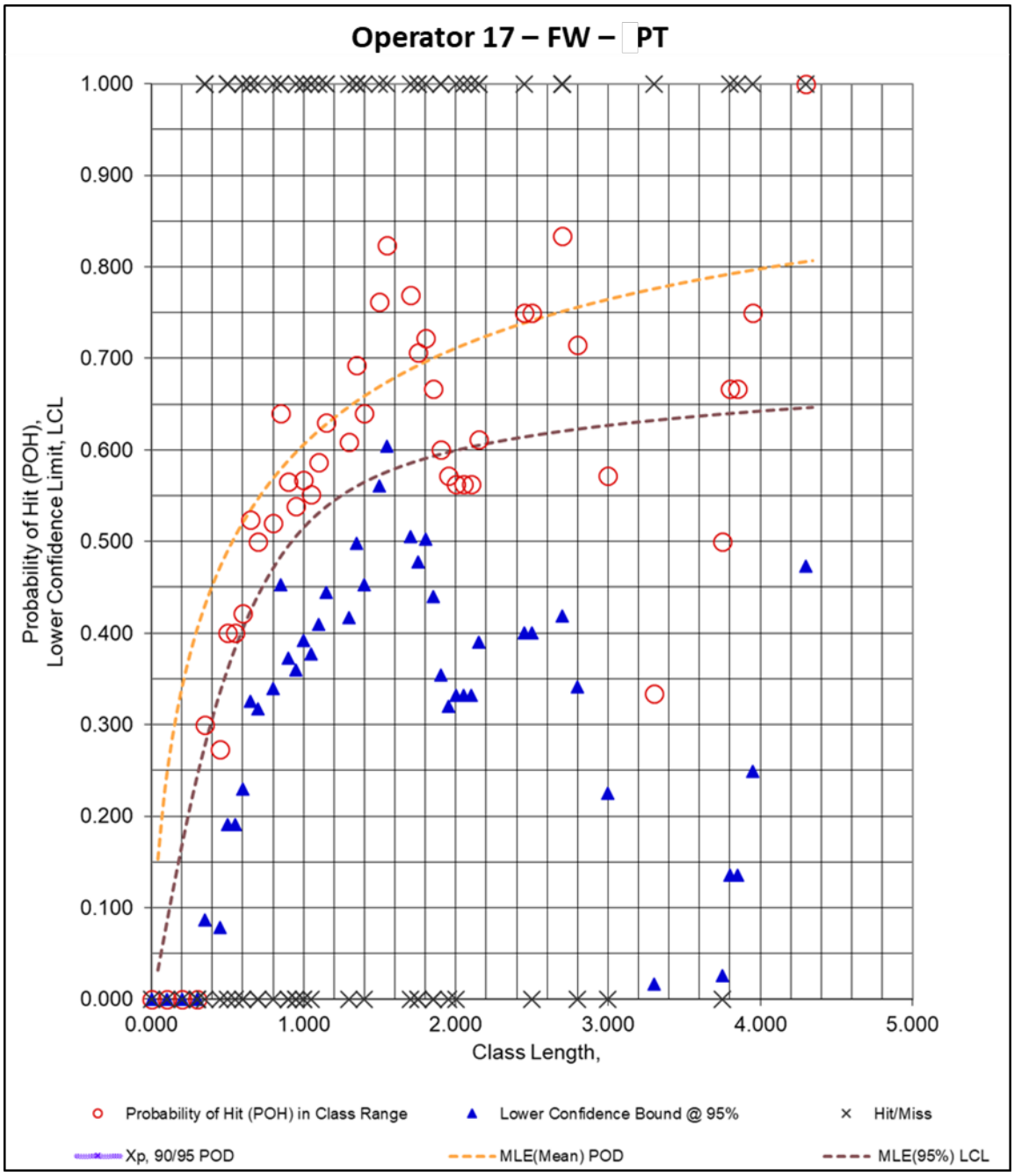

Figure 223. DOEPOD – FW – PT – Operator 17

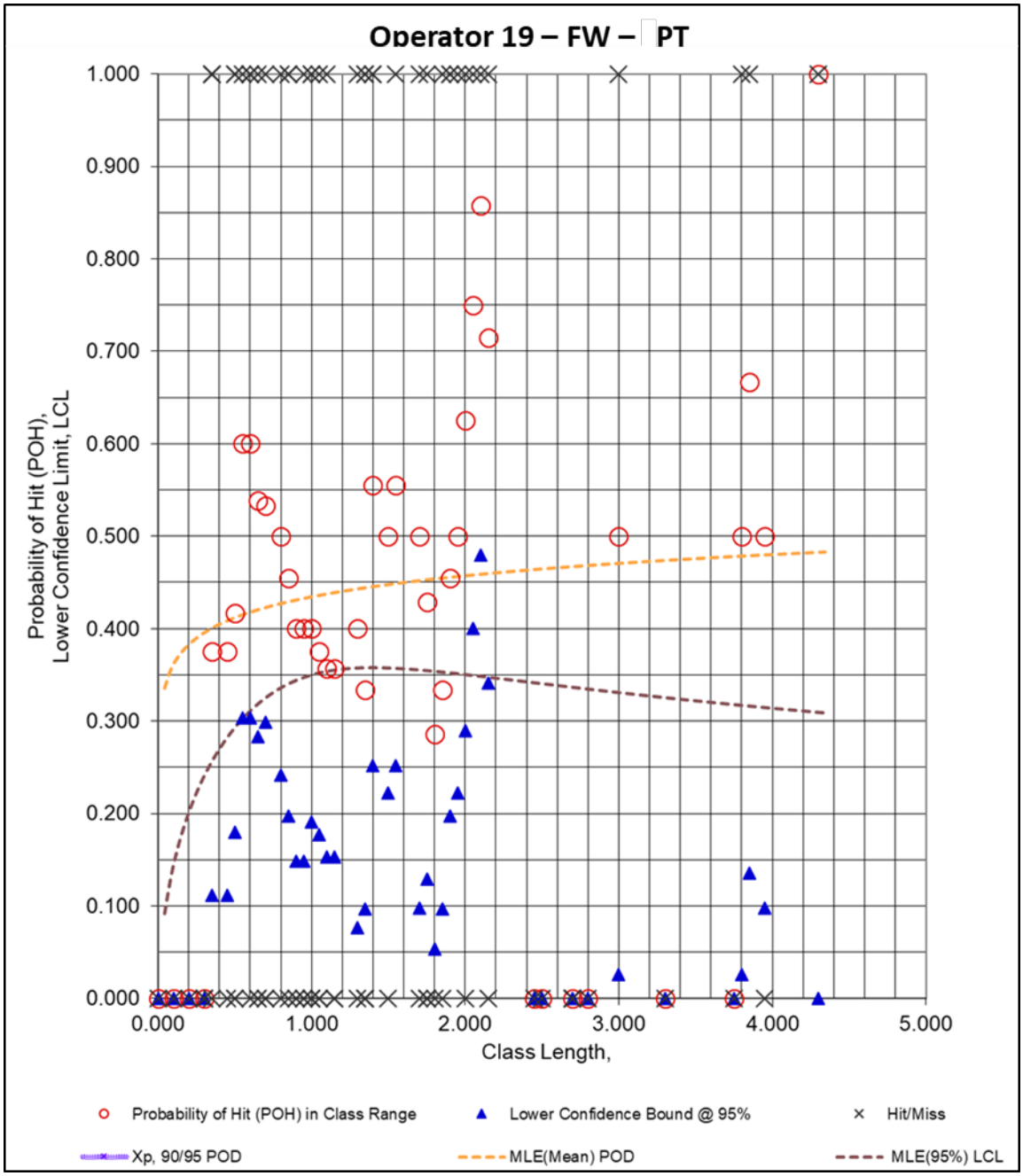

Figure 224. DOEPOD – FW – PT – Operator 19

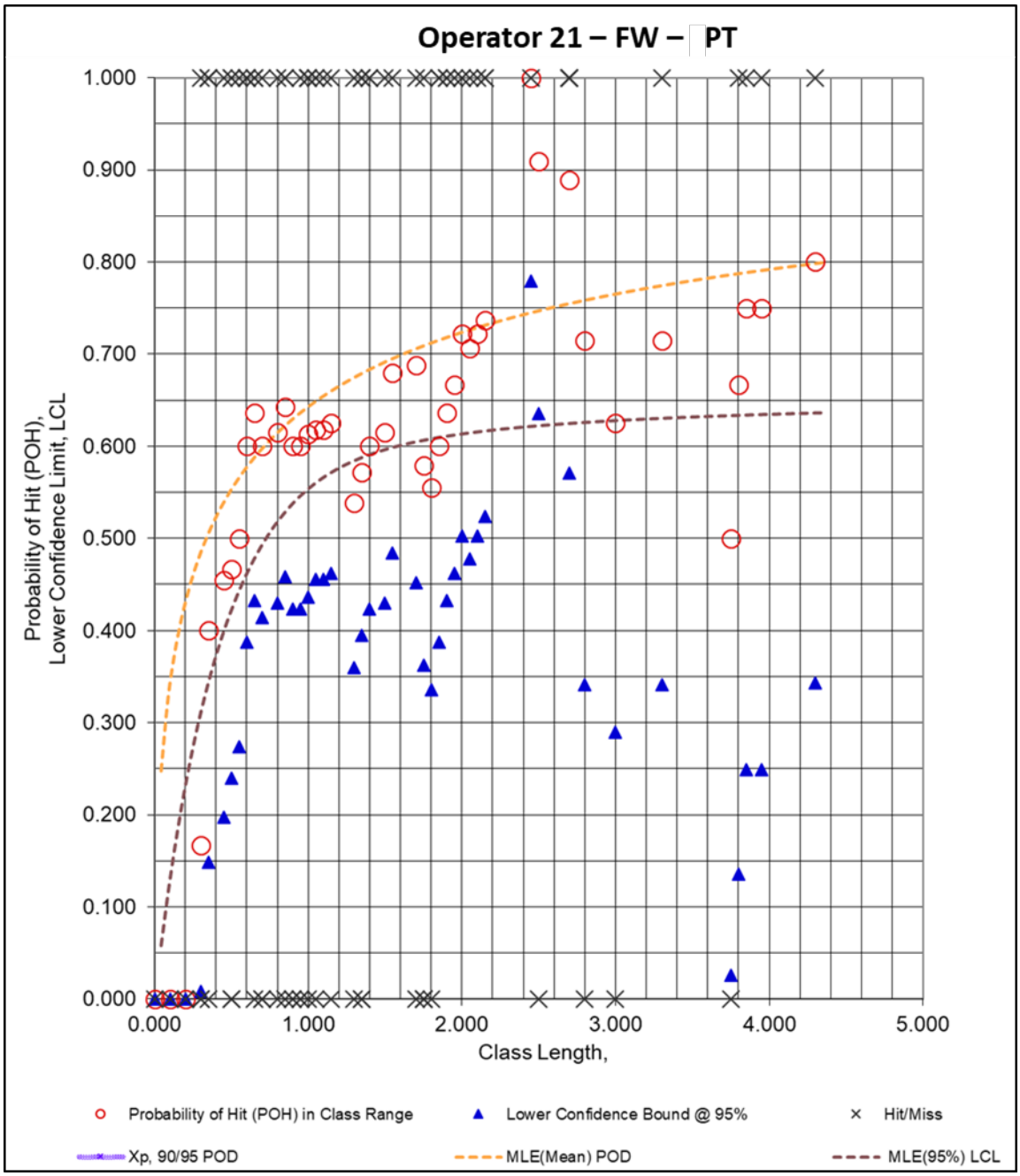

Figure 225. DOEPOD – FW – PT – Operator 21

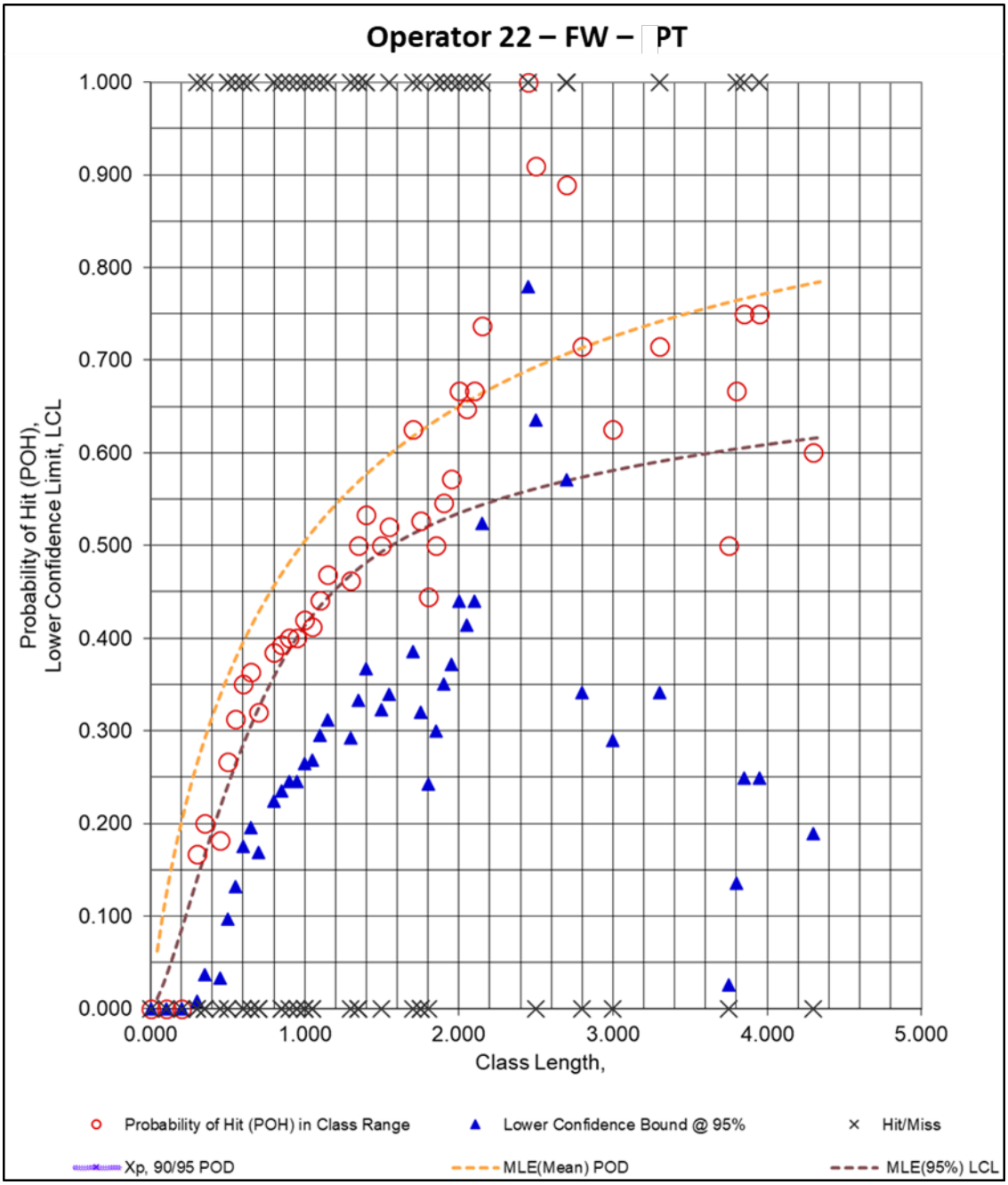

Figure 226. DOEPOD – FW – PT – Operator 22

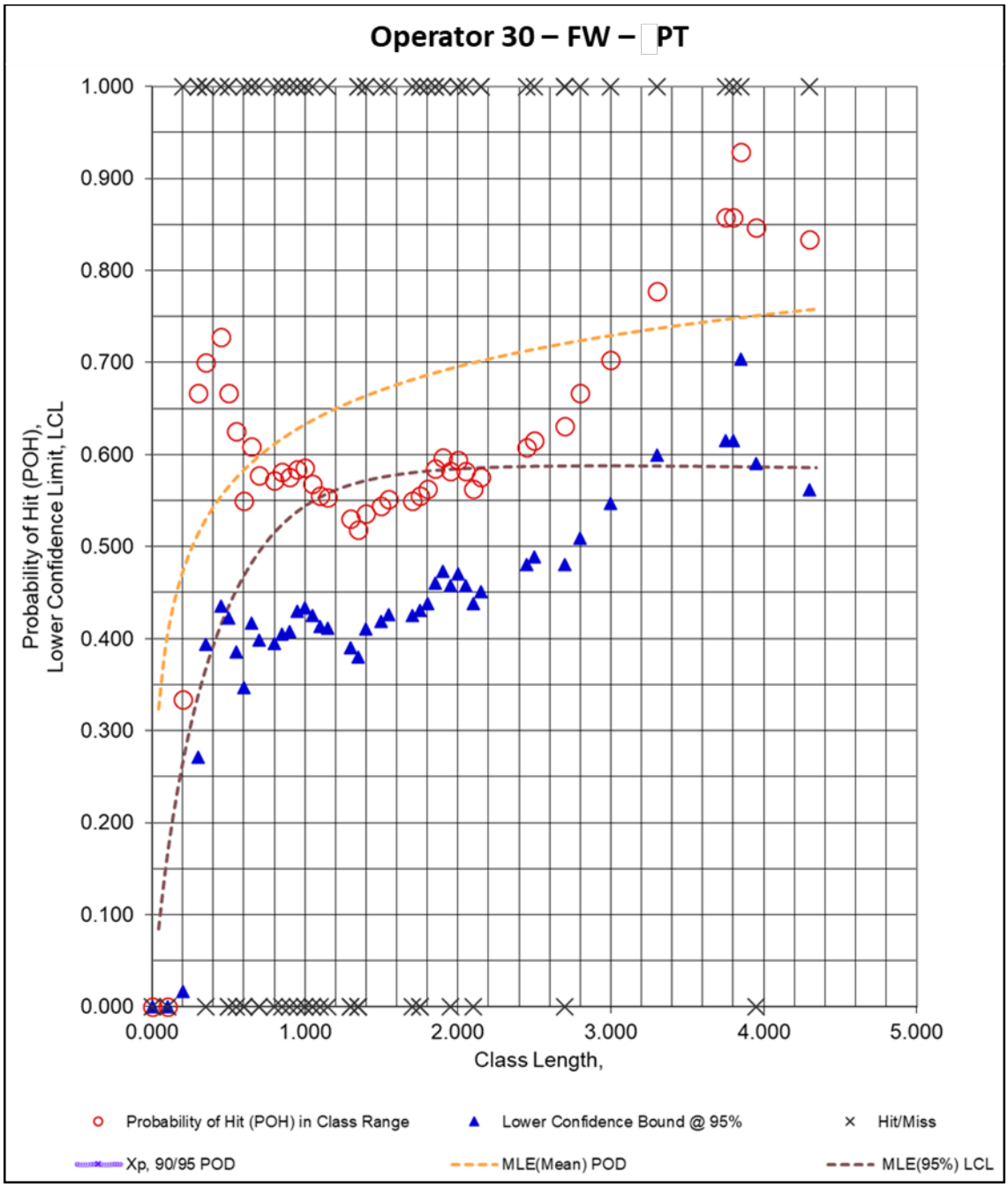

Figure 227. DOEPOD – FW – PT – Operator 30

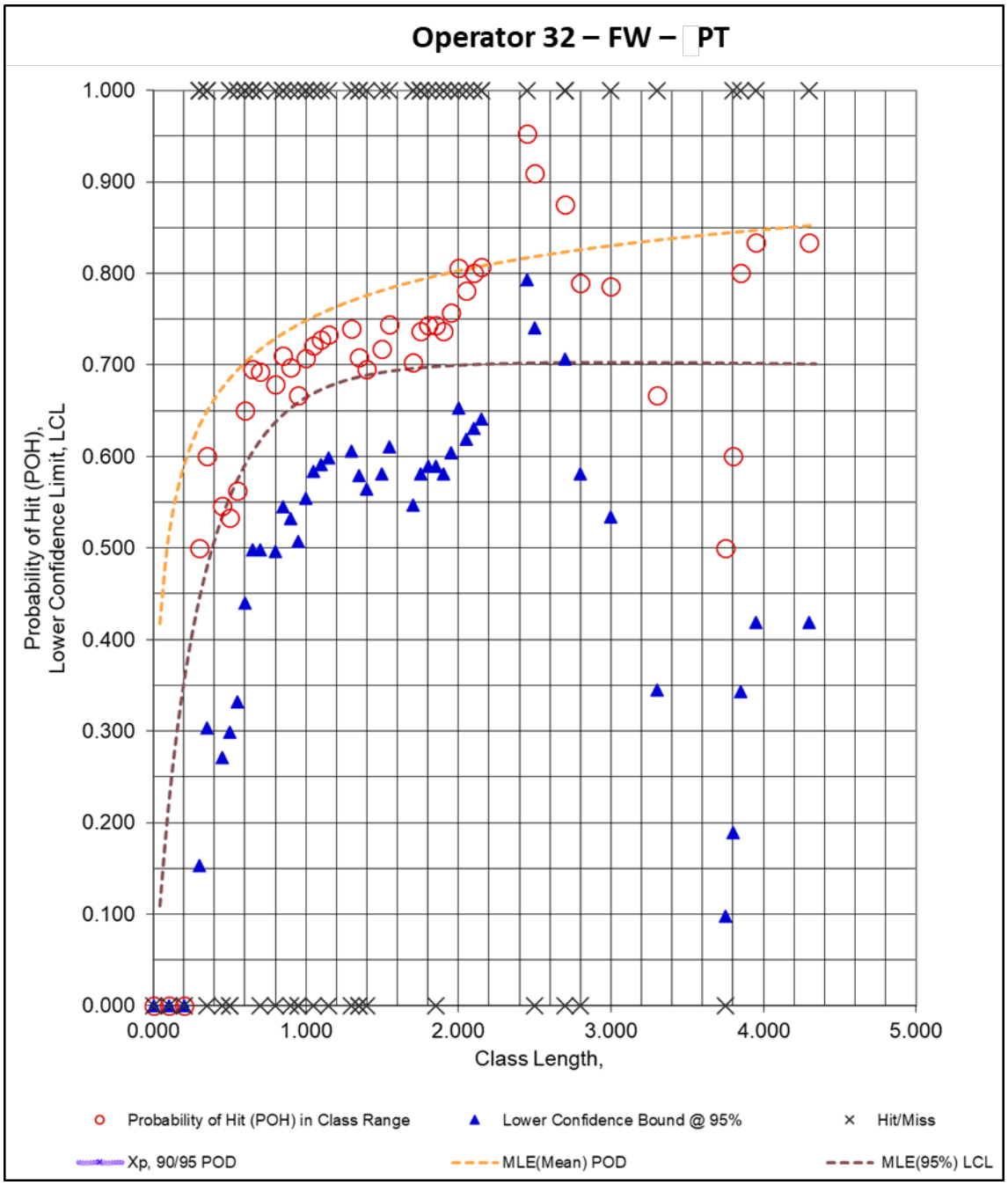

Figure 228. DOEPOD – FW – PT – Operator 32

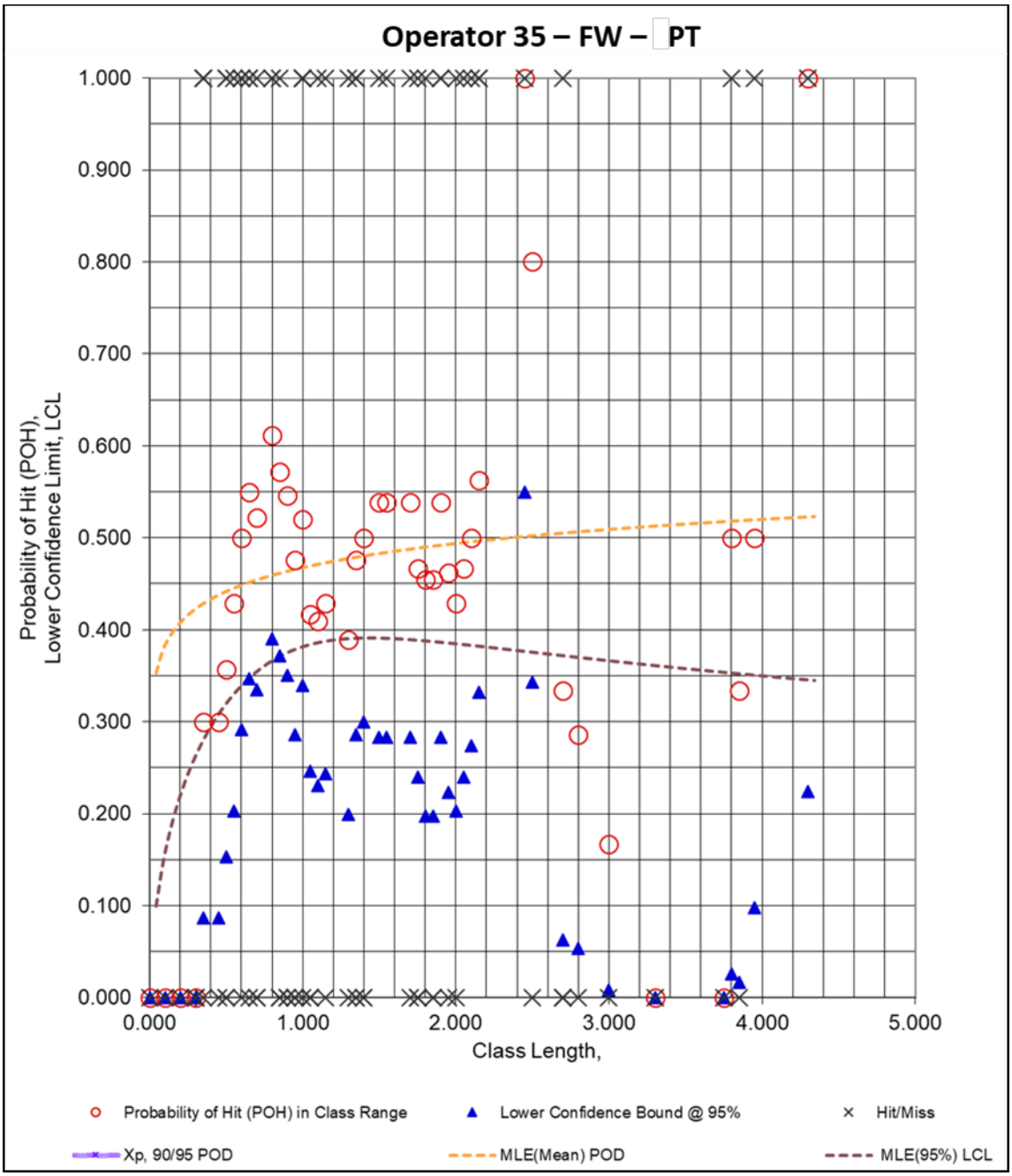

Figure 229. DOEPOD – FW – PT – Operator 35

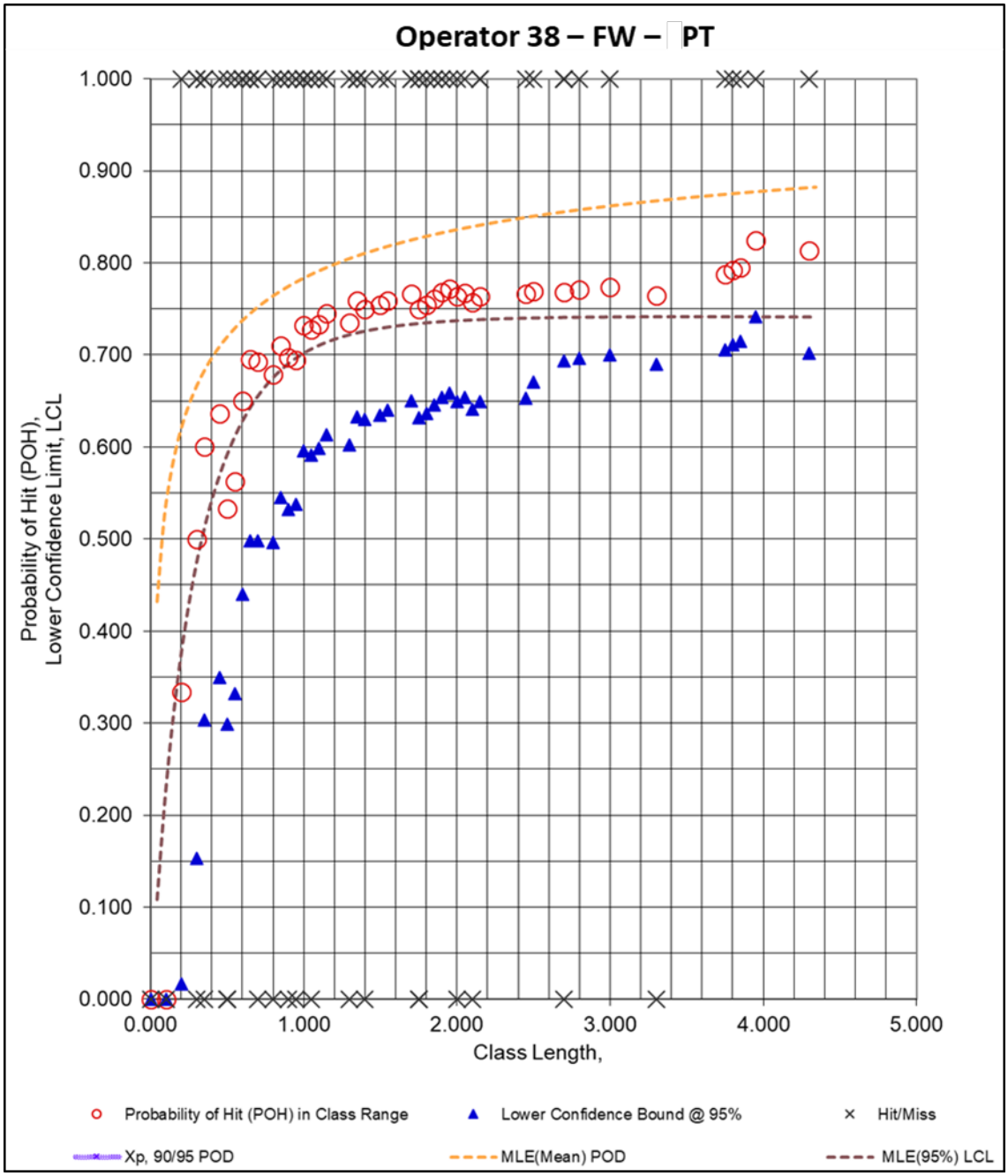

Figure 230. DOEPOD – FW – PT – Operator 38

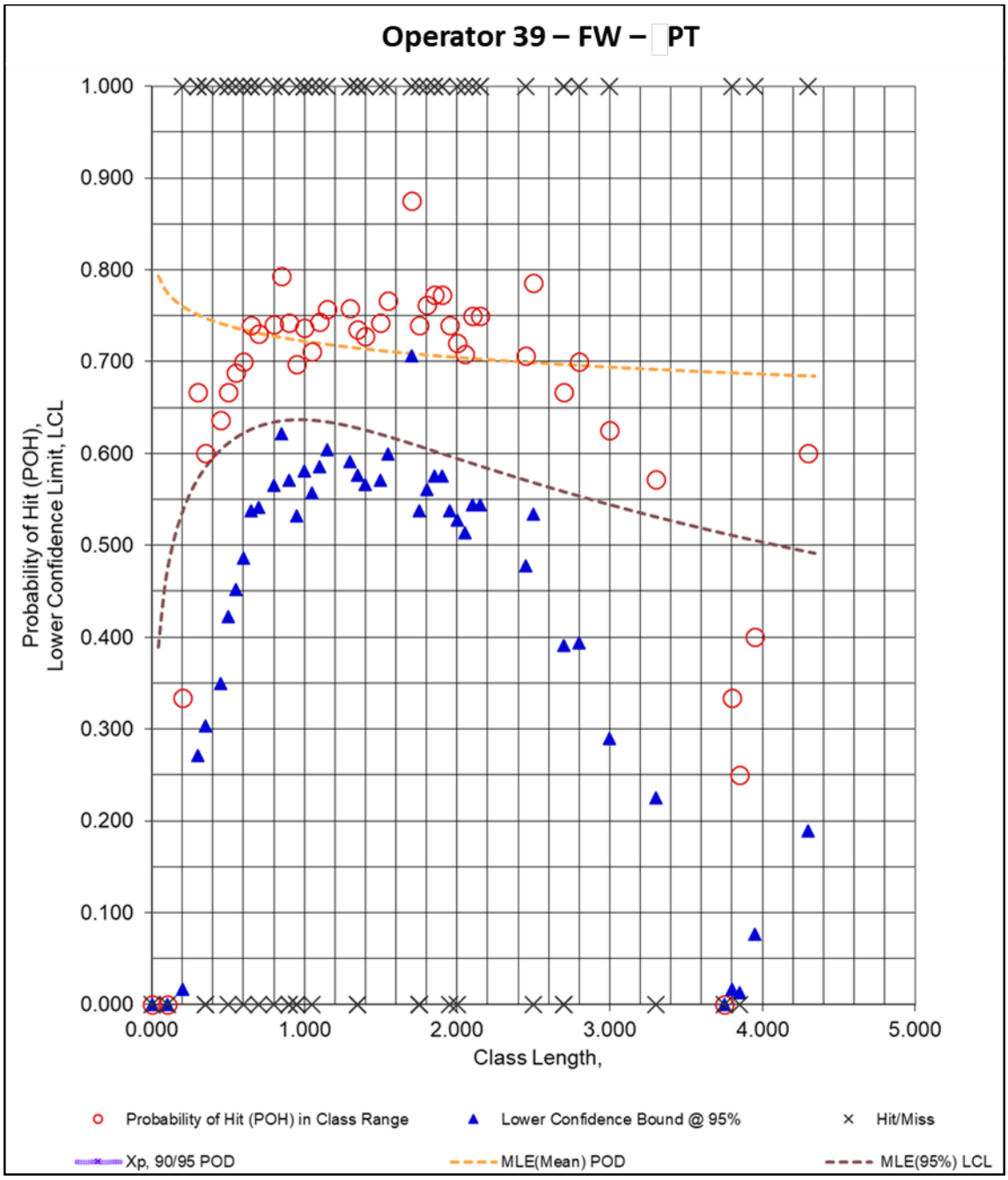

Figure 231. DOEPOD – FW – PT – Operator 39

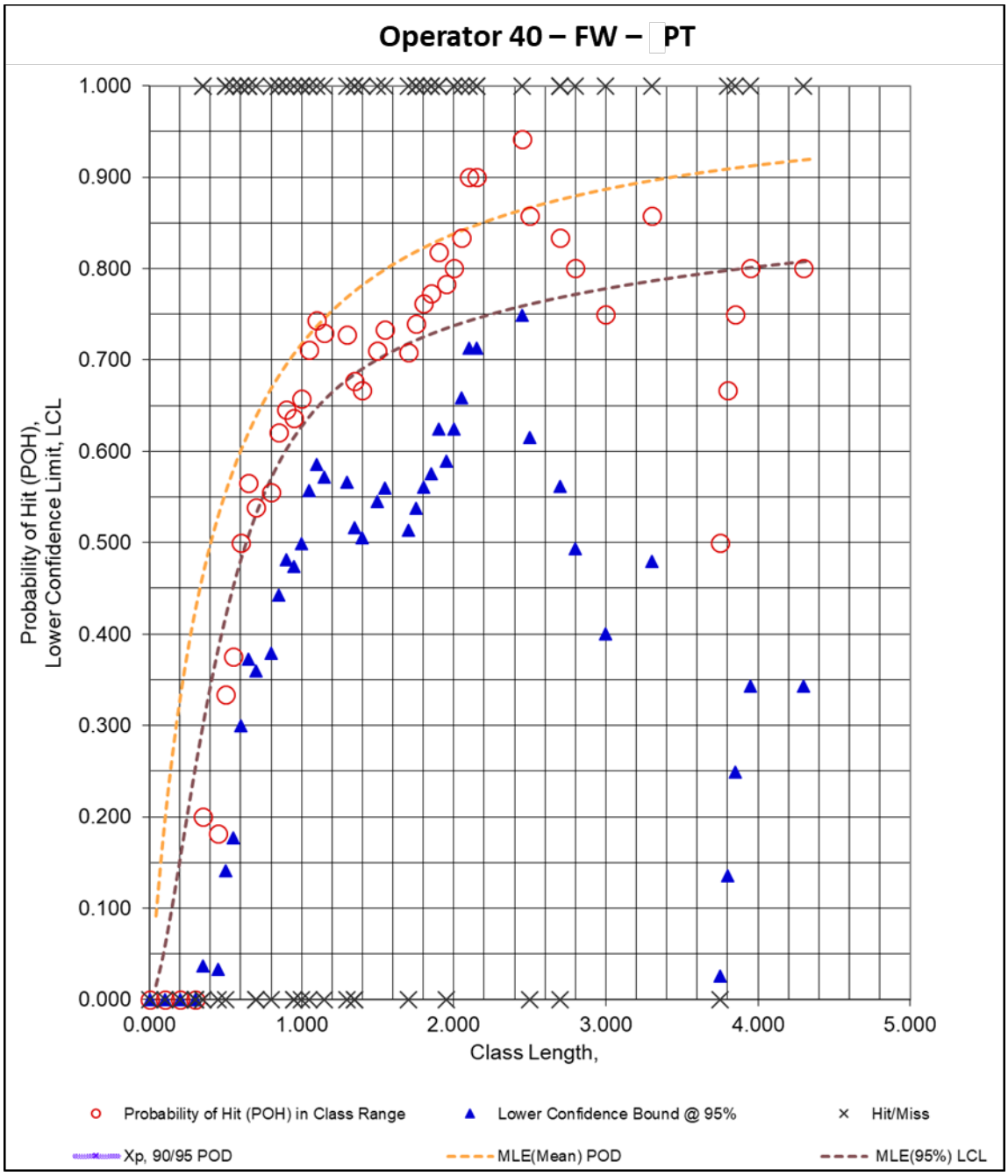

Figure 232. DOEPOD – FW – PT – Operator 40

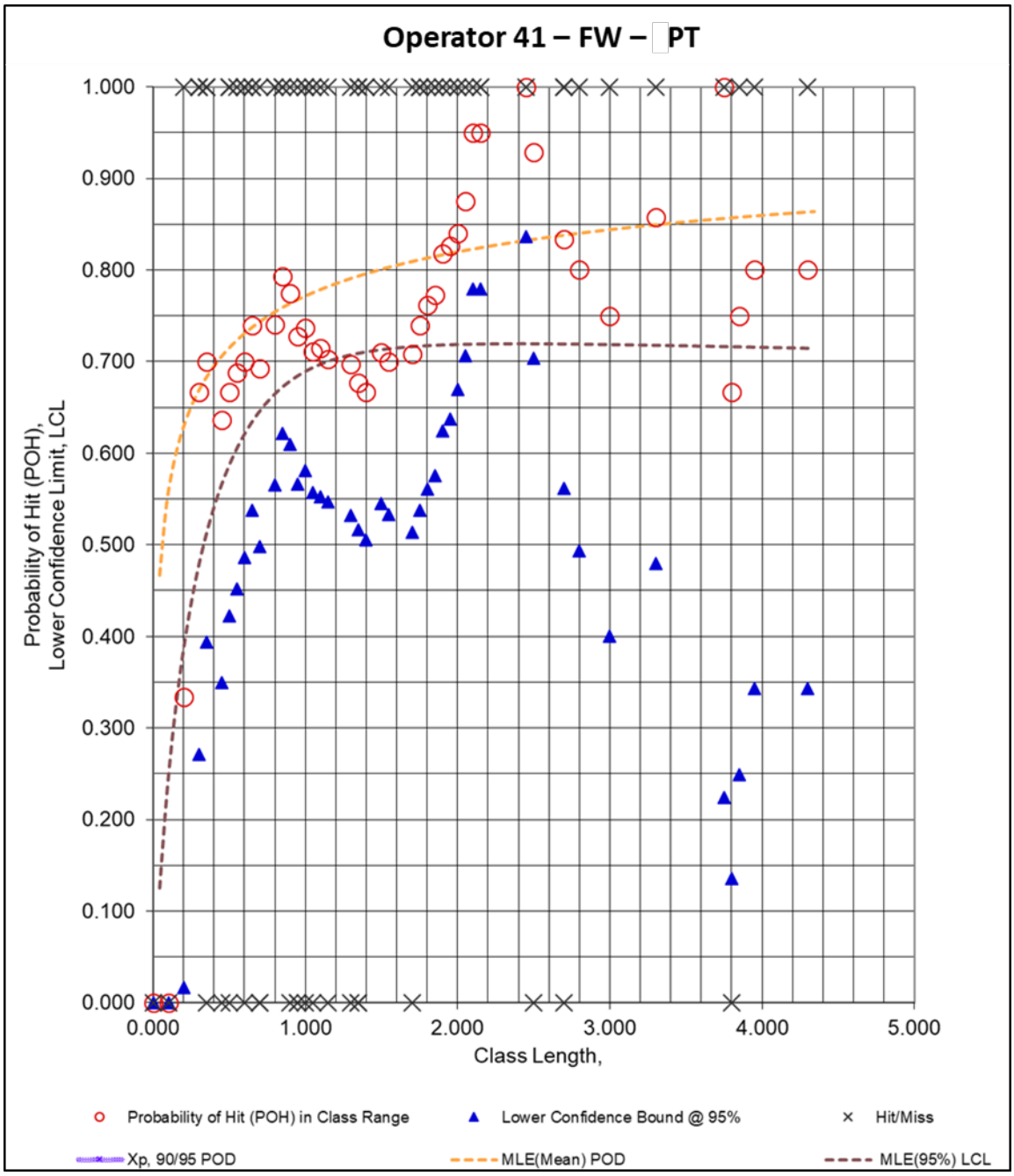

Figure 233. DOEPOD – FW – PT – Operator 41

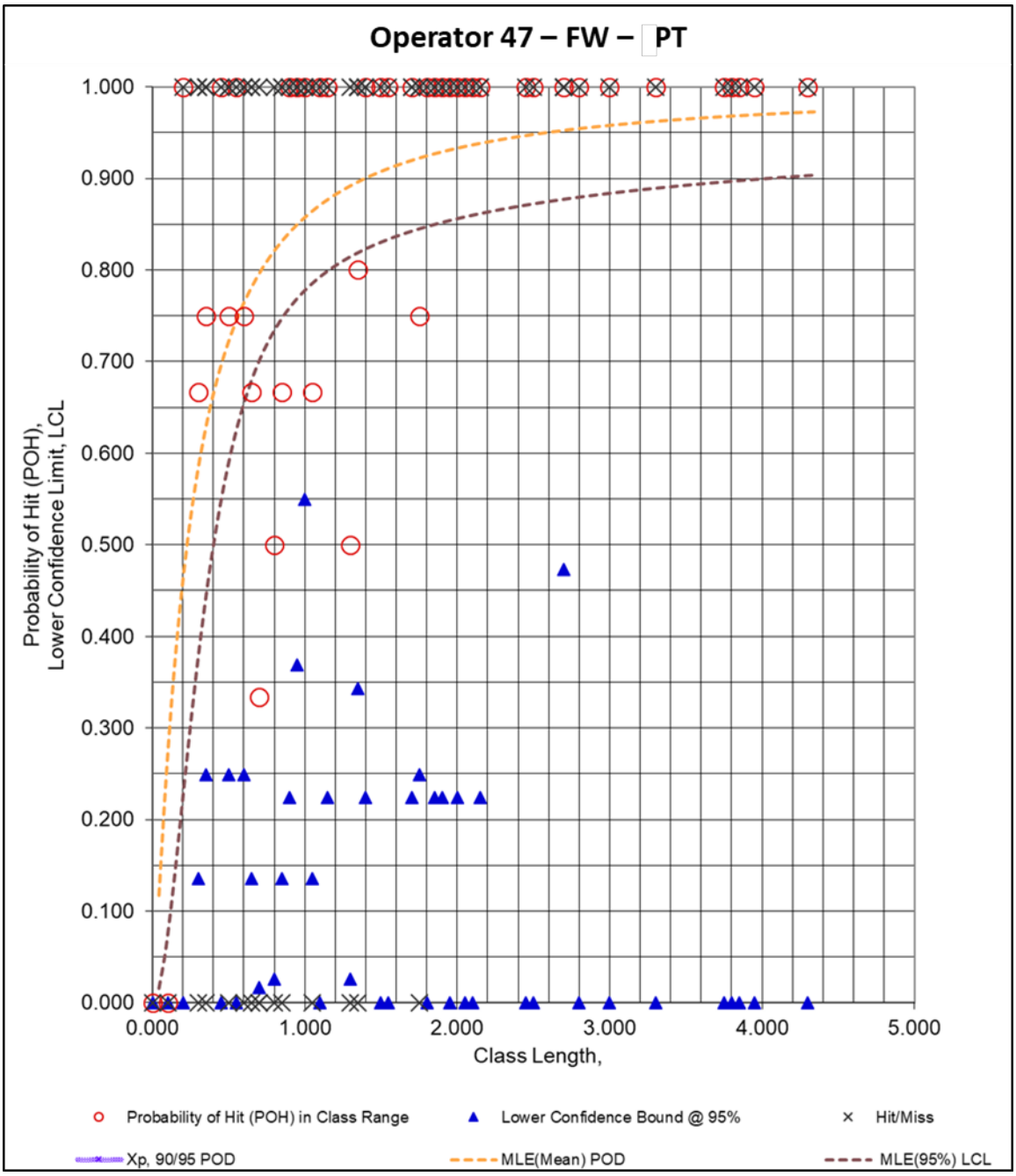

Figure 234. DOEPOD – FW – PT – Operator 47

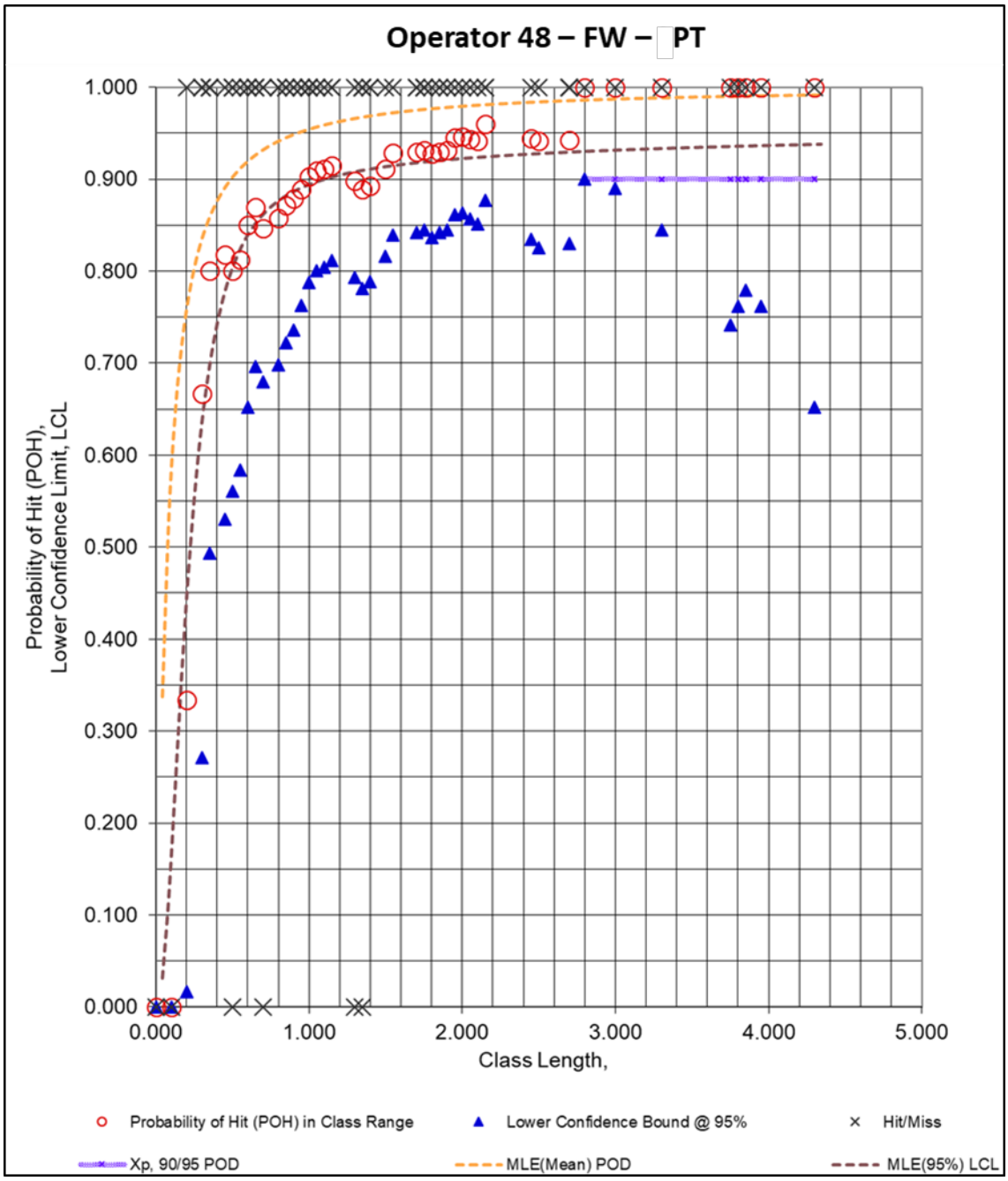

Figure 235. DOEPOD – FW – PT – Operator 48

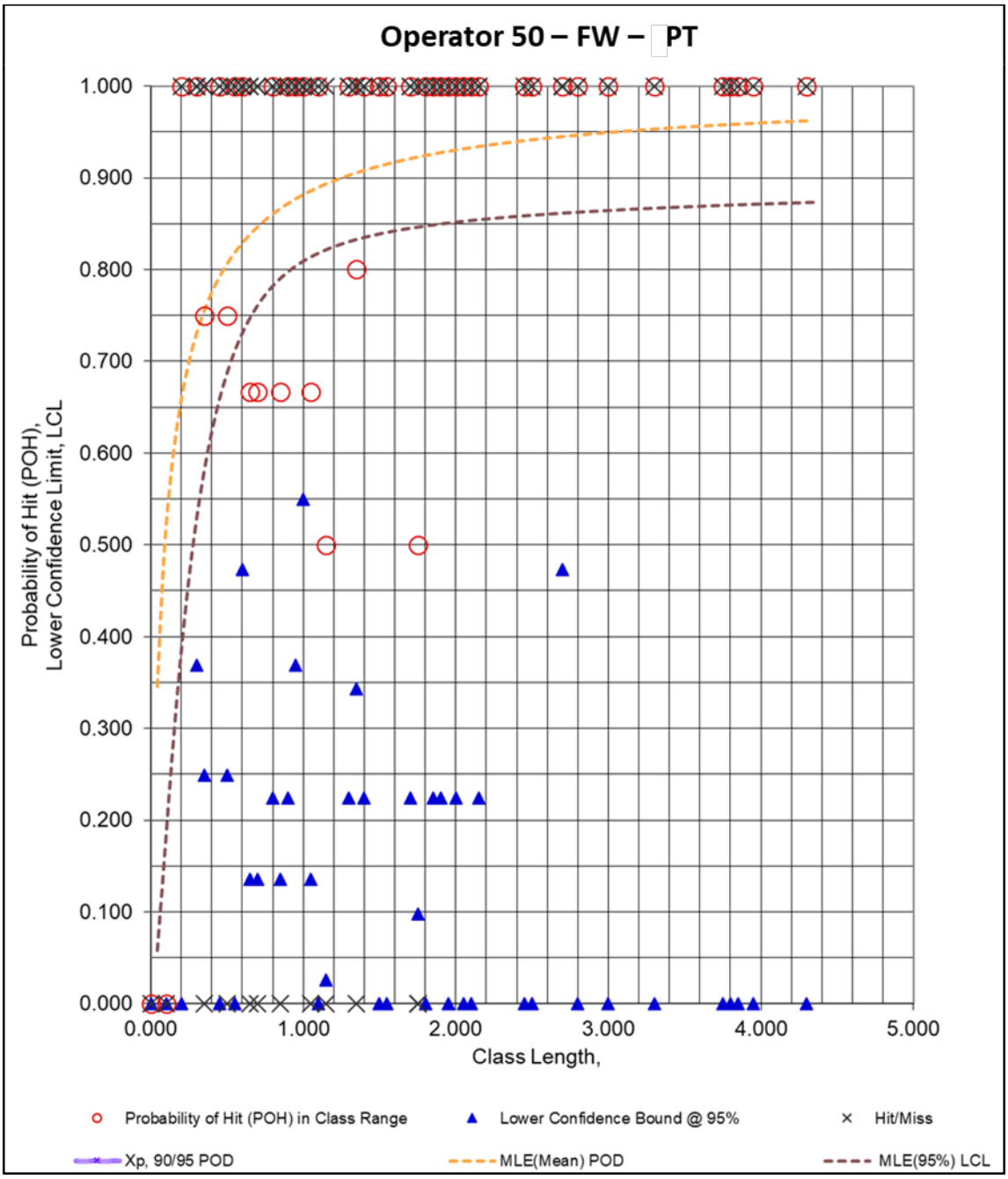

Figure 236. DOEPOD – FW – PT – Operator 50

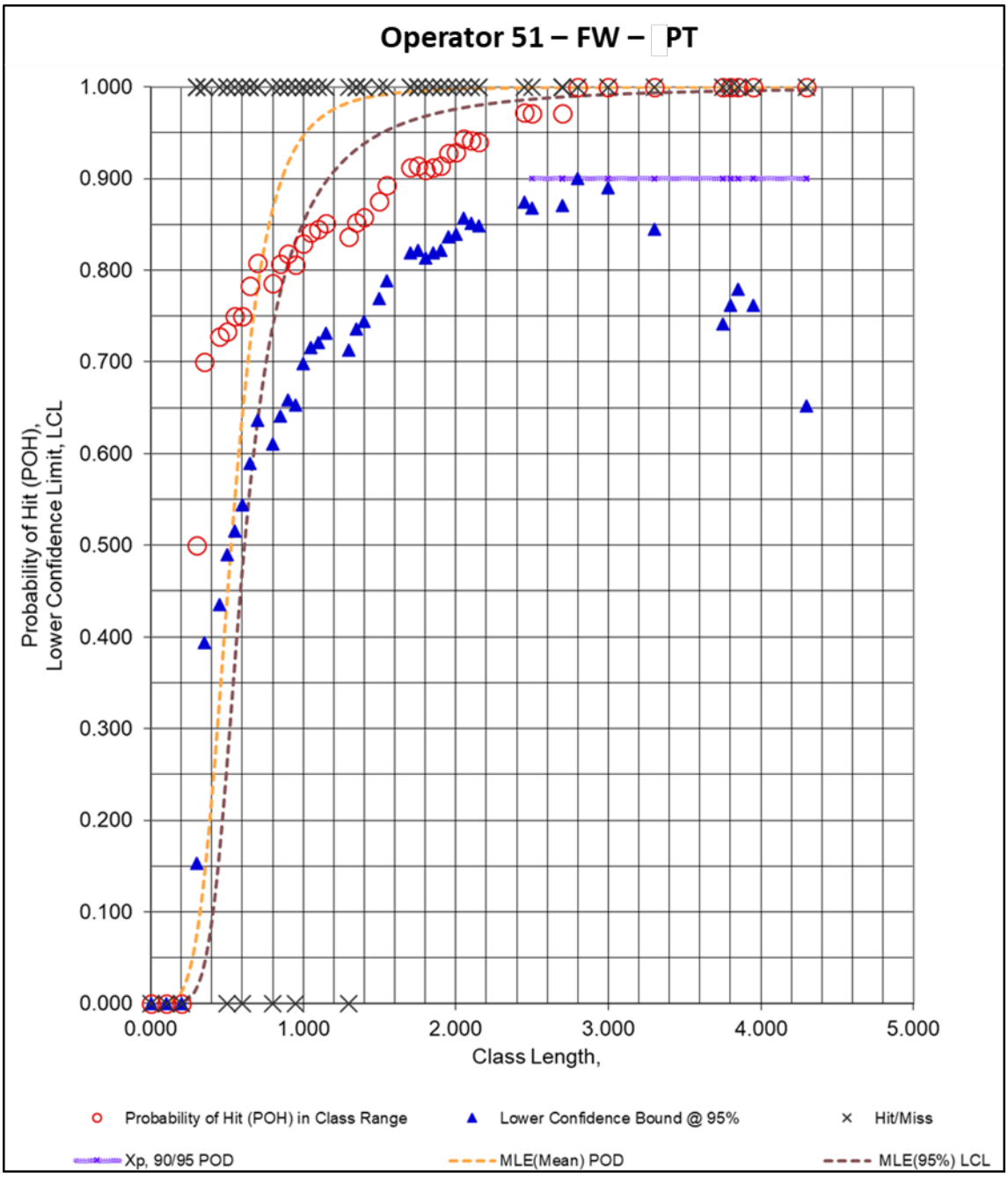

Figure 237. DOEPOD – FW – PT – Operator 51

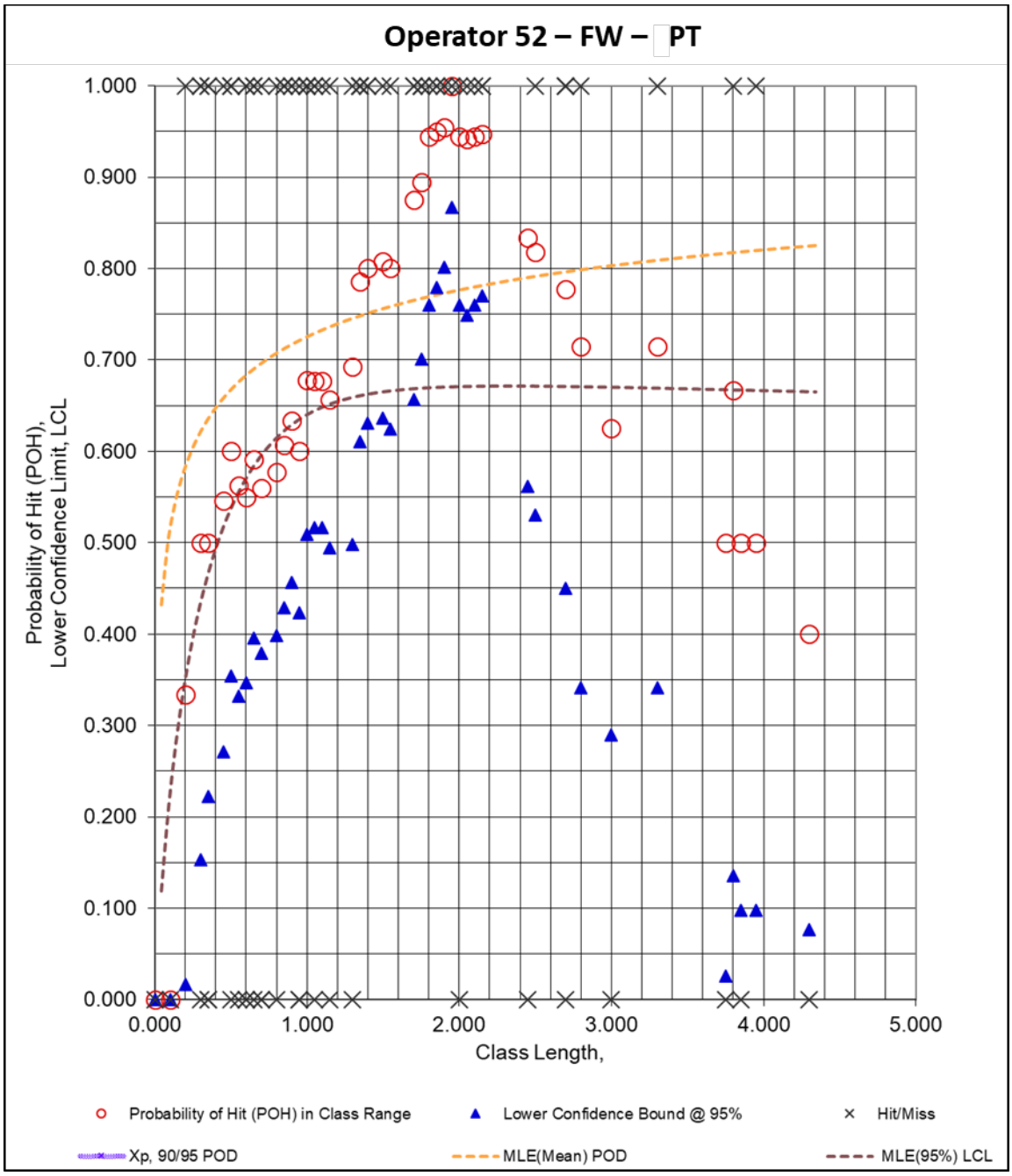

Figure 238. DOEPOD – FW – PT – Operator 52

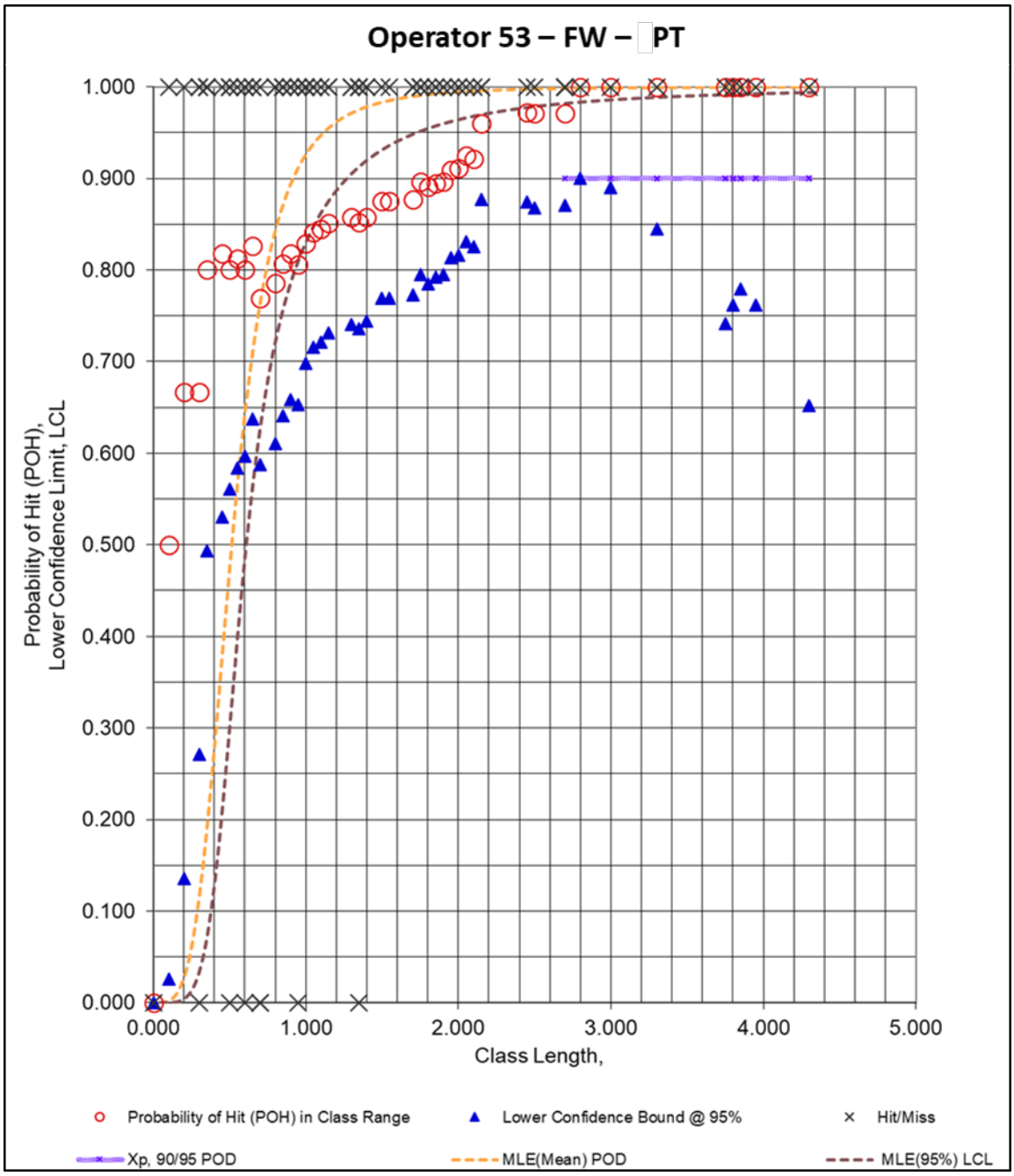

Figure 239. DOEPOD – FW – PT – Operator 53

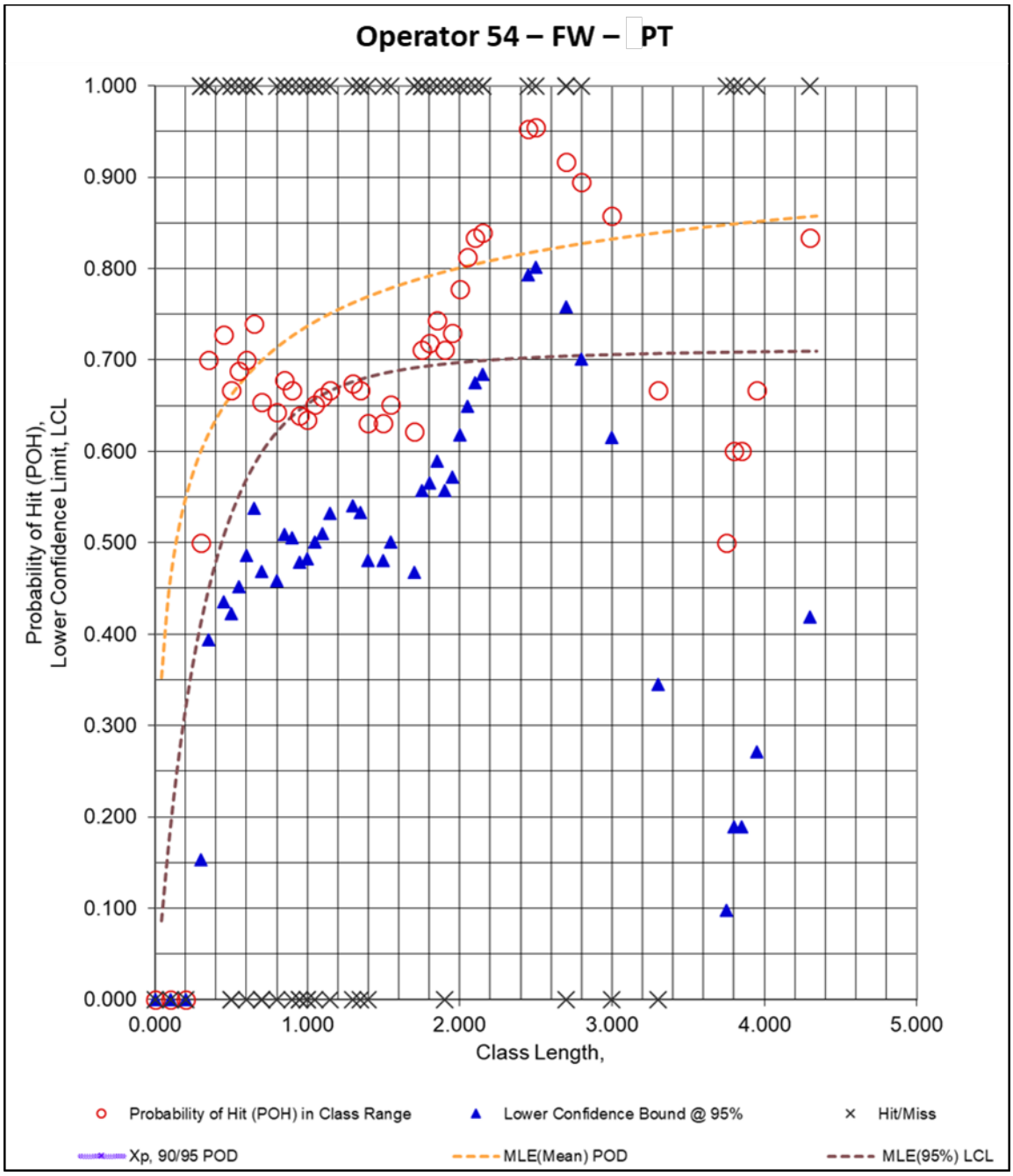

Figure 240. DOEPOD – FW – PT – Operator 54

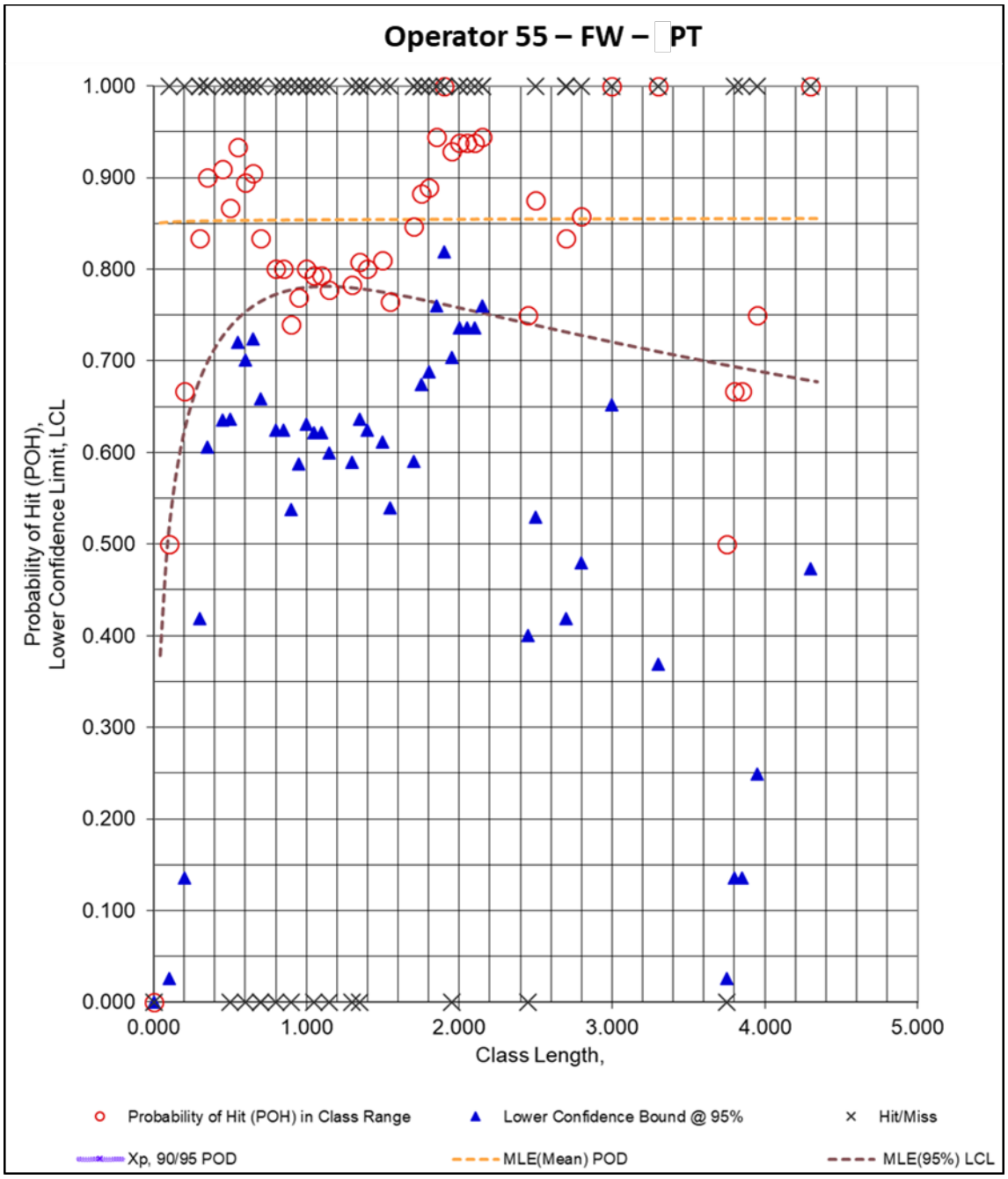

Figure 241. DOEPOD – FW – PT – Operator 55

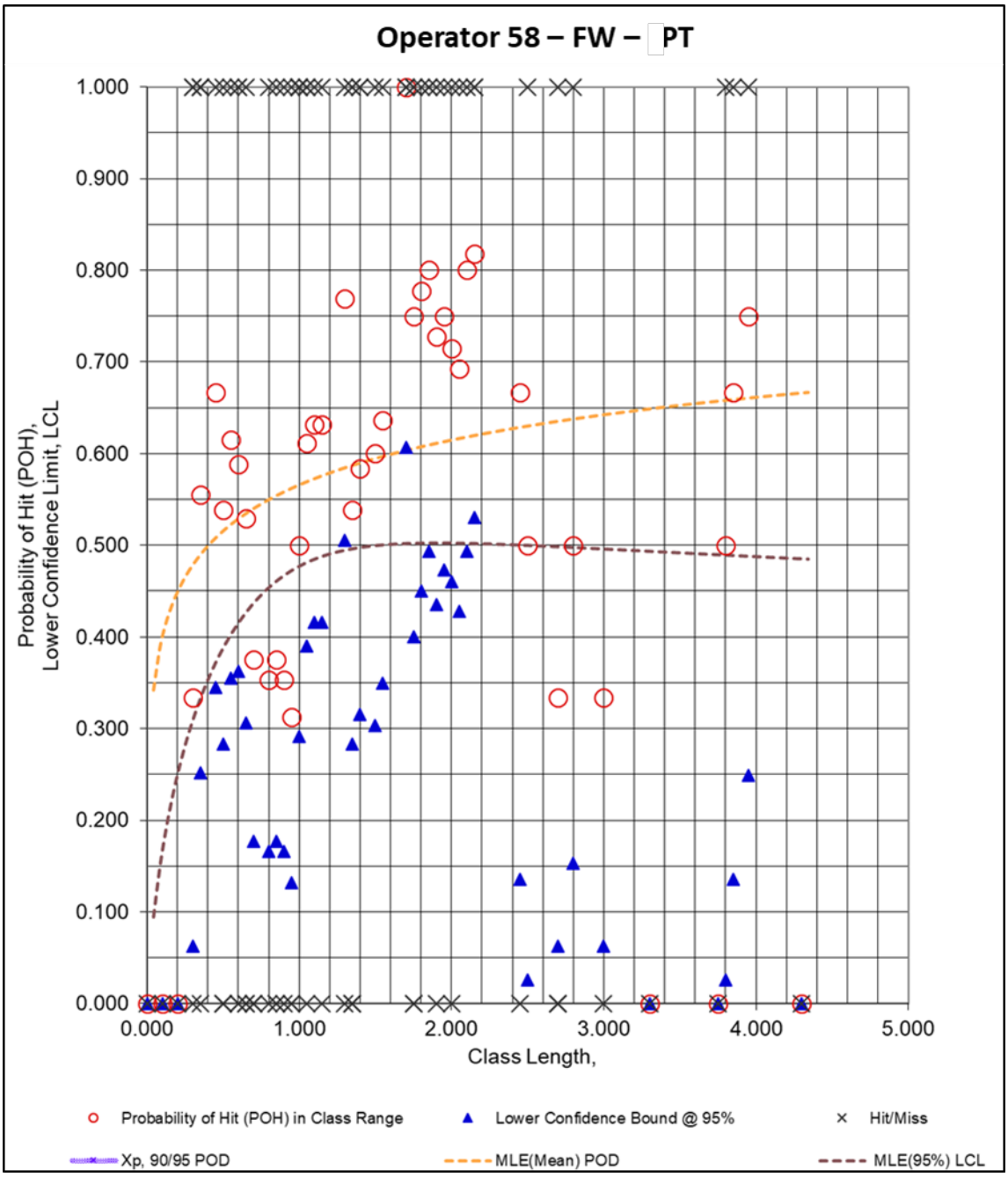

Figure 242. DOEPOD – FW – PT – Operator 58

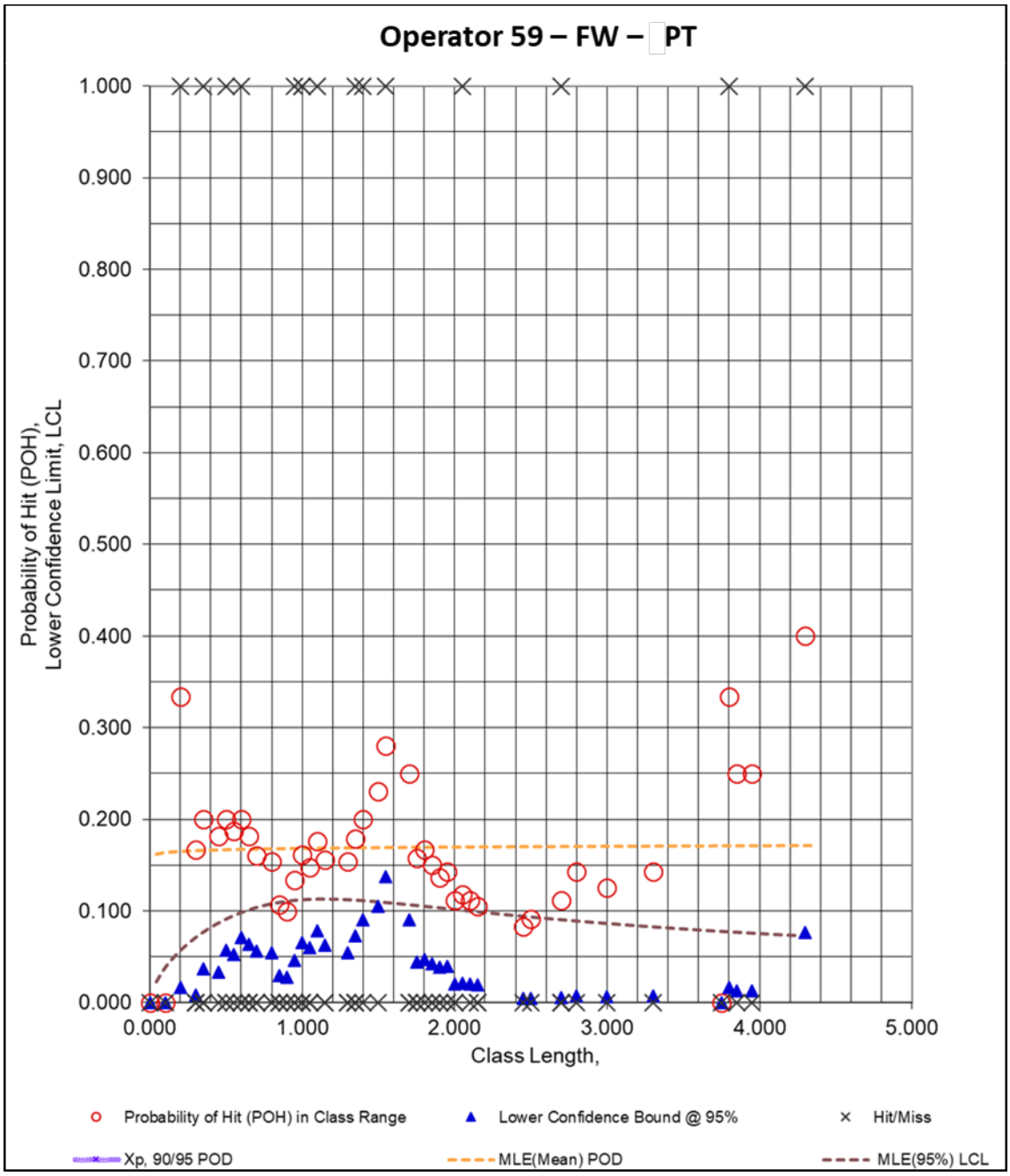

Figure 243. DOEPOD – FW – PT – Operator 59

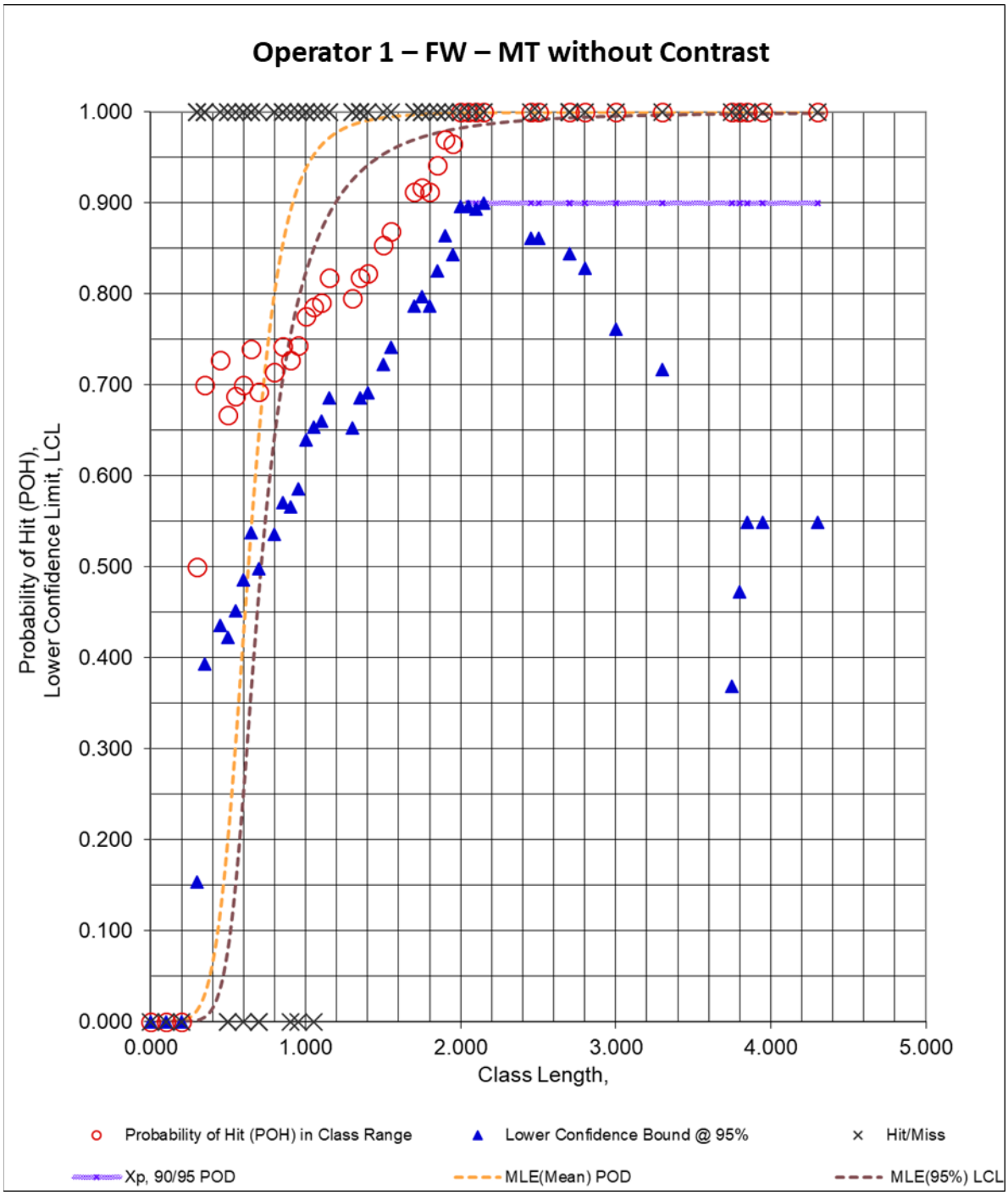

Figure 244. DOEPOD – FW – MT without Contrast – Operator 1

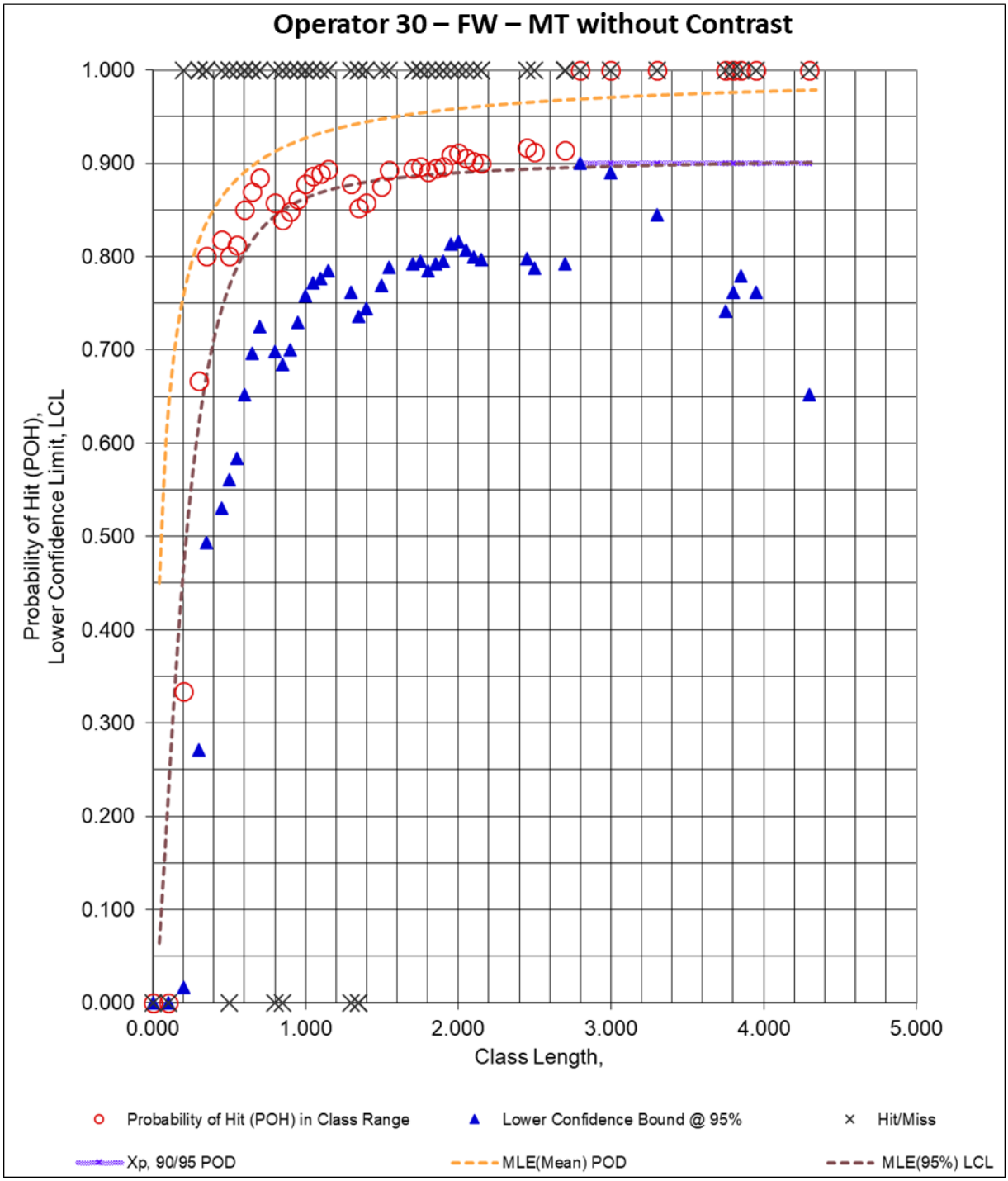

Figure 245. DOEPOD – FW – MT without Contrast – Operator 30

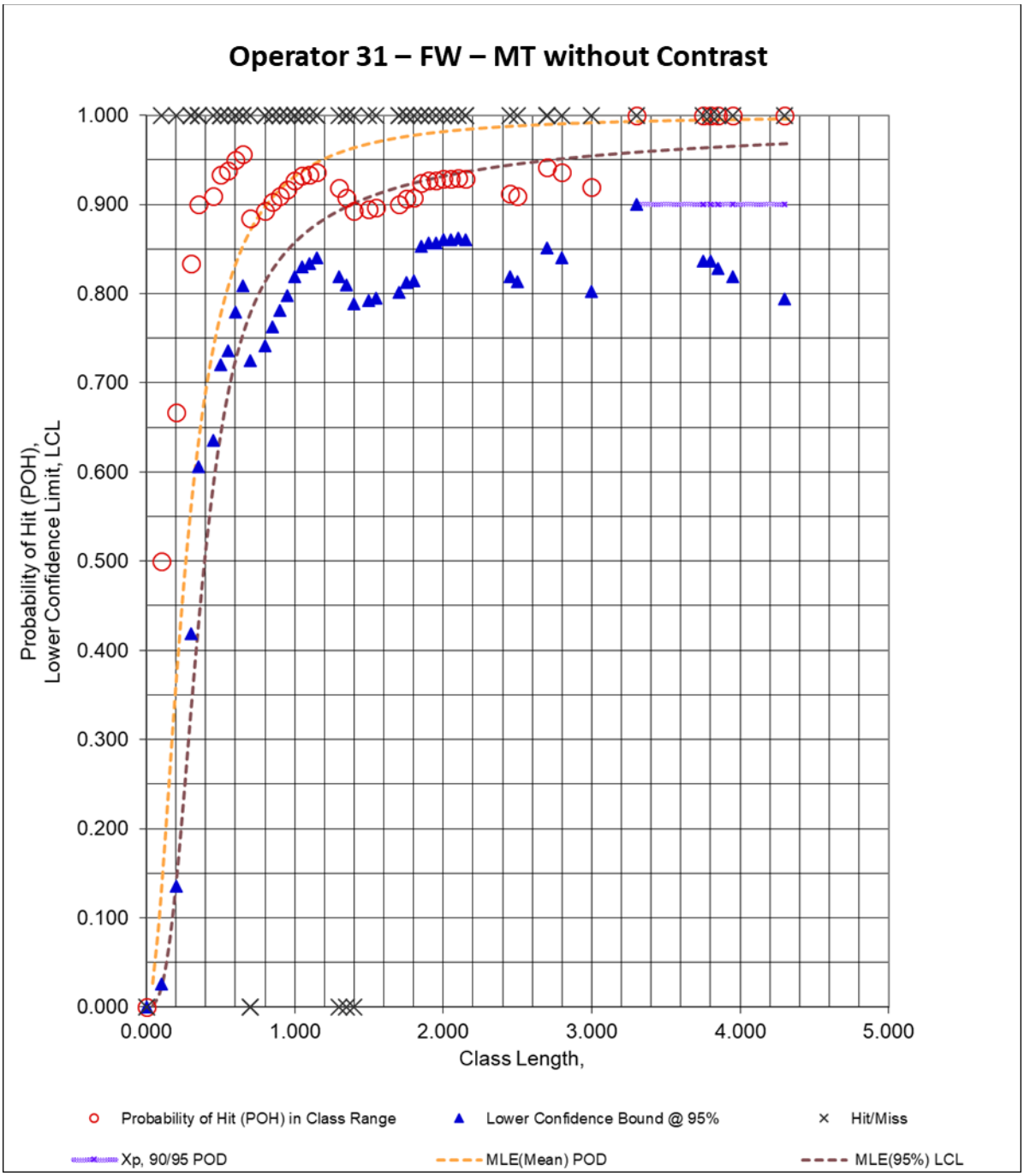

Figure 246. DOEPOD – FW – MT without Contrast – Operator 31

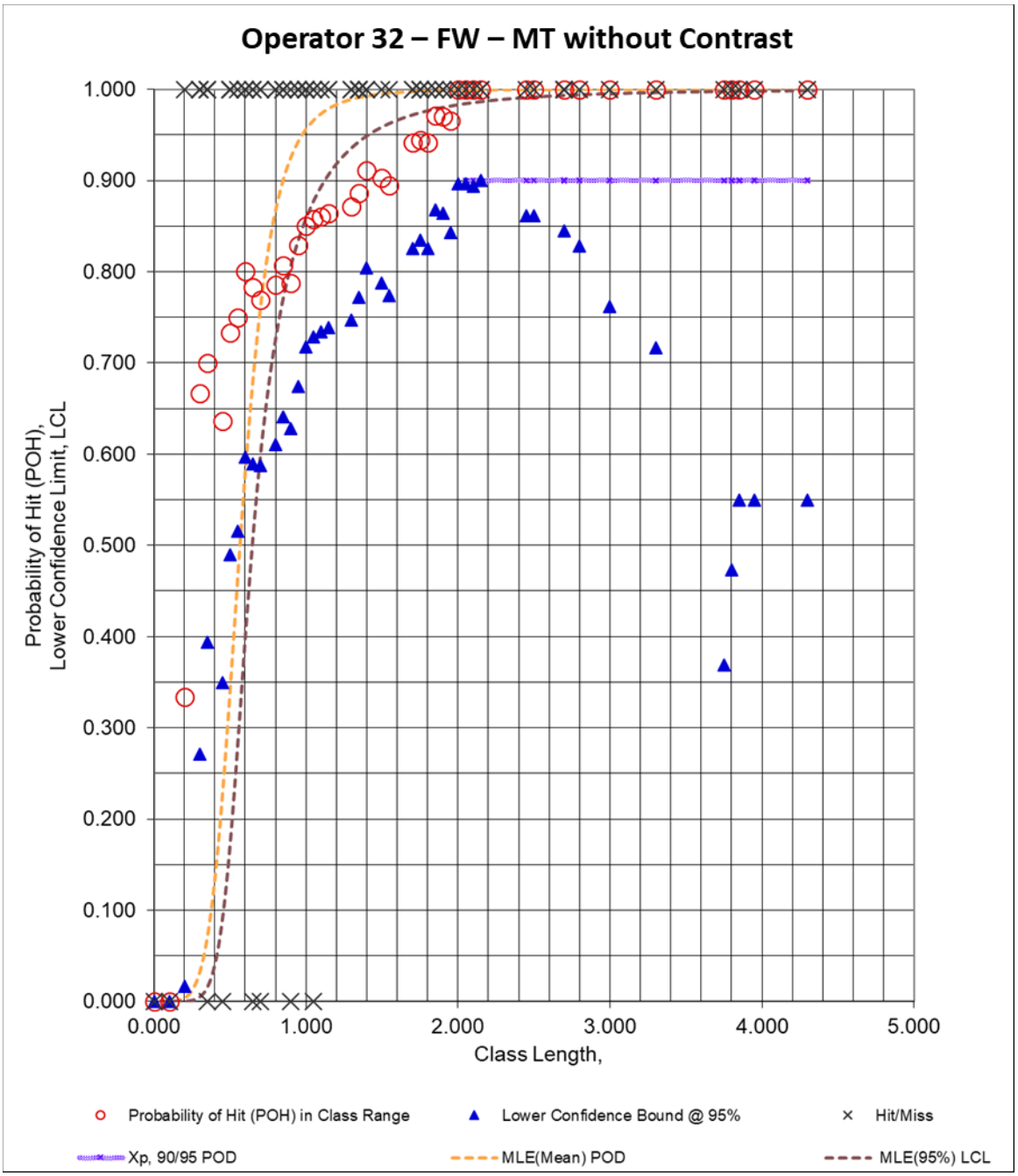

Figure 247. DOEPOD – FW – MT without Contrast – Operator 32

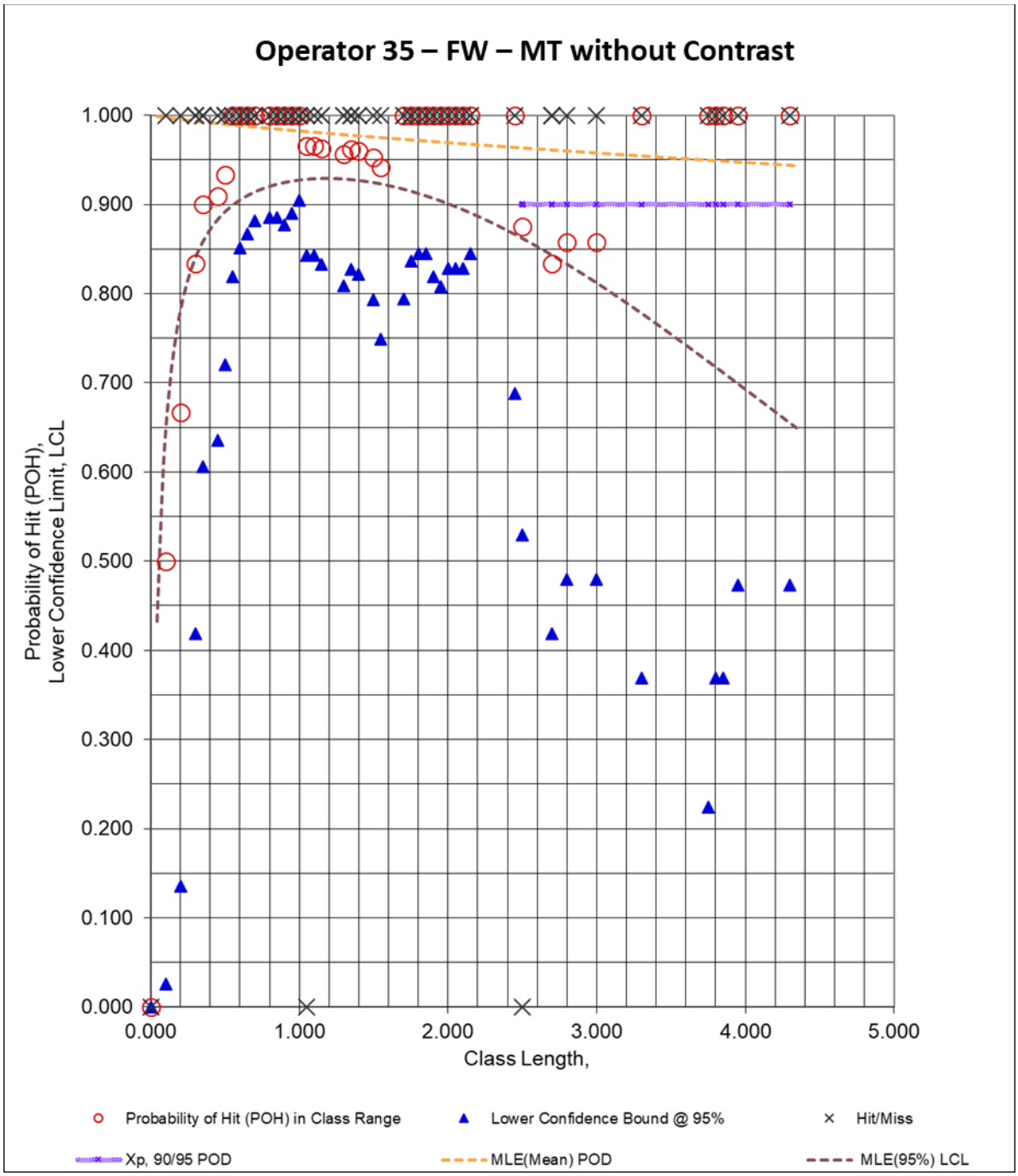

Figure 248. DOEPOD – FW – MT without Contrast – Operator 35

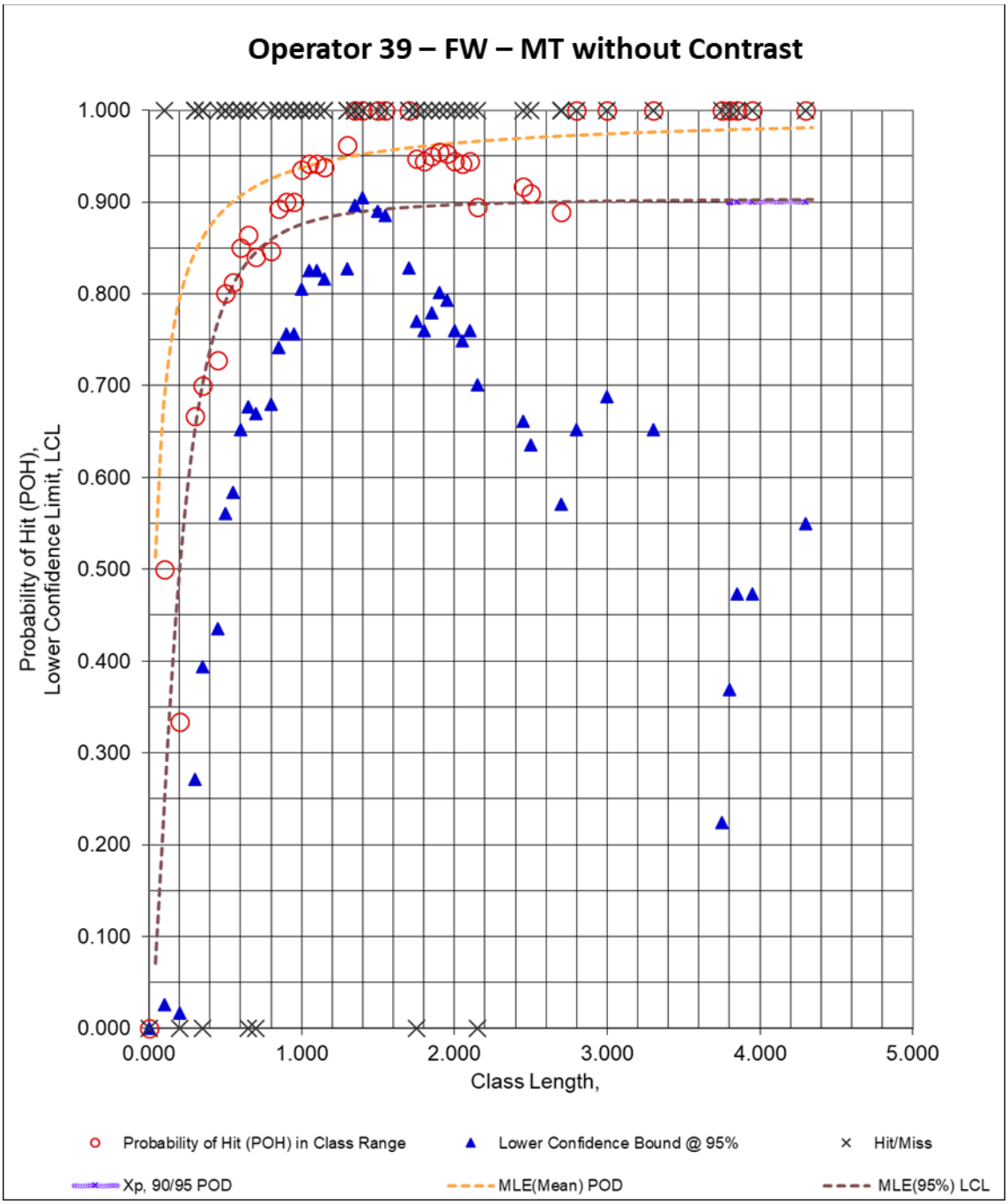

Figure 249. DOEPOD – FW – MT without Contrast – Operator 39

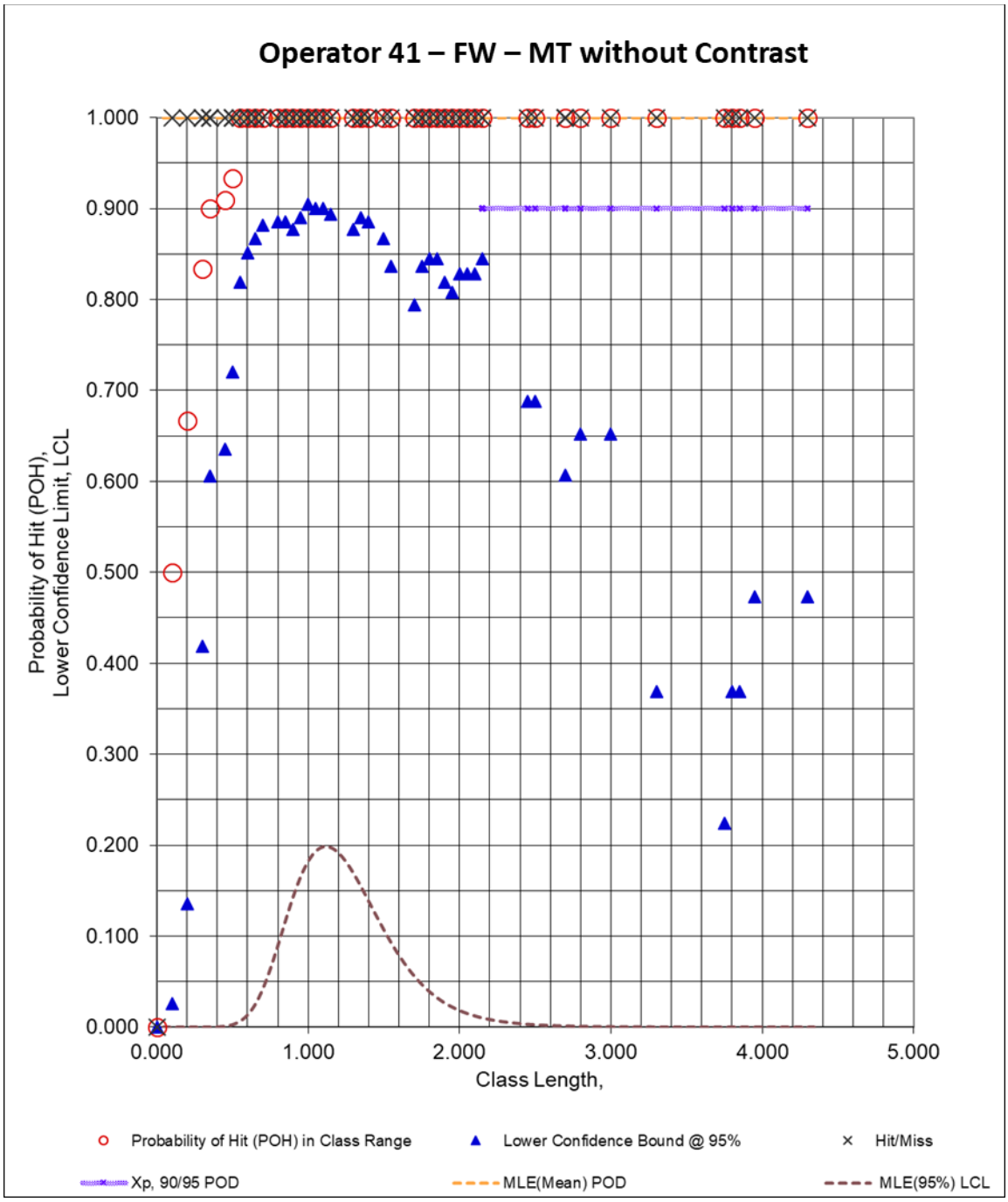

Figure 250. DOEPOD – FW – MT without Contrast – Operator 41

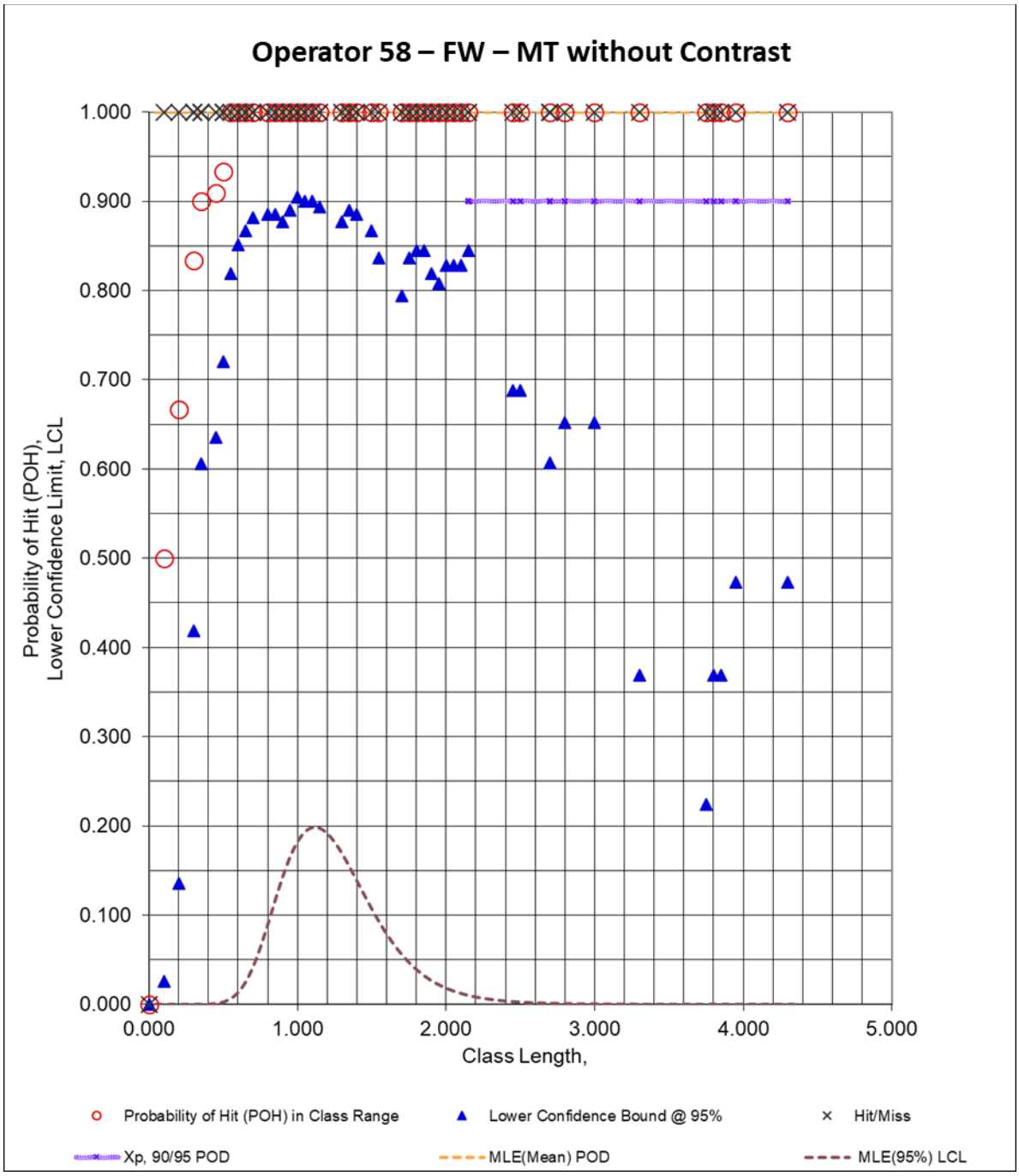

Figure 251. DOEPOD – FW – MT without Contrast – Operator 58

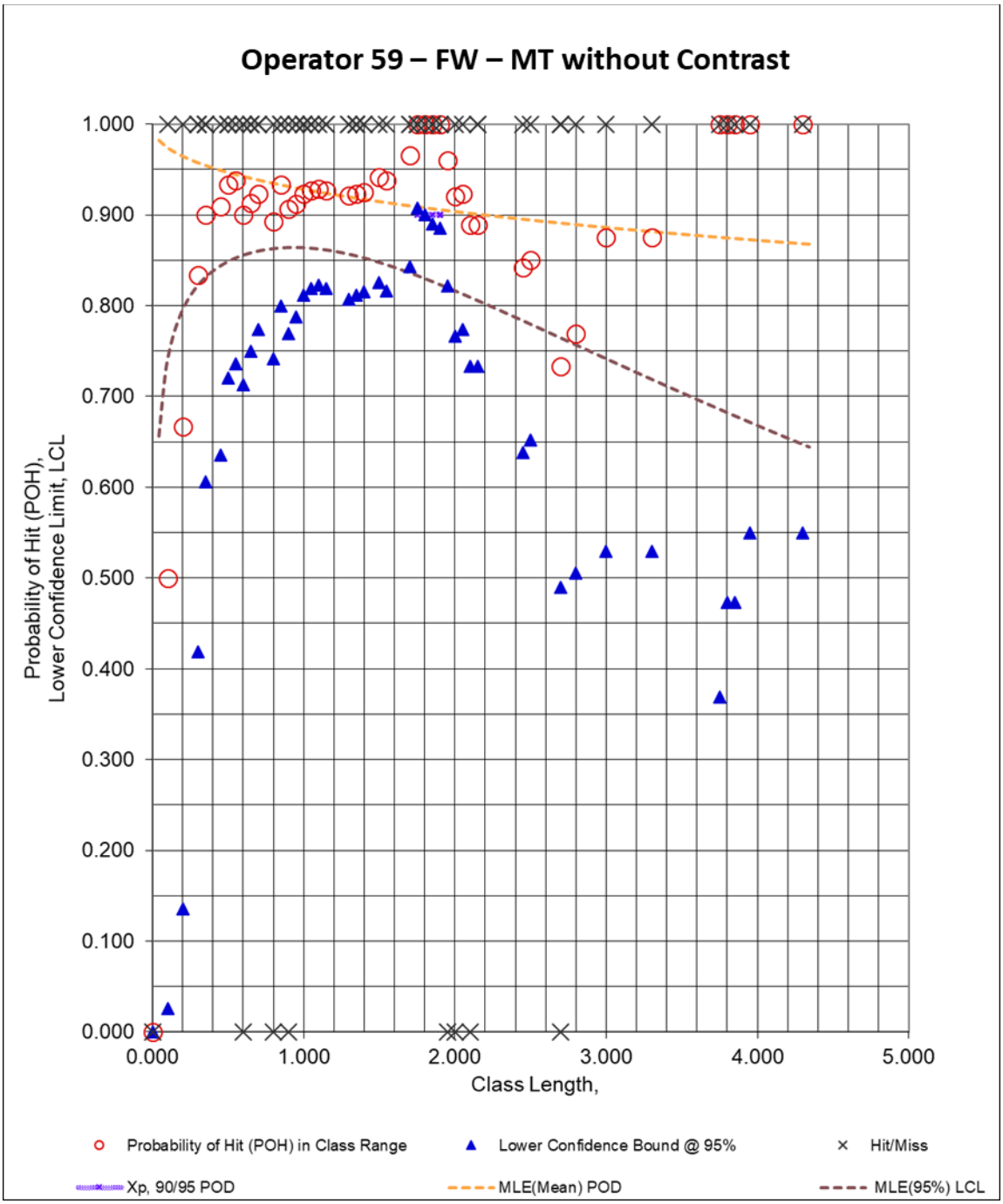

Figure 252. DOEPOD – FW – MT without Contrast – Operator 59

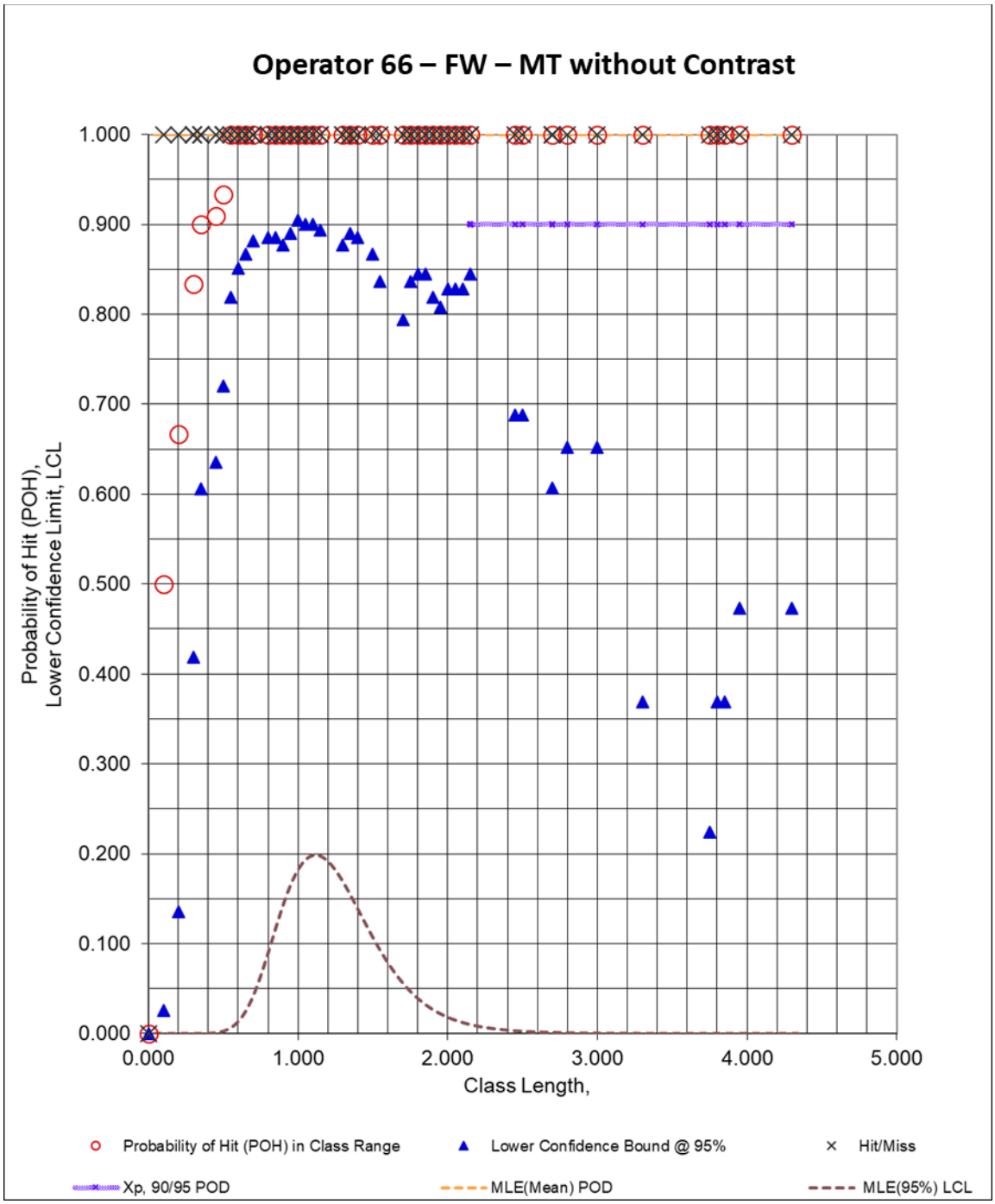

Figure 253. DOEPOD – FW – MT without Contrast – Operator 66

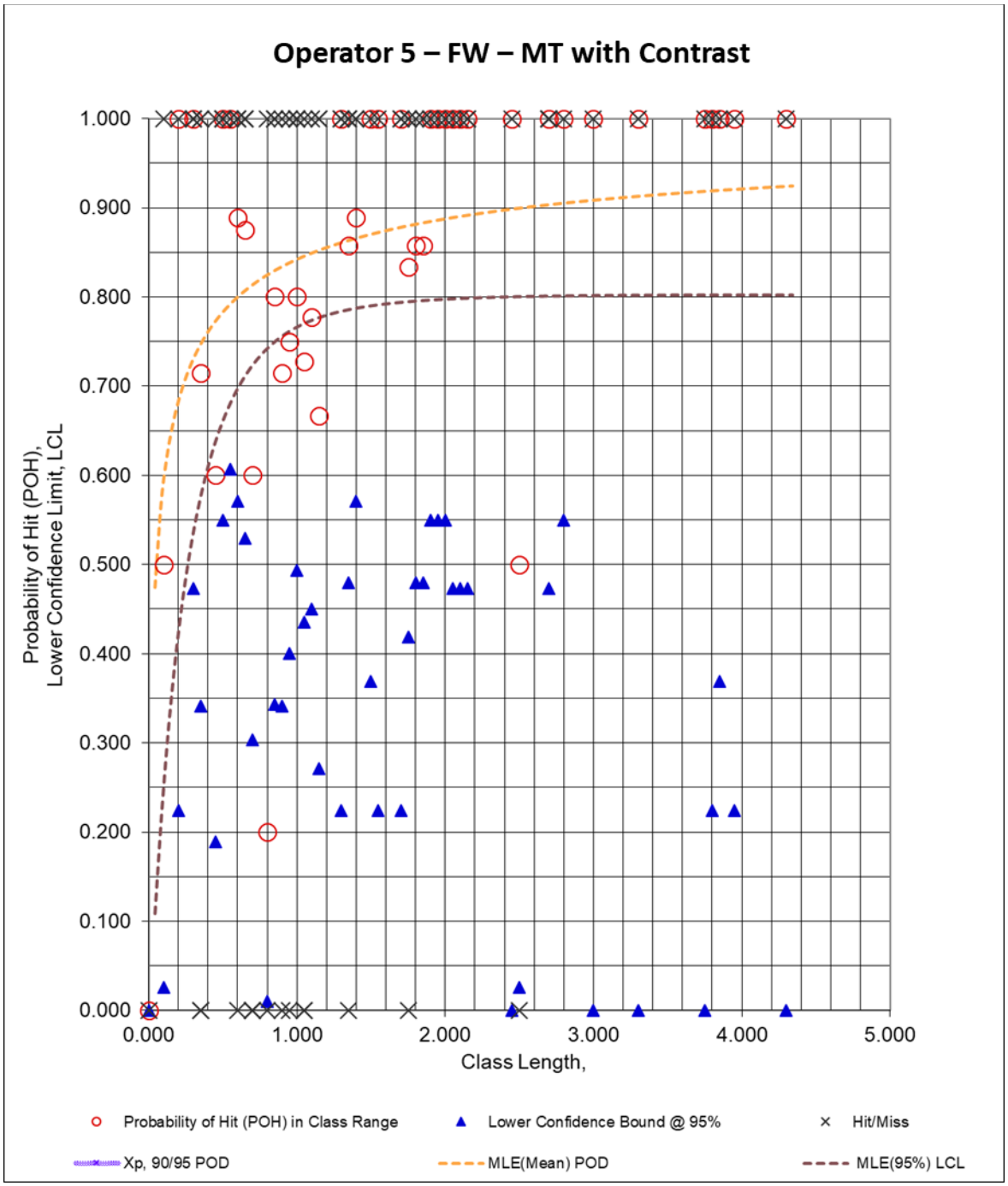

Figure 254. DOEPOD – FW – MT with Contrast – Operator 5

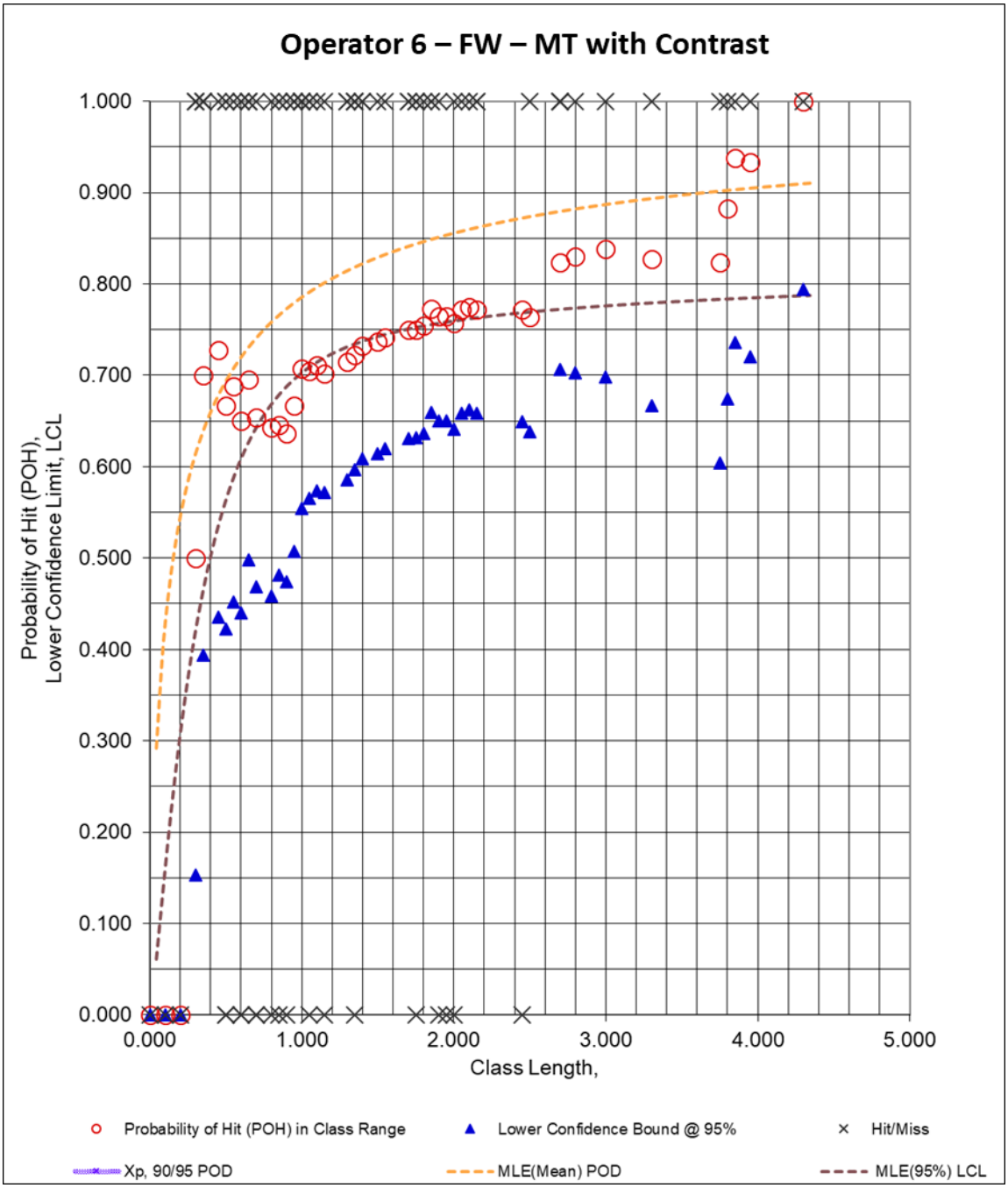

Figure 255. DOEPOD – FW – MT with Contrast – Operator 6

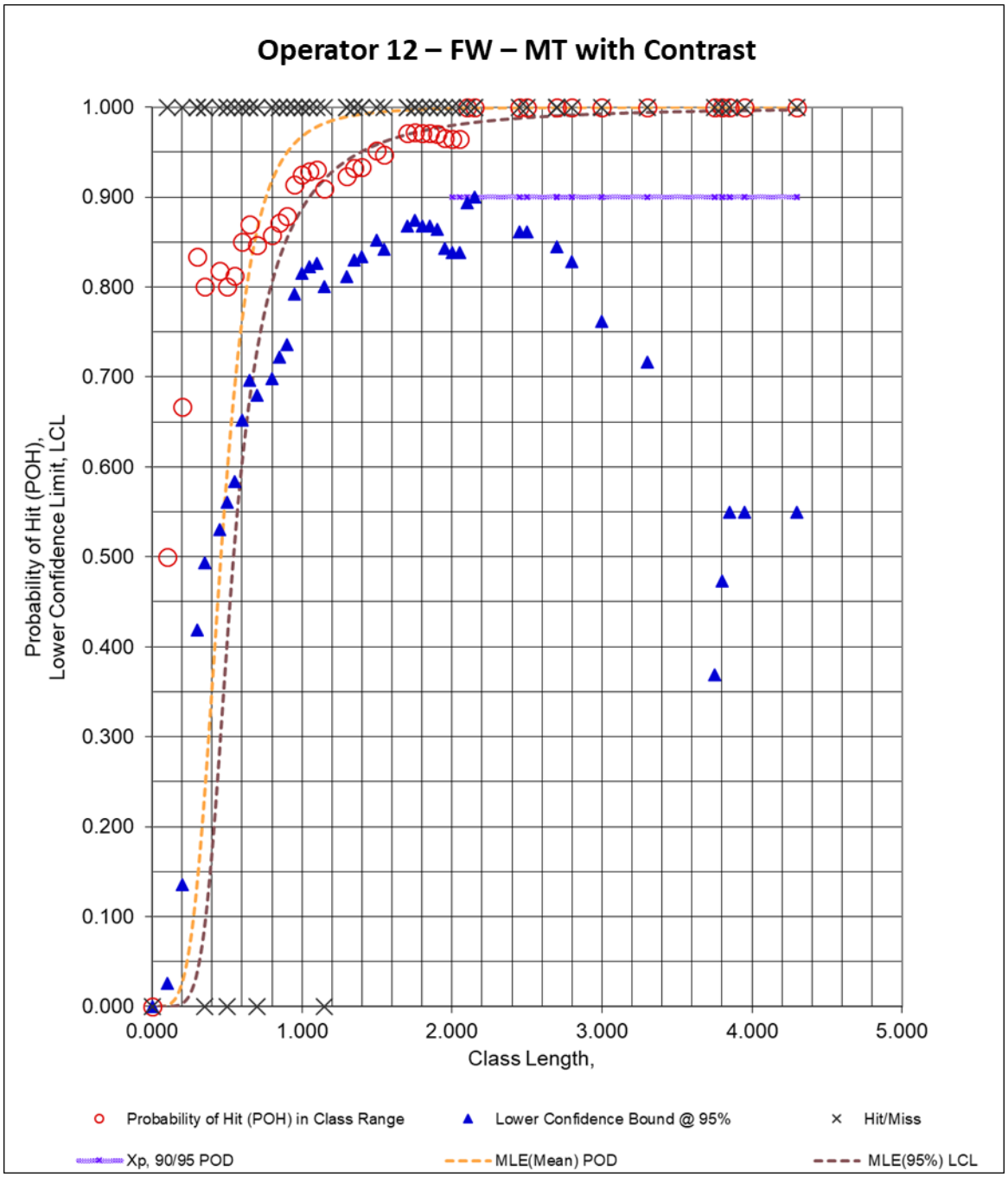

Figure 256. DOEPOD – FW – MT with Contrast – Operator 12

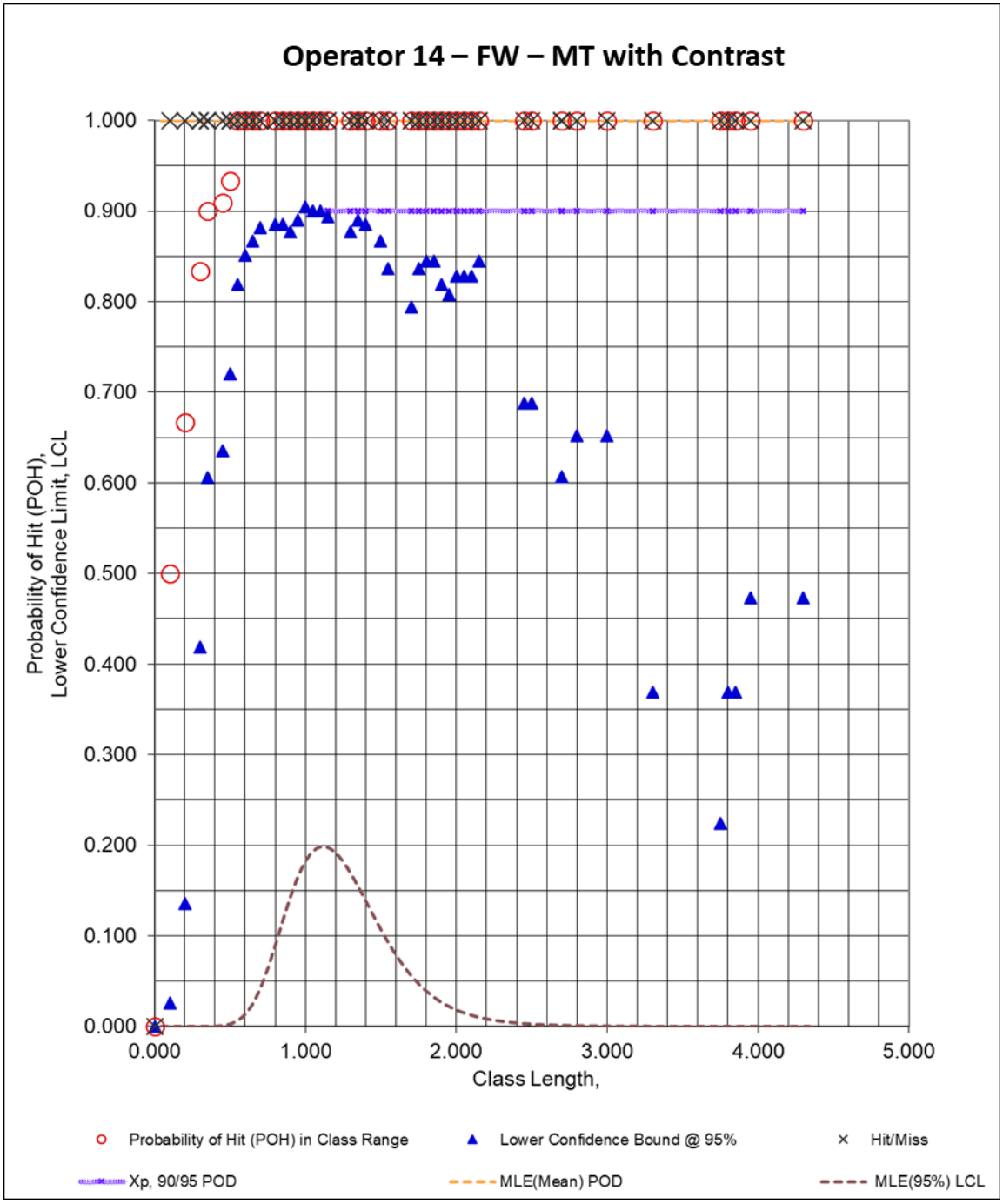

Figure 257. DOEPOD – FW – MT with Contrast – Operator 14

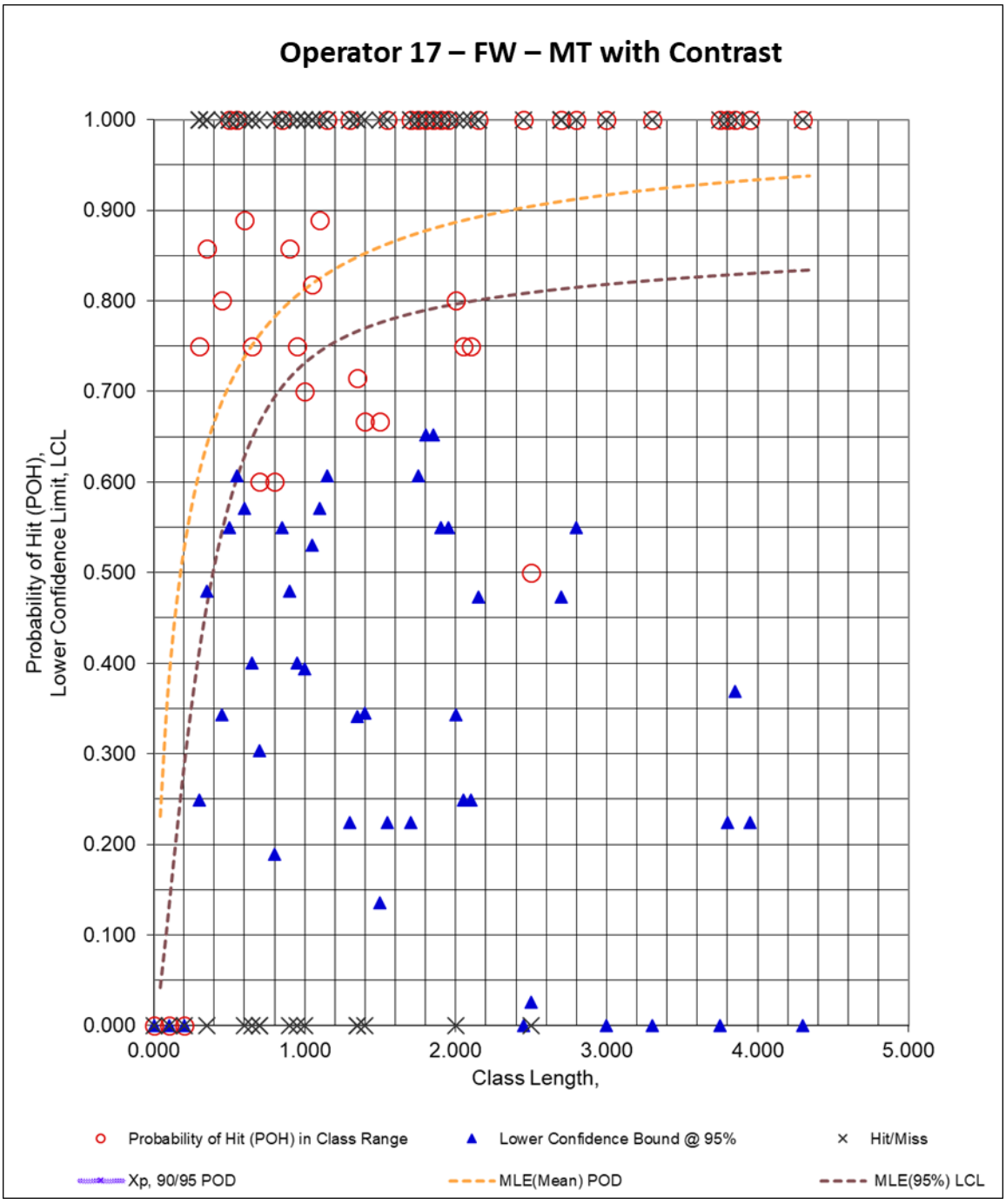

Figure 258. DOEPOD – FW – MT with Contrast – Operator 17

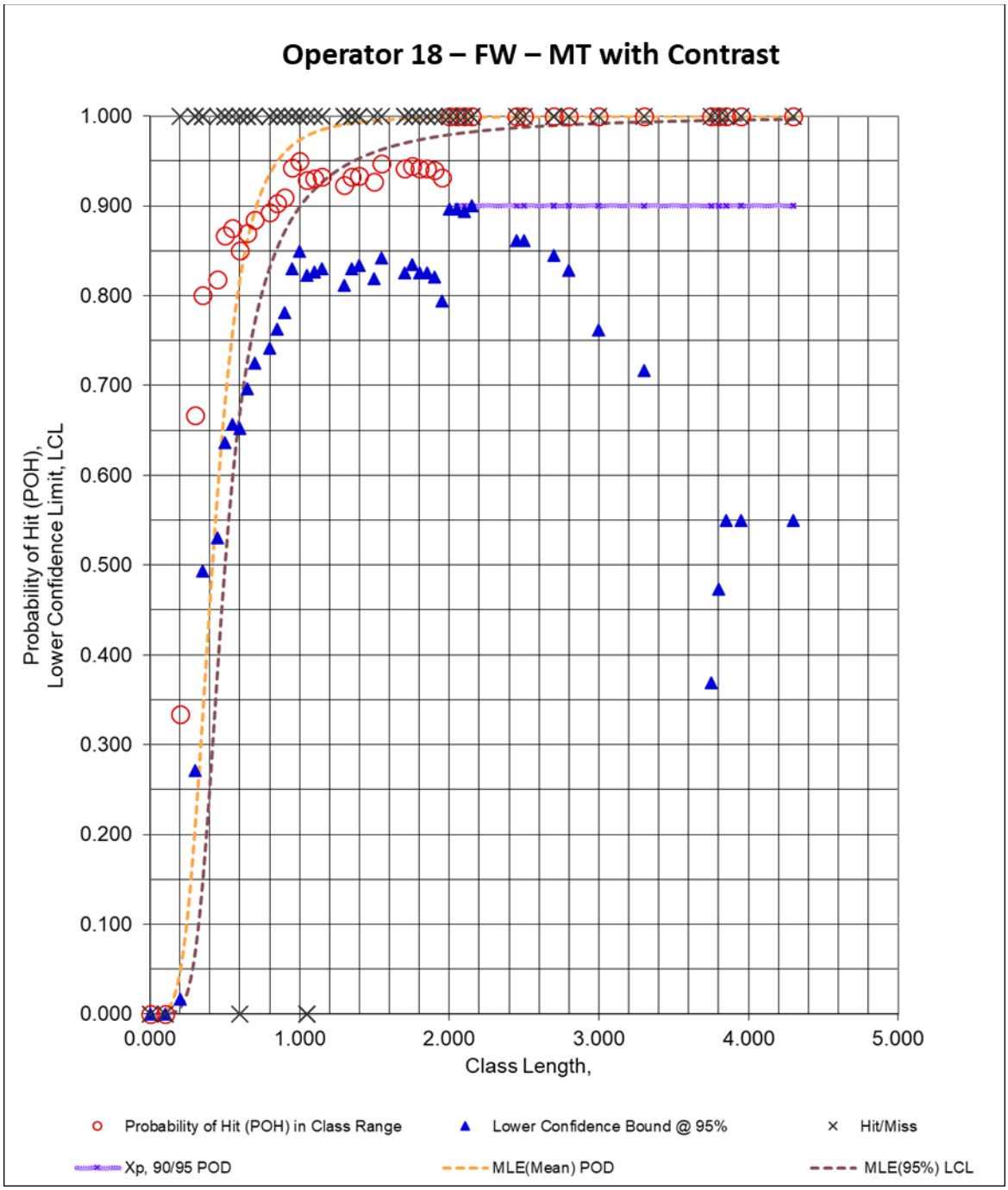

Figure 259. DOEPOD – FW – MT with Contrast – Operator 18

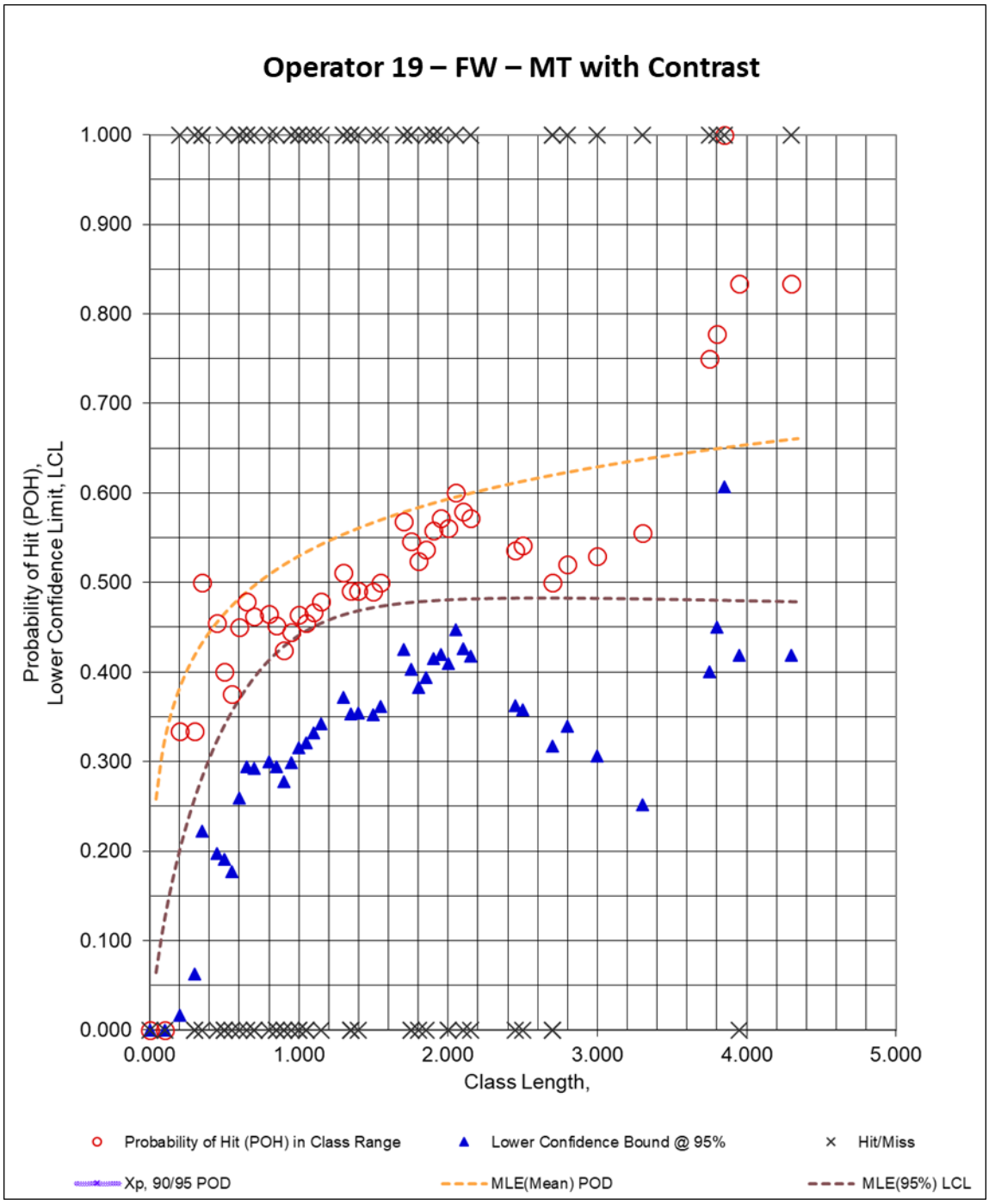

Figure 260. DOEPOD – FW – MT with Contrast – Operator 19

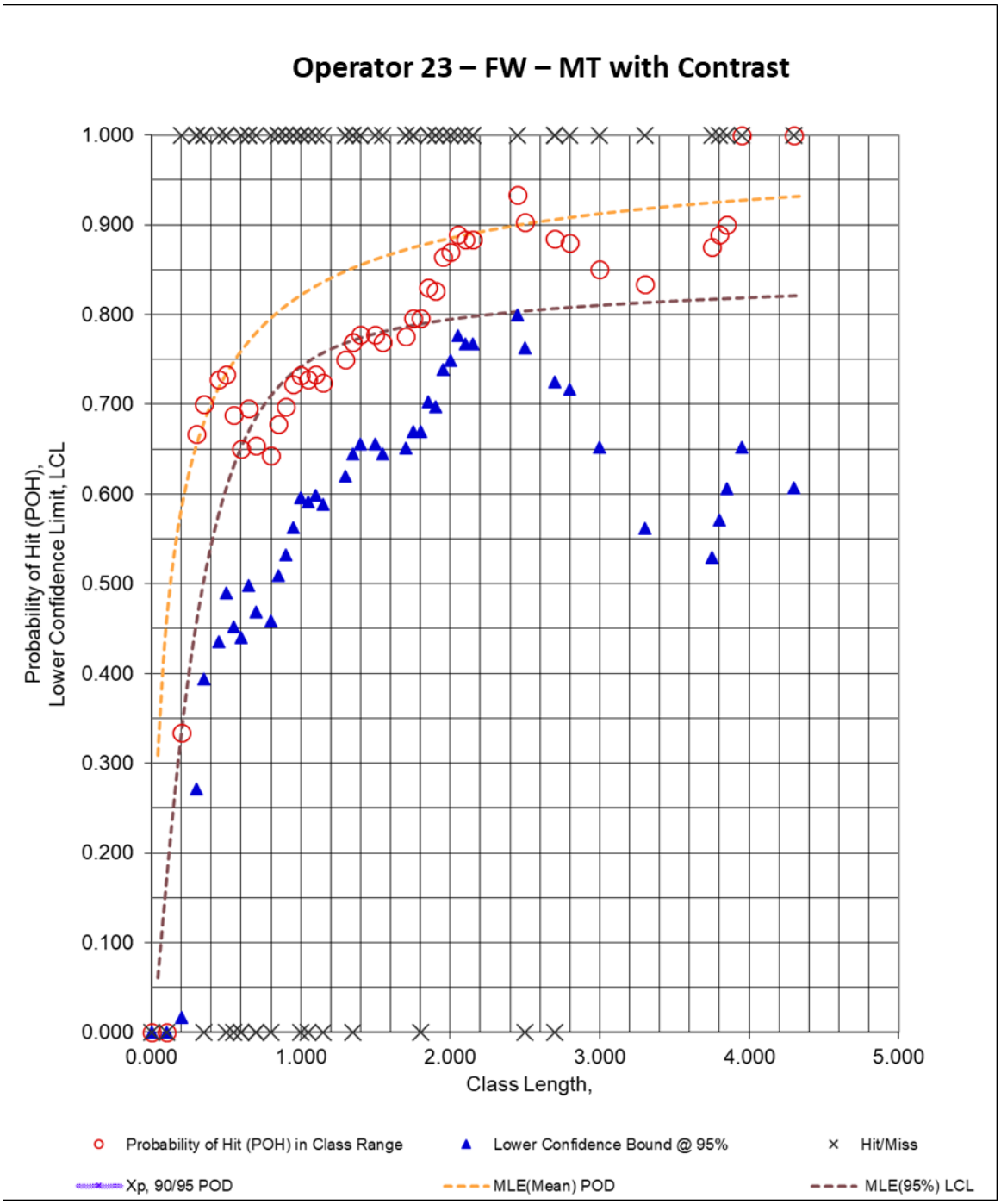

Figure 261. DOEPOD – FW – MT with Contrast – Operator 23

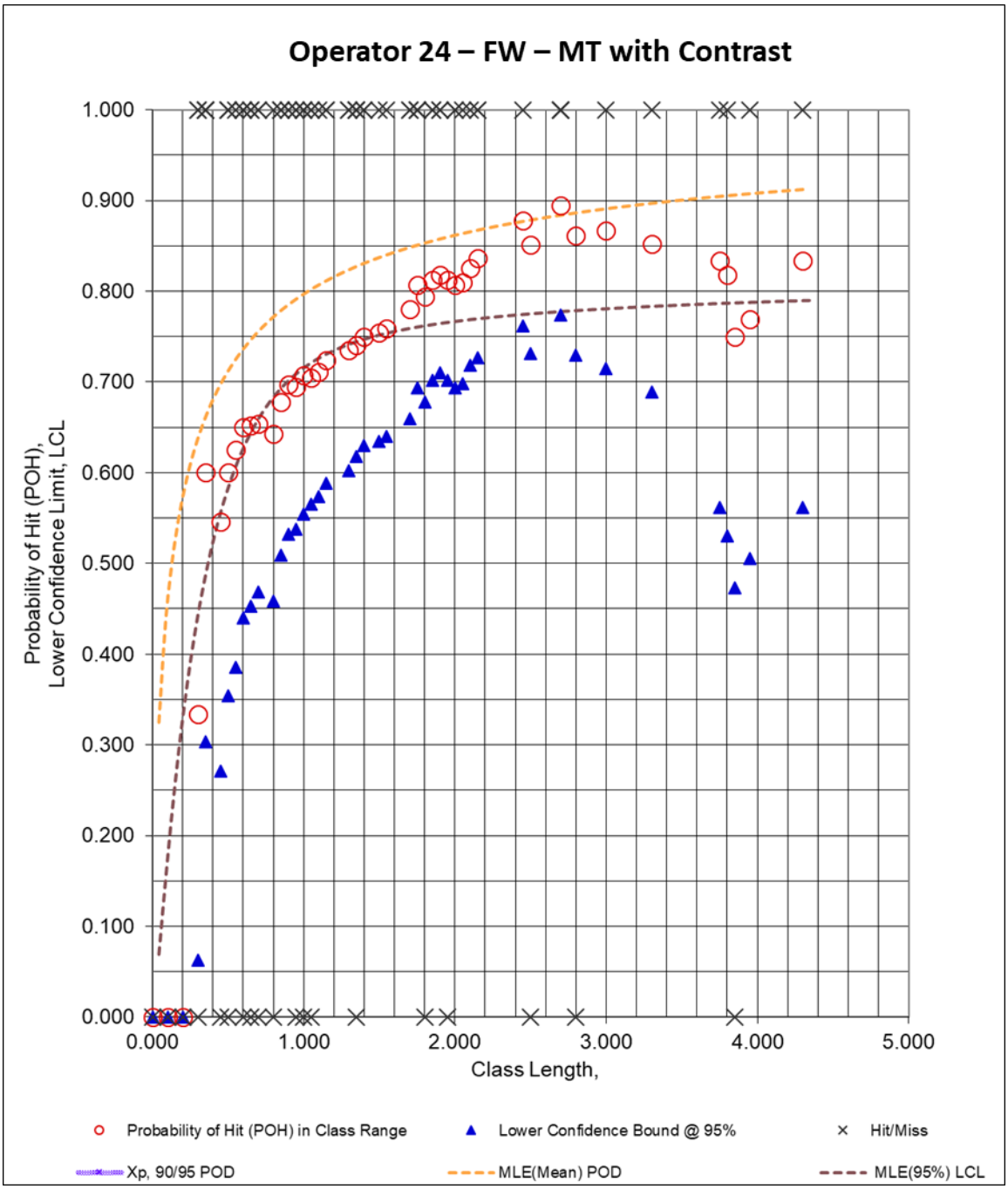

Figure 262. DOEPOD – FW – MT with Contrast – Operator 24

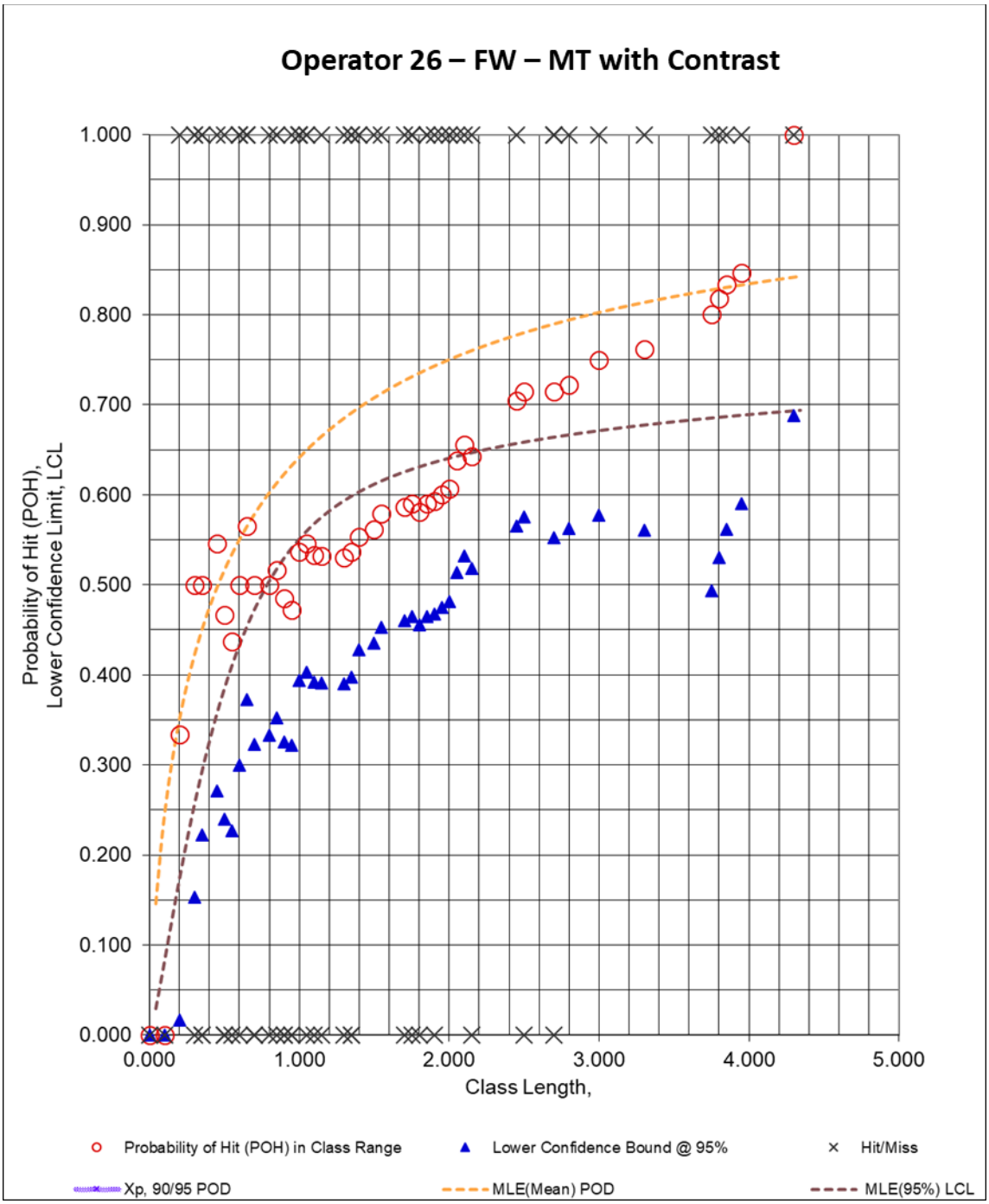

Figure 263. DOEPOD – FW – MT with Contrast – Operator 26

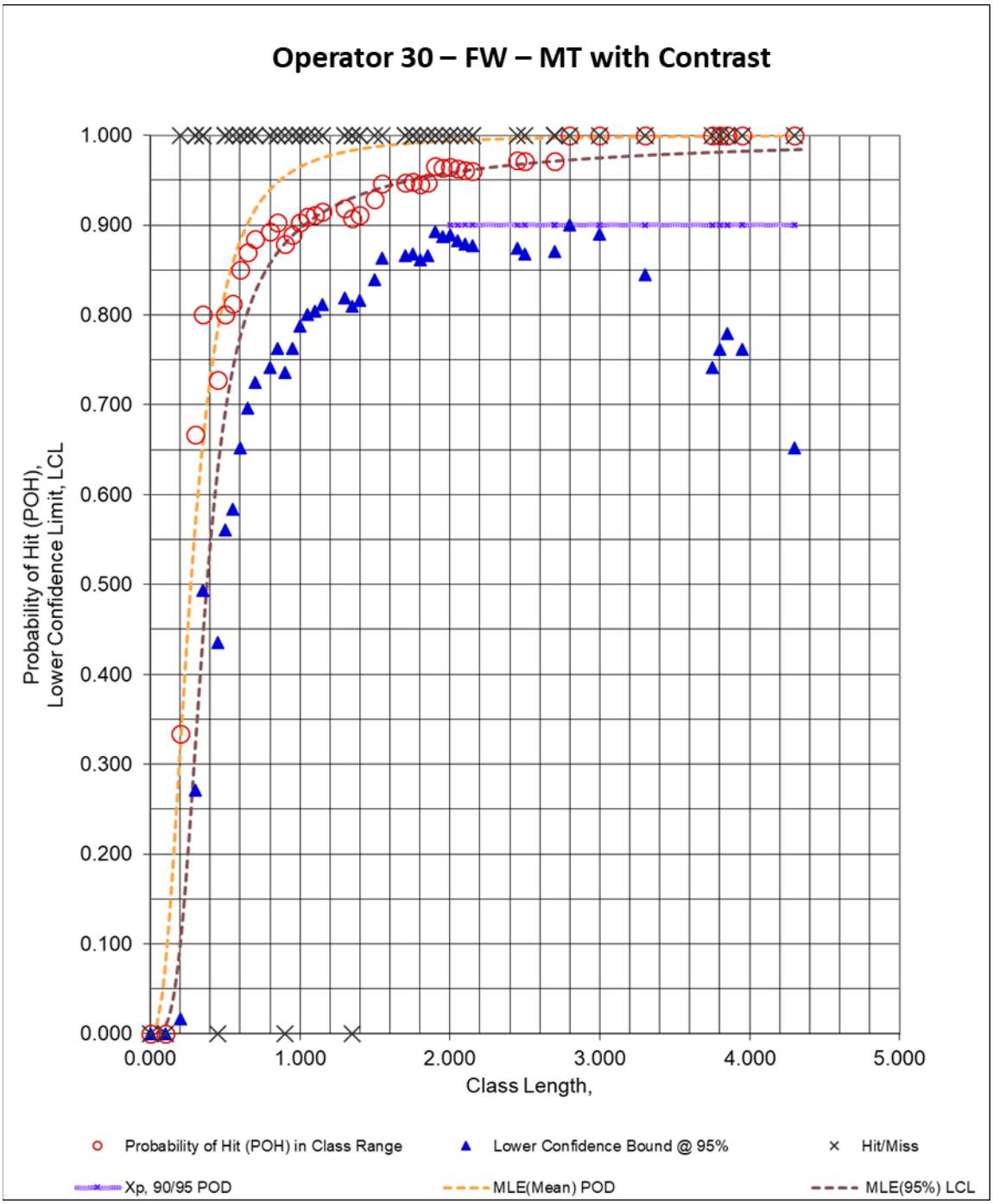

Figure 264. DOEPOD – FW – MT with Contrast – Operator 30

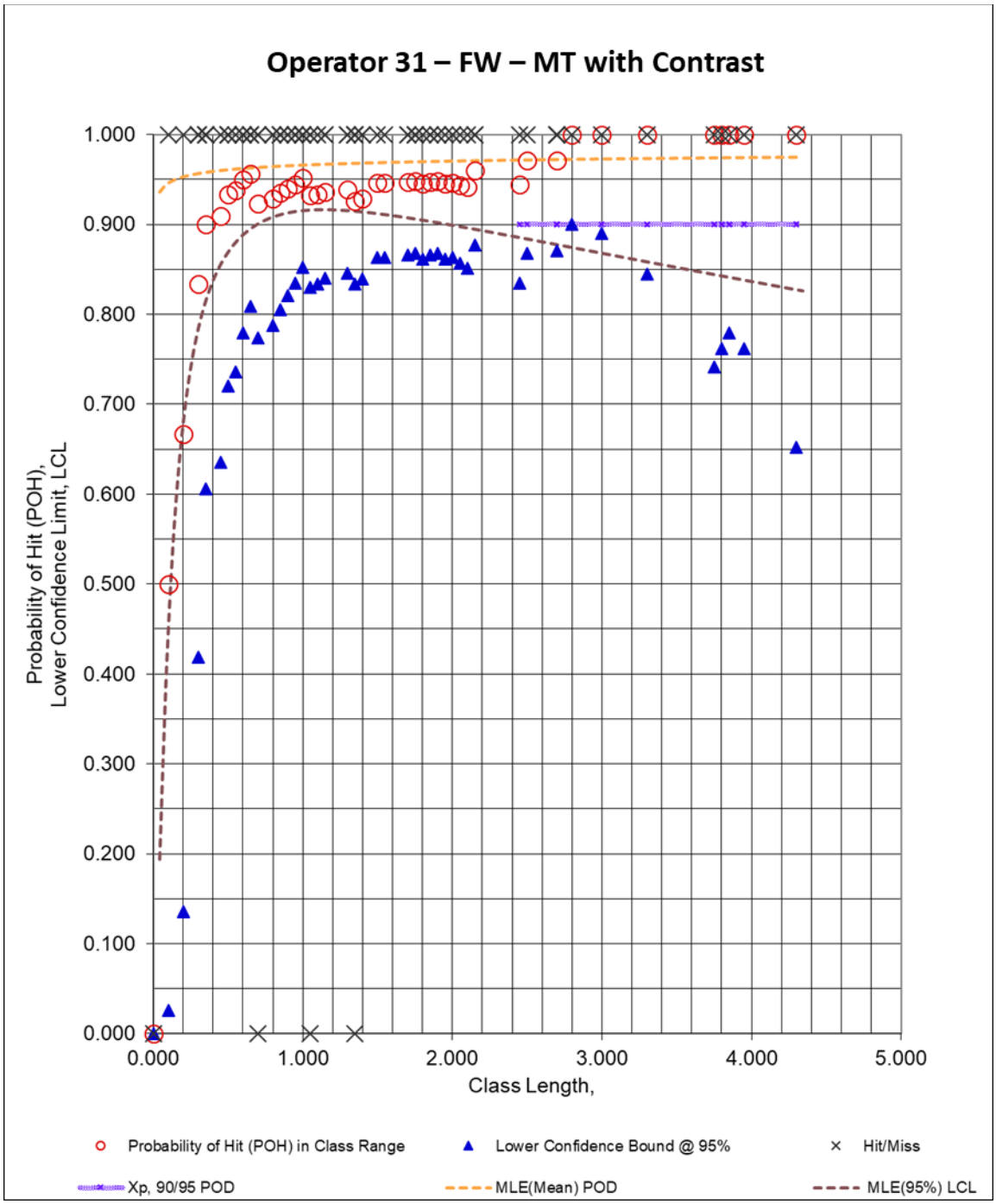

Figure 265. DOEPOD – FW – MT with Contrast – Operator 31

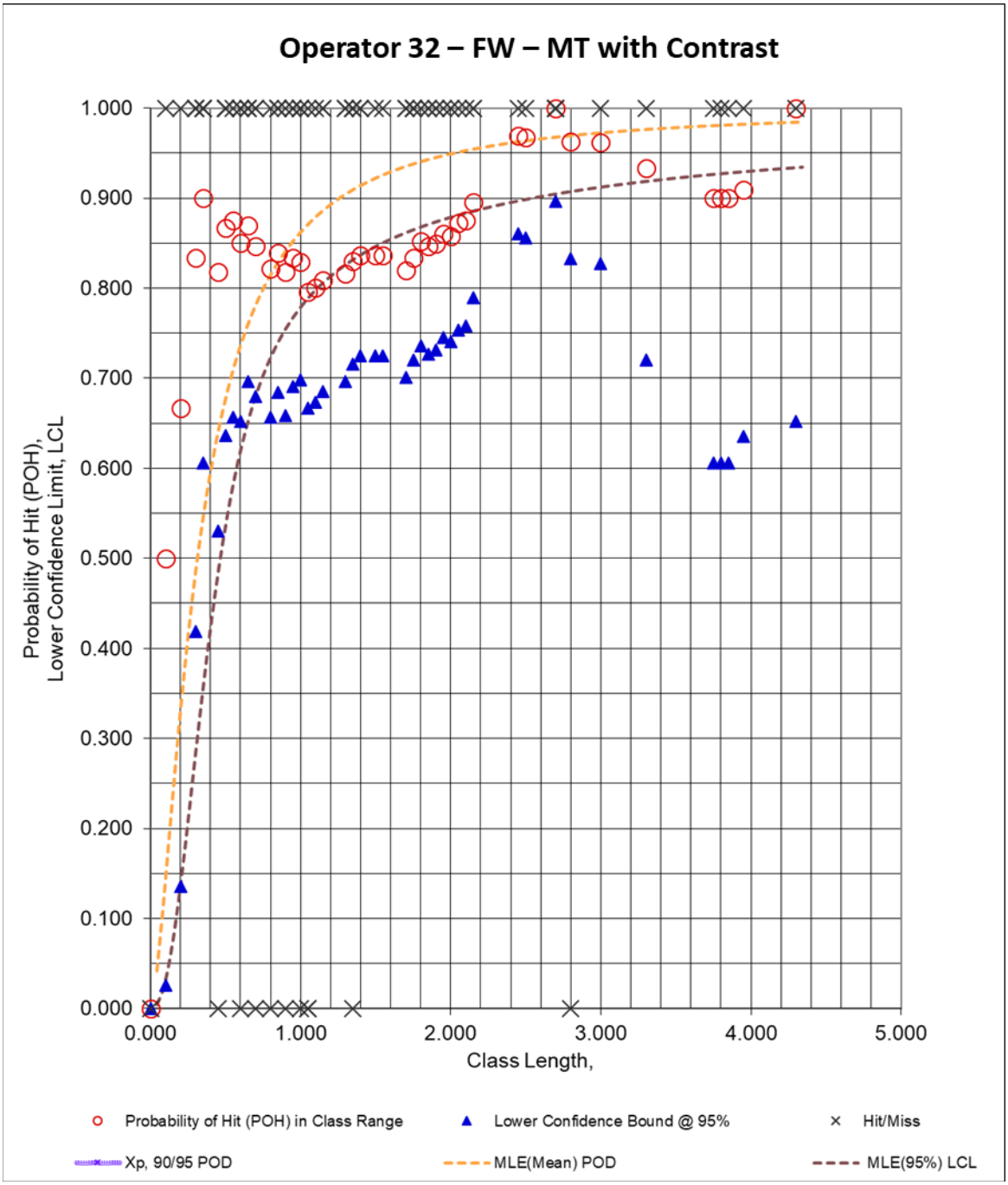

Figure 266. DOEPOD – FW – MT with Contrast – Operator 32

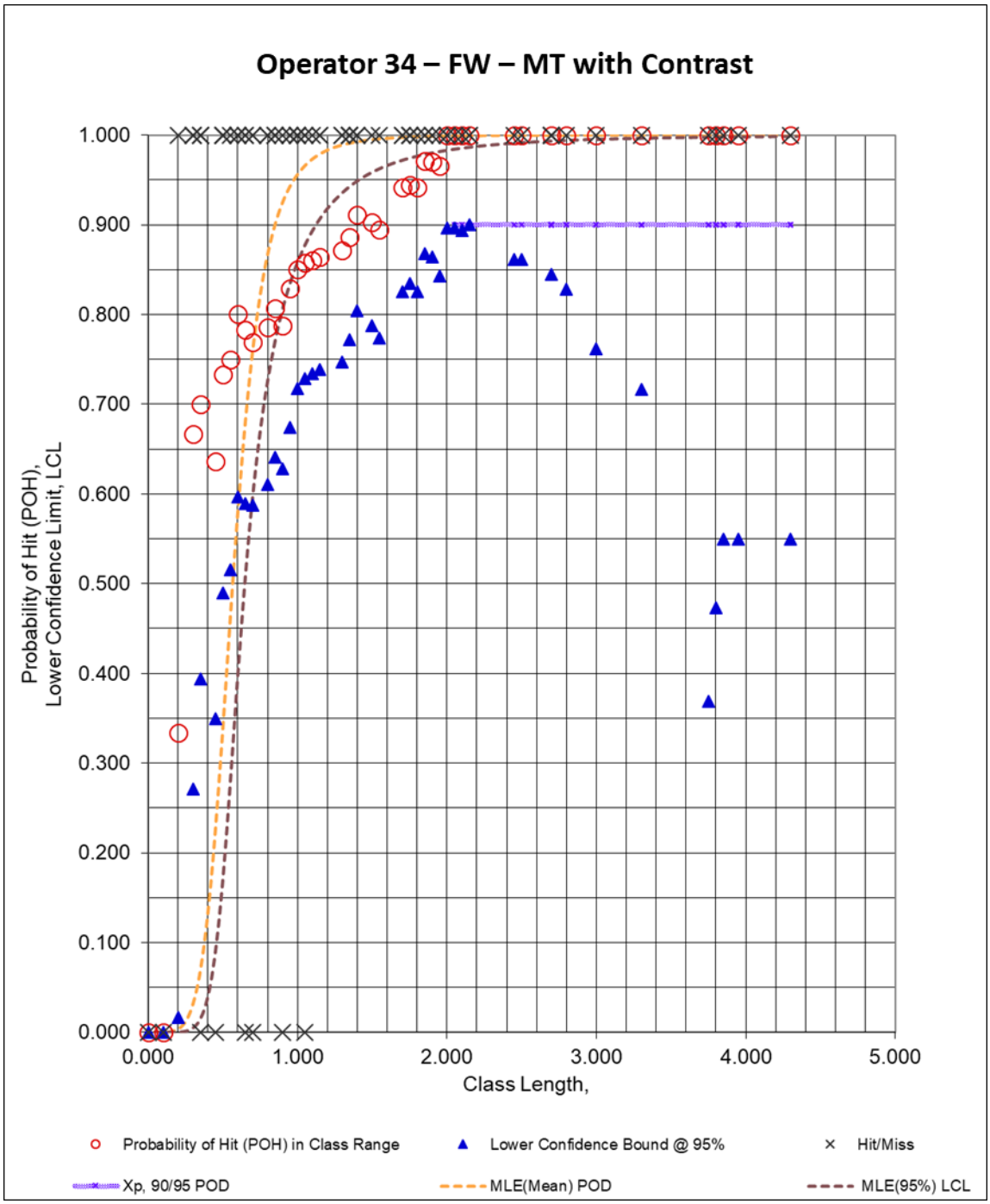

Figure 267. DOEPOD – FW – MT with Contrast – Operator 34

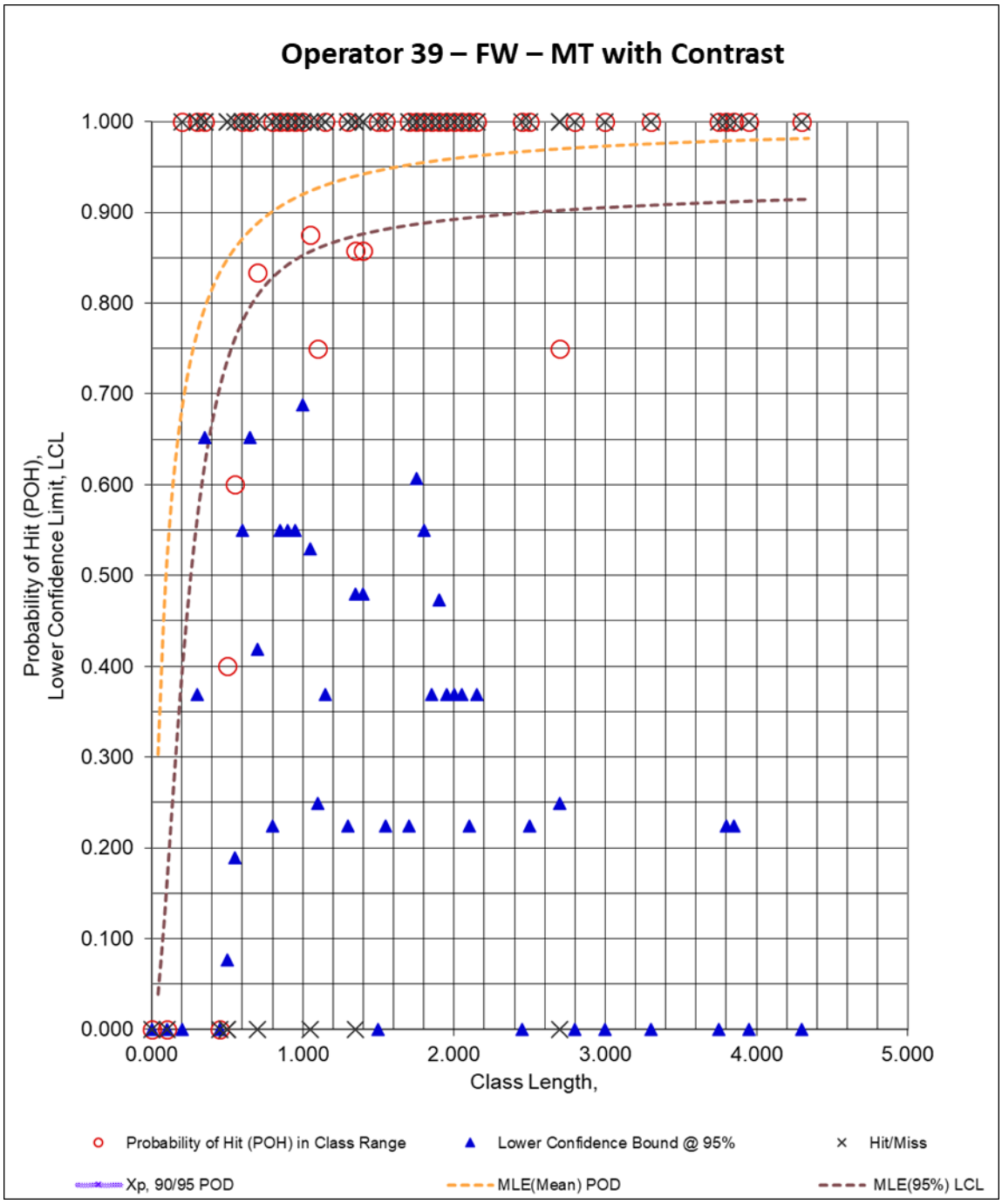

Figure 268. DOEPOD – FW – MT with Contrast – Operator 39

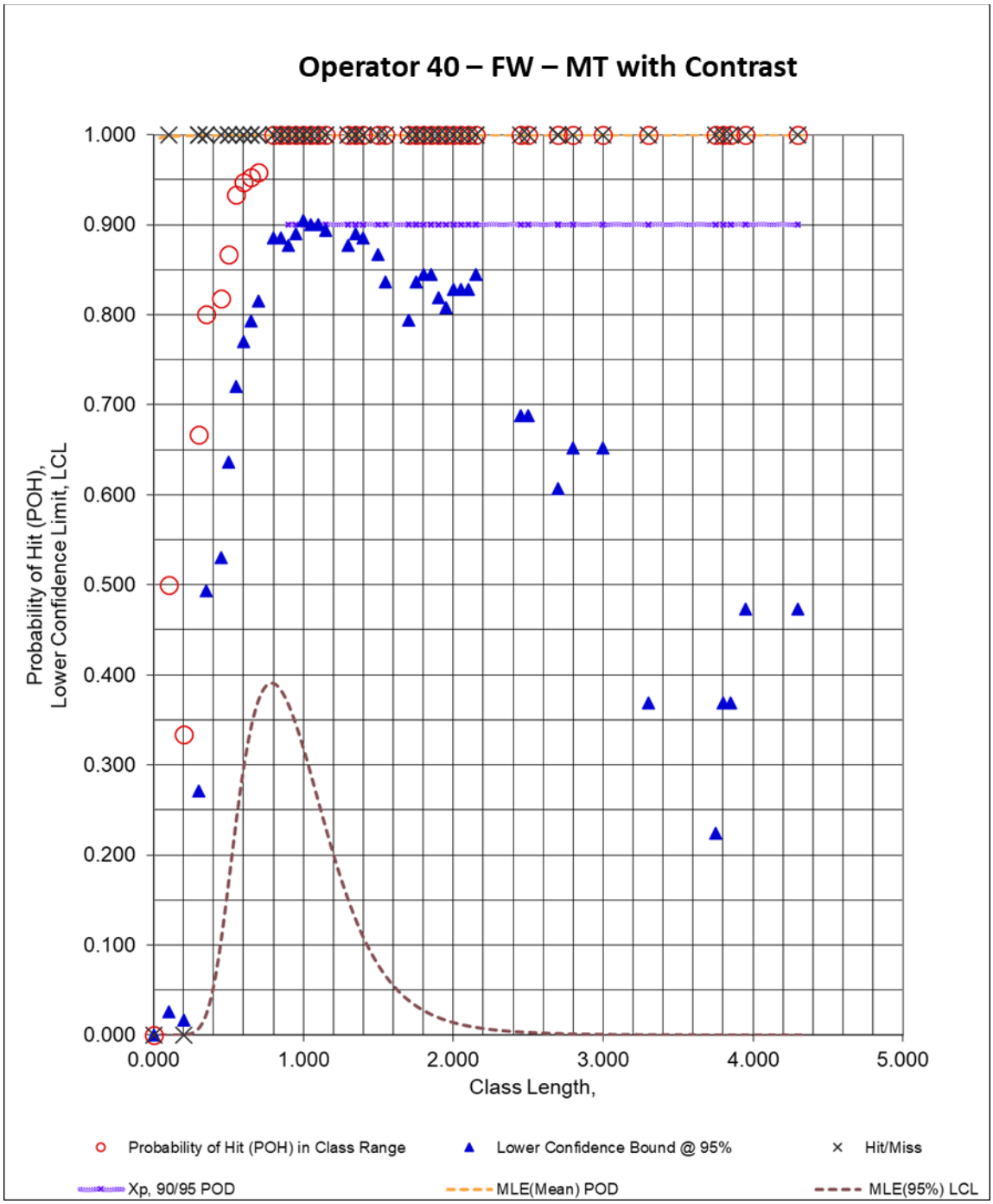

Figure 269. DOEPOD – FW – MT with Contrast – Operator 40

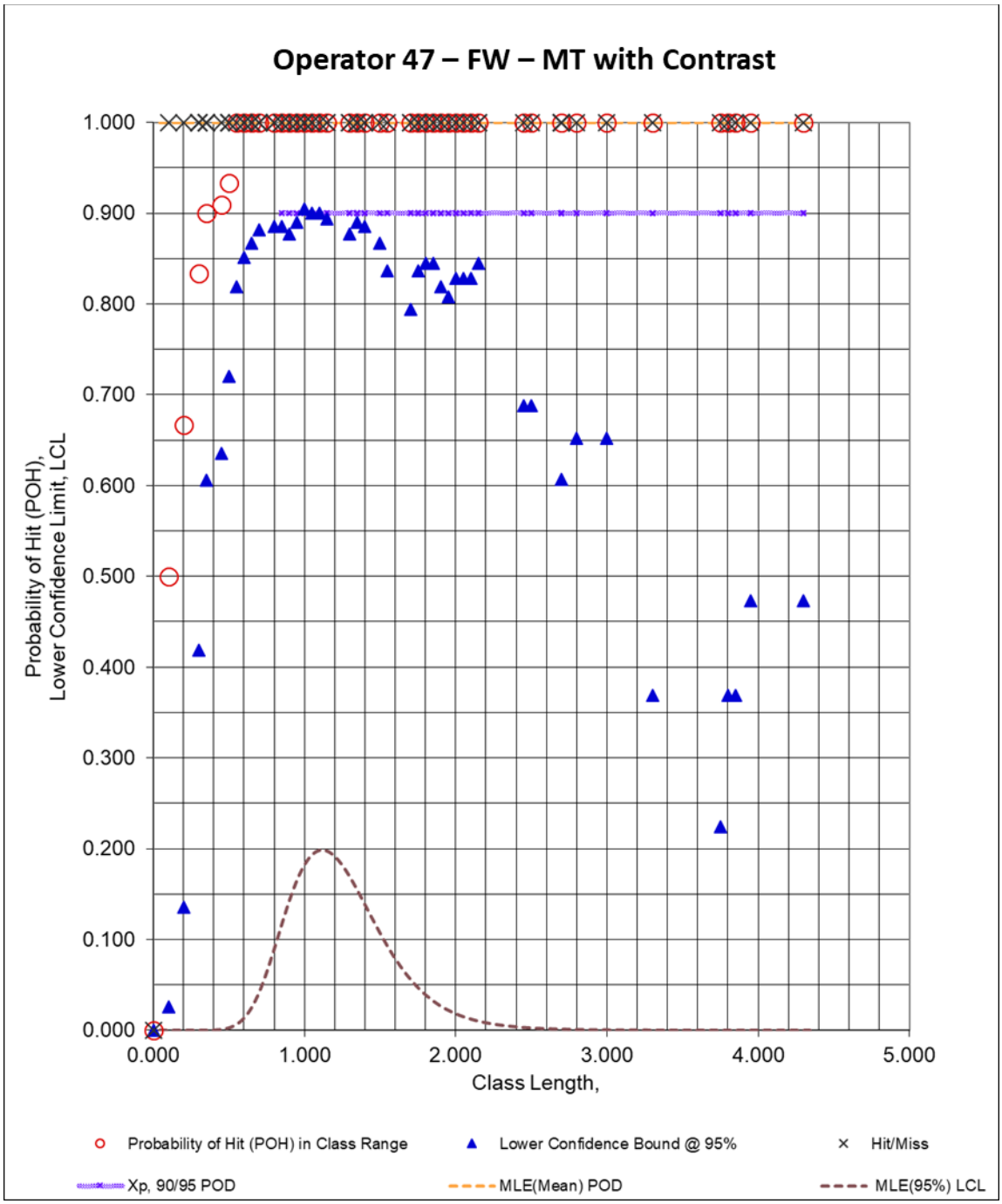

Figure 270. DOEPOD – FW – MT with Contrast – Operator 47

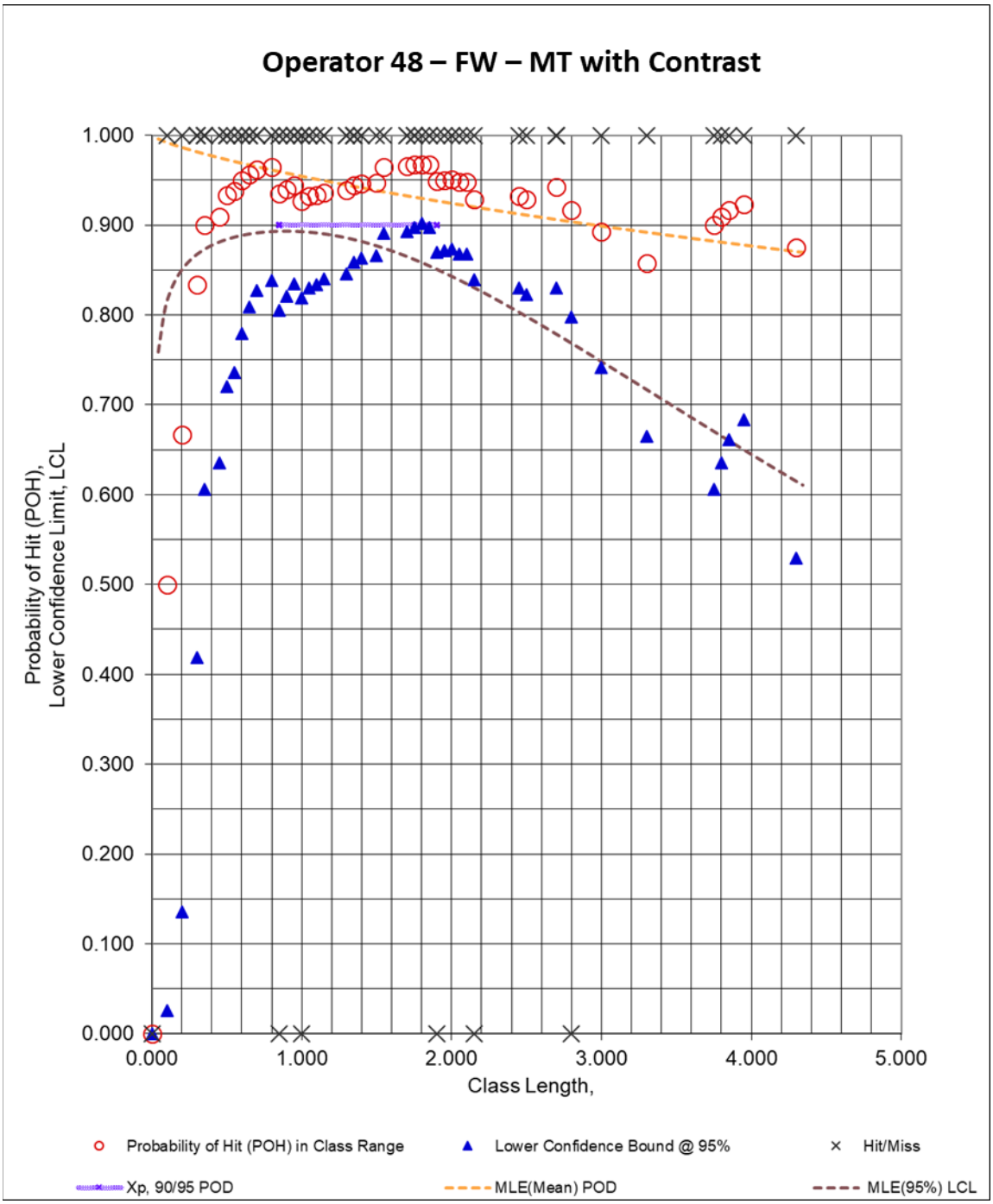

Figure 271. DOEPOD – FW – MT with Contrast – Operator 48

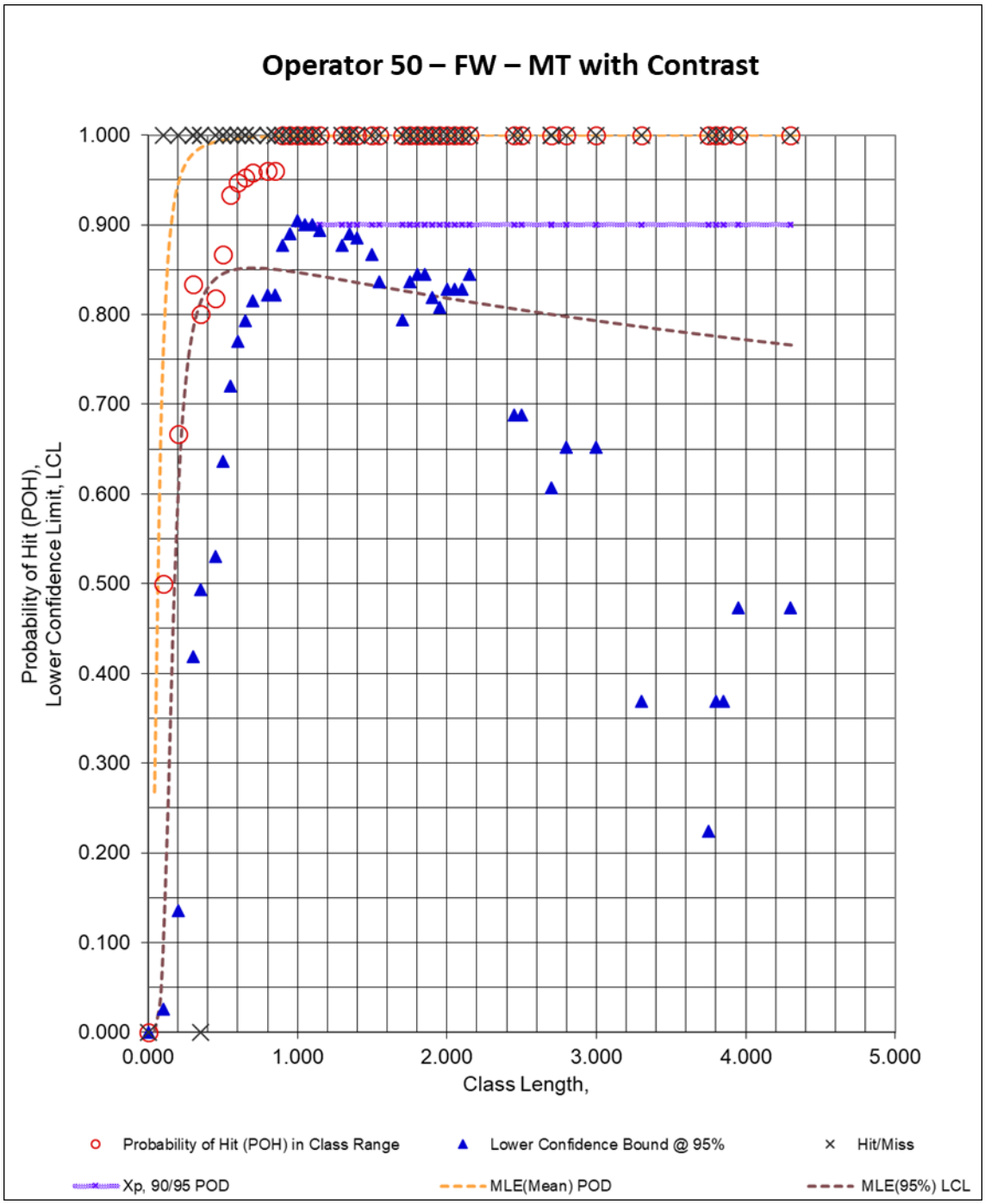

Figure 272. DOEPOD – FW – MT with Contrast – Operator 50

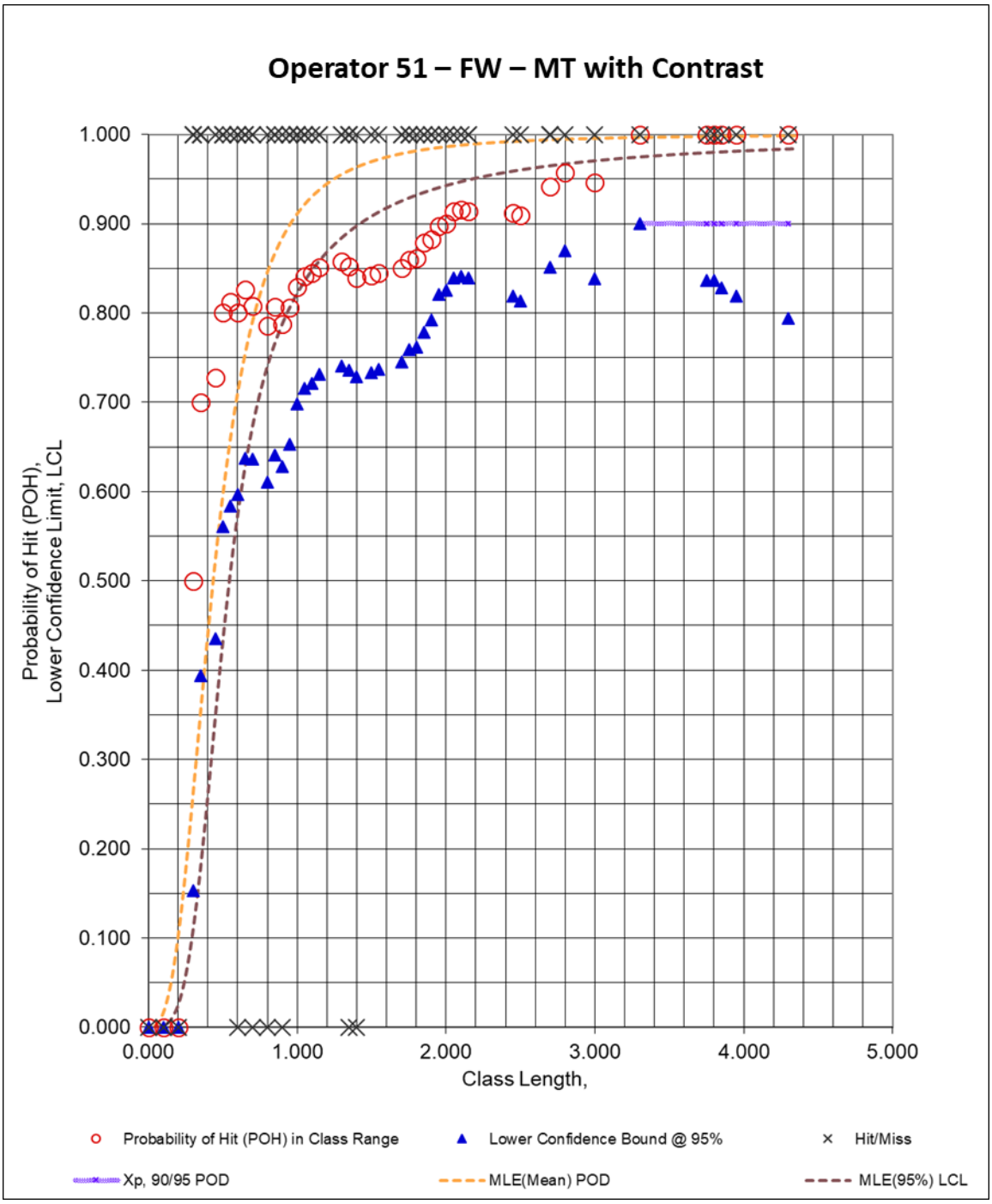

Figure 273. DOEPOD – FW – MT with Contrast – Operator 51

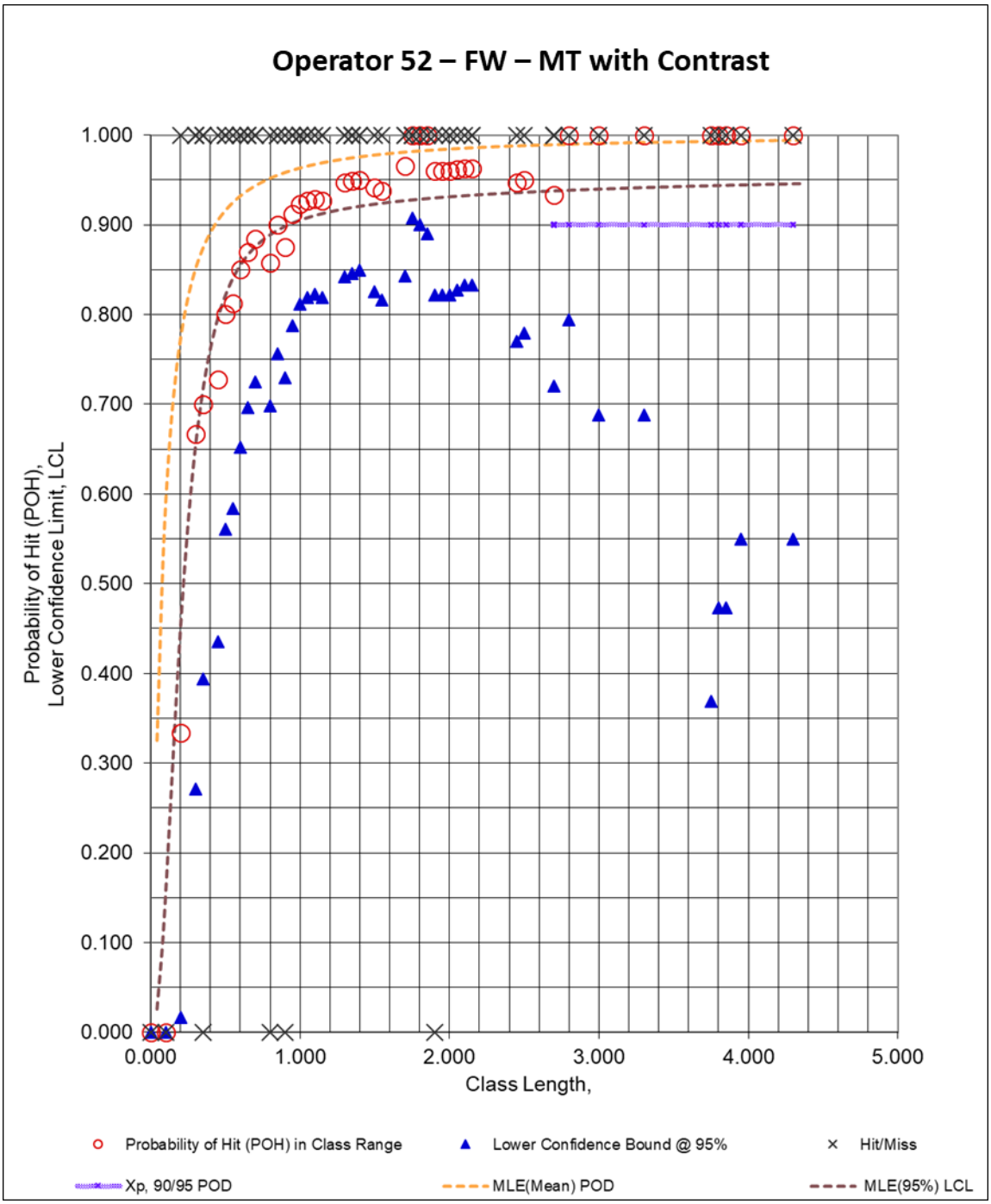

Figure 274. DOEPOD – FW – MT with Contrast – Operator 52

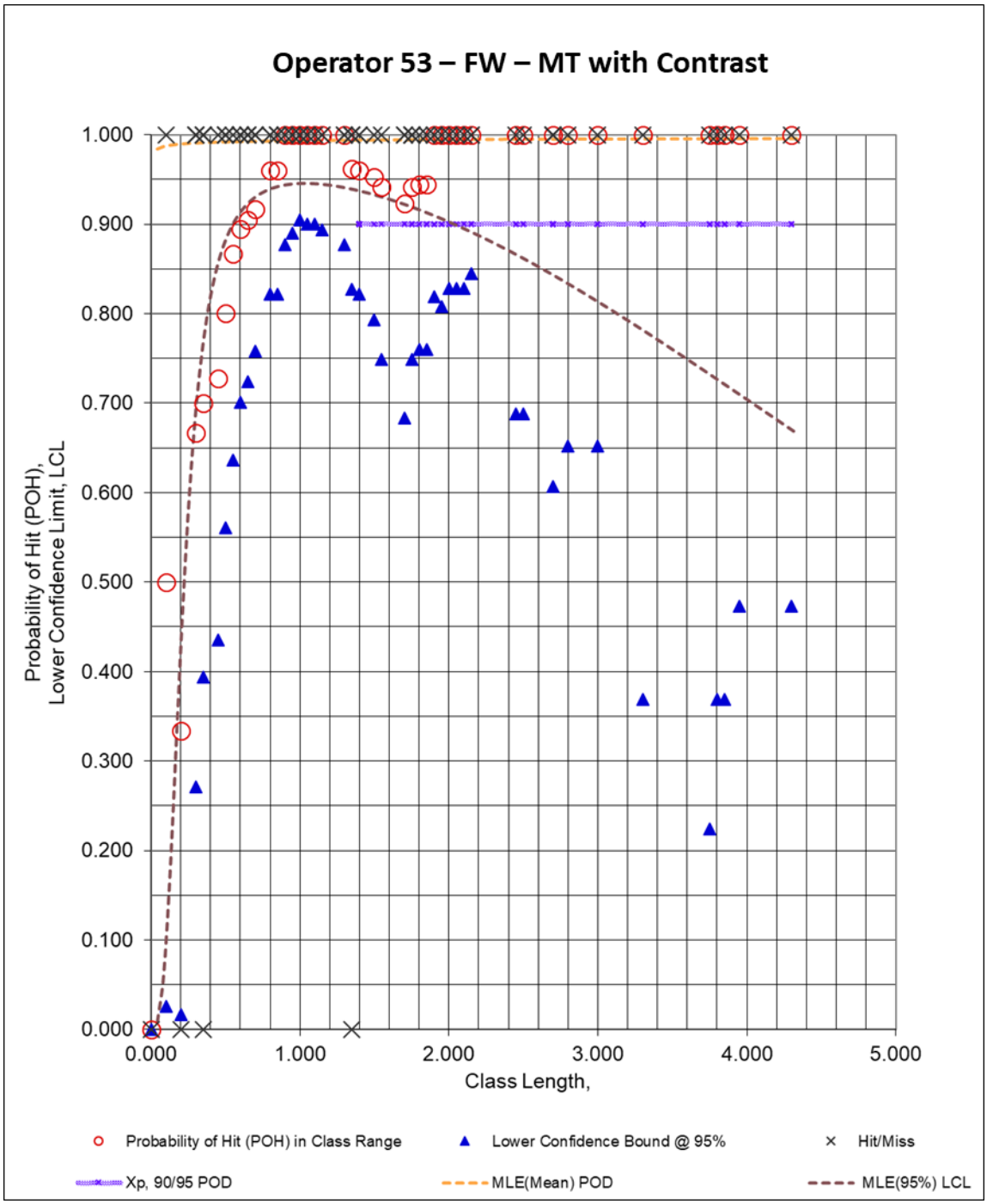

Figure 275. DOEPOD – FW – MT with Contrast – Operator 53

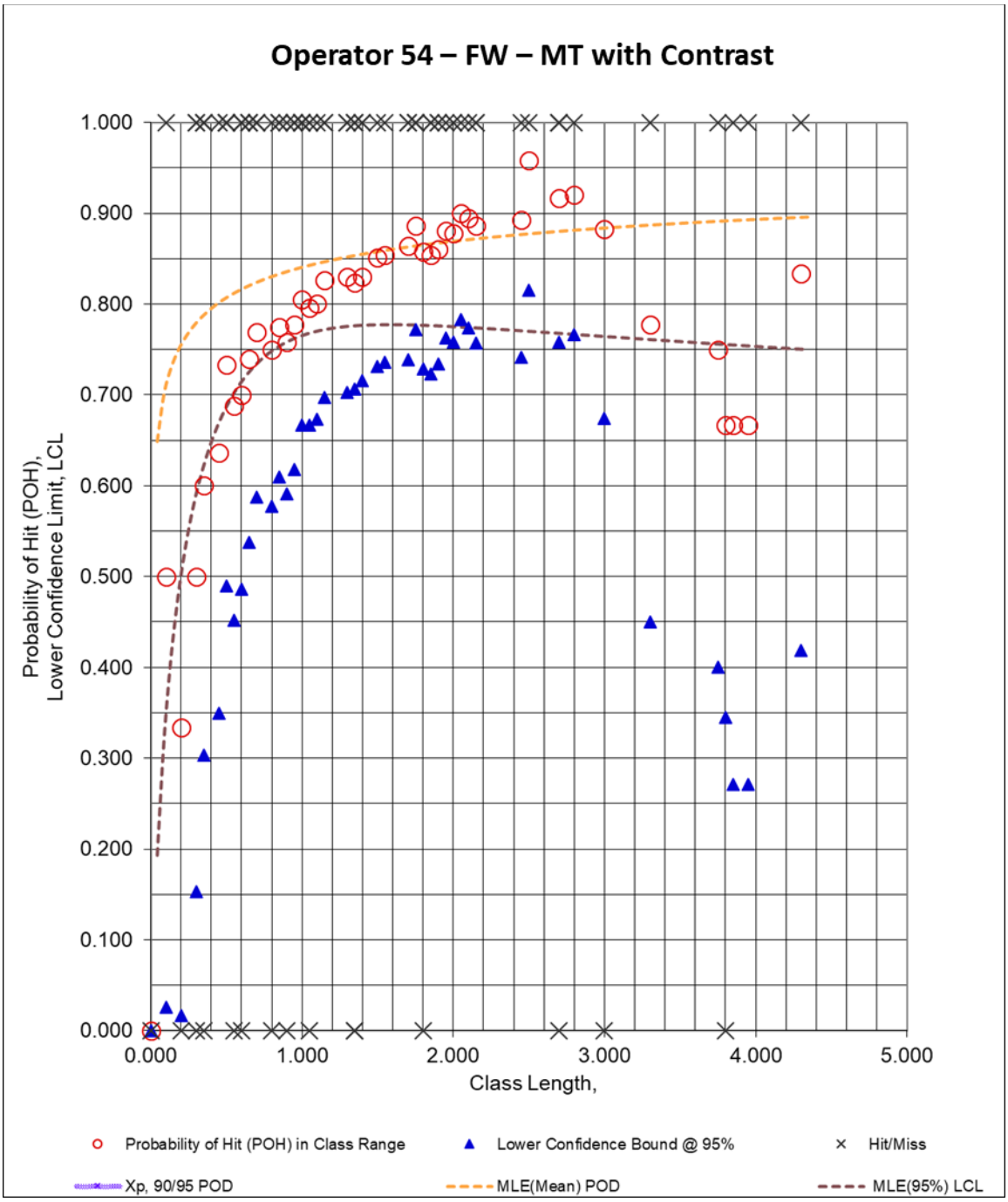

Figure 276. DOEPOD – FW – MT with Contrast – Operator 54

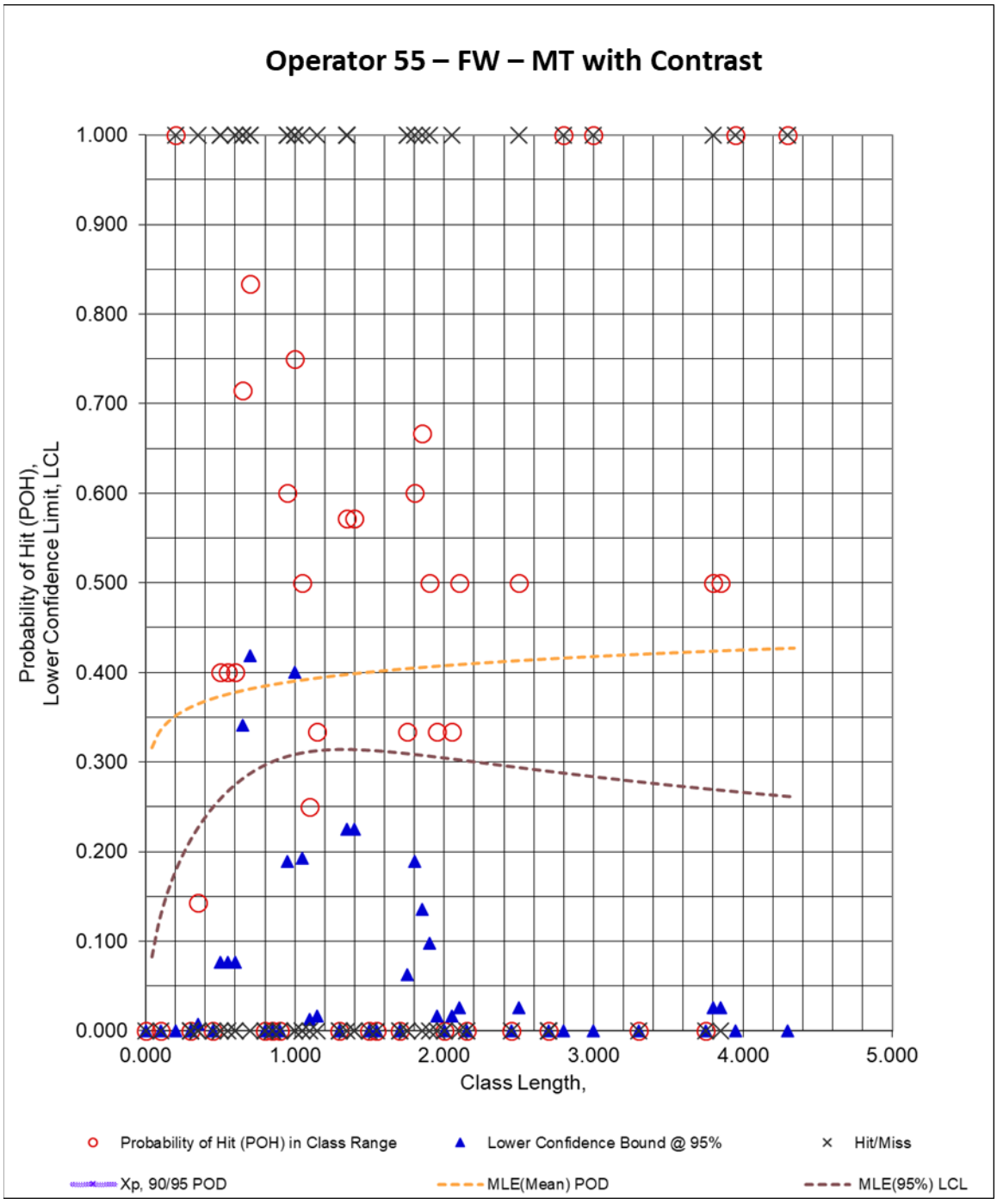

Figure 277. DOEPOD – FW – MT with Contrast – Operator 55

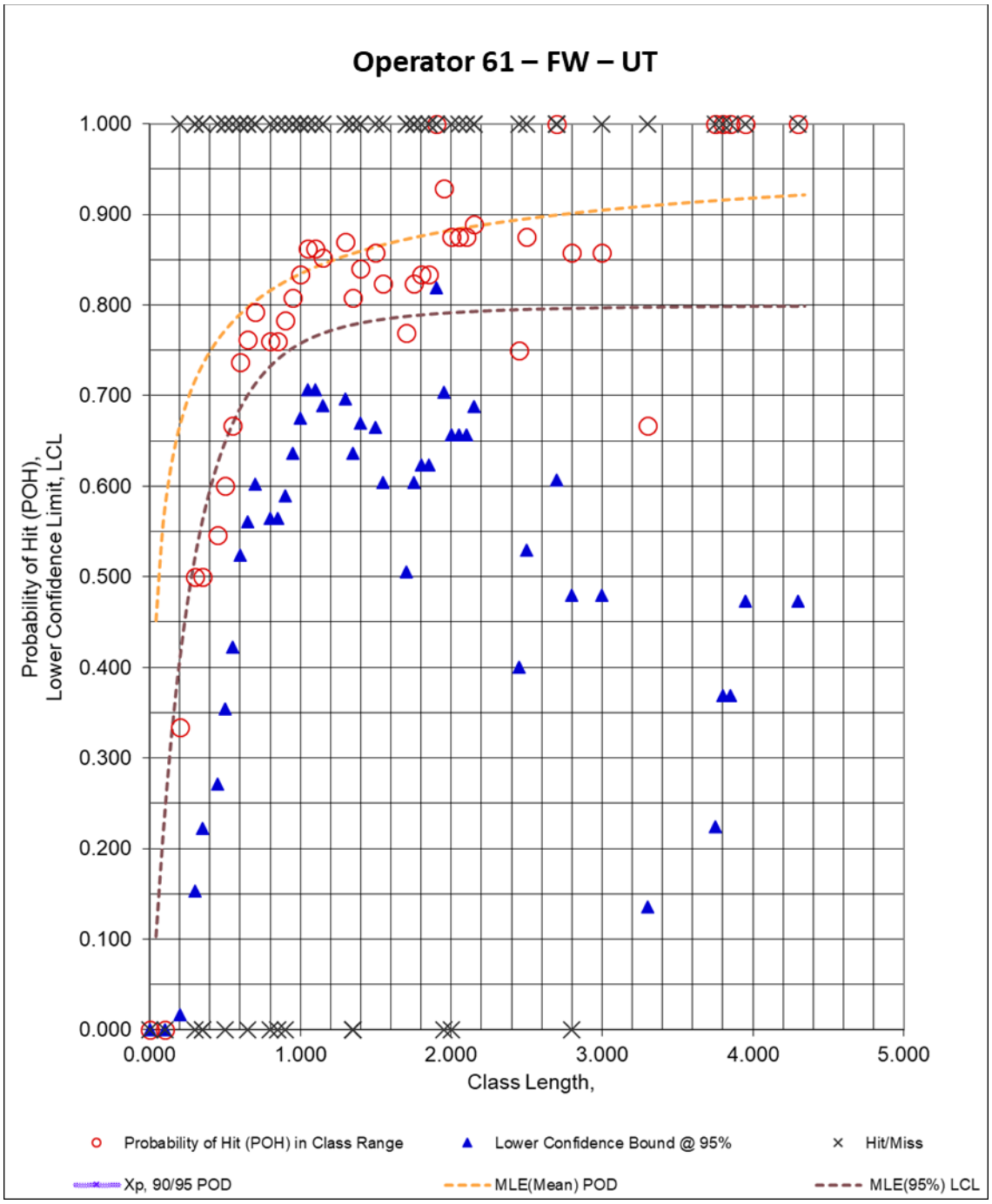

Figure 278. DOEPOD – FW – UT – Operator 61

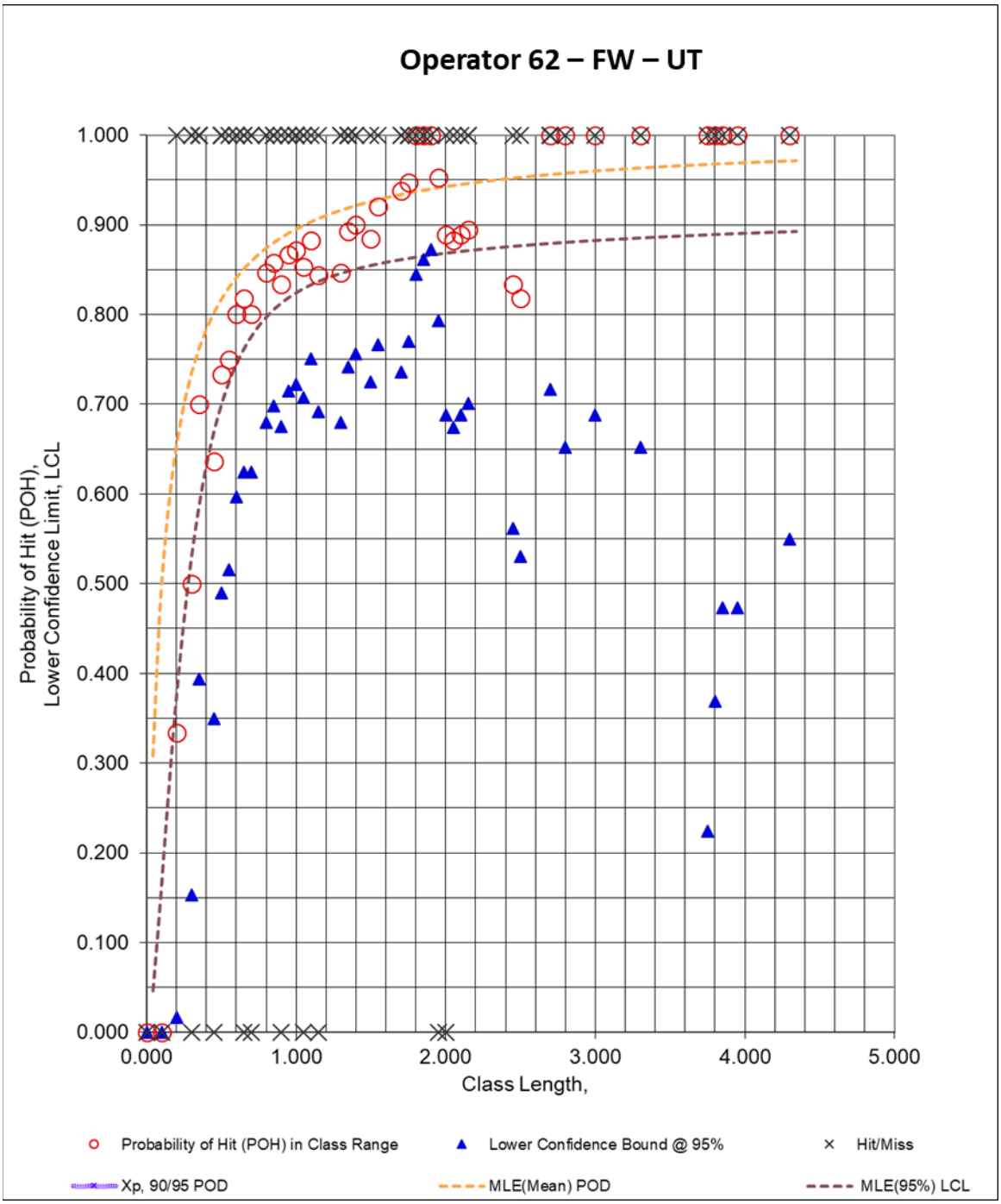

Figure 279. DOEPOD – FW – UT – Operator 62

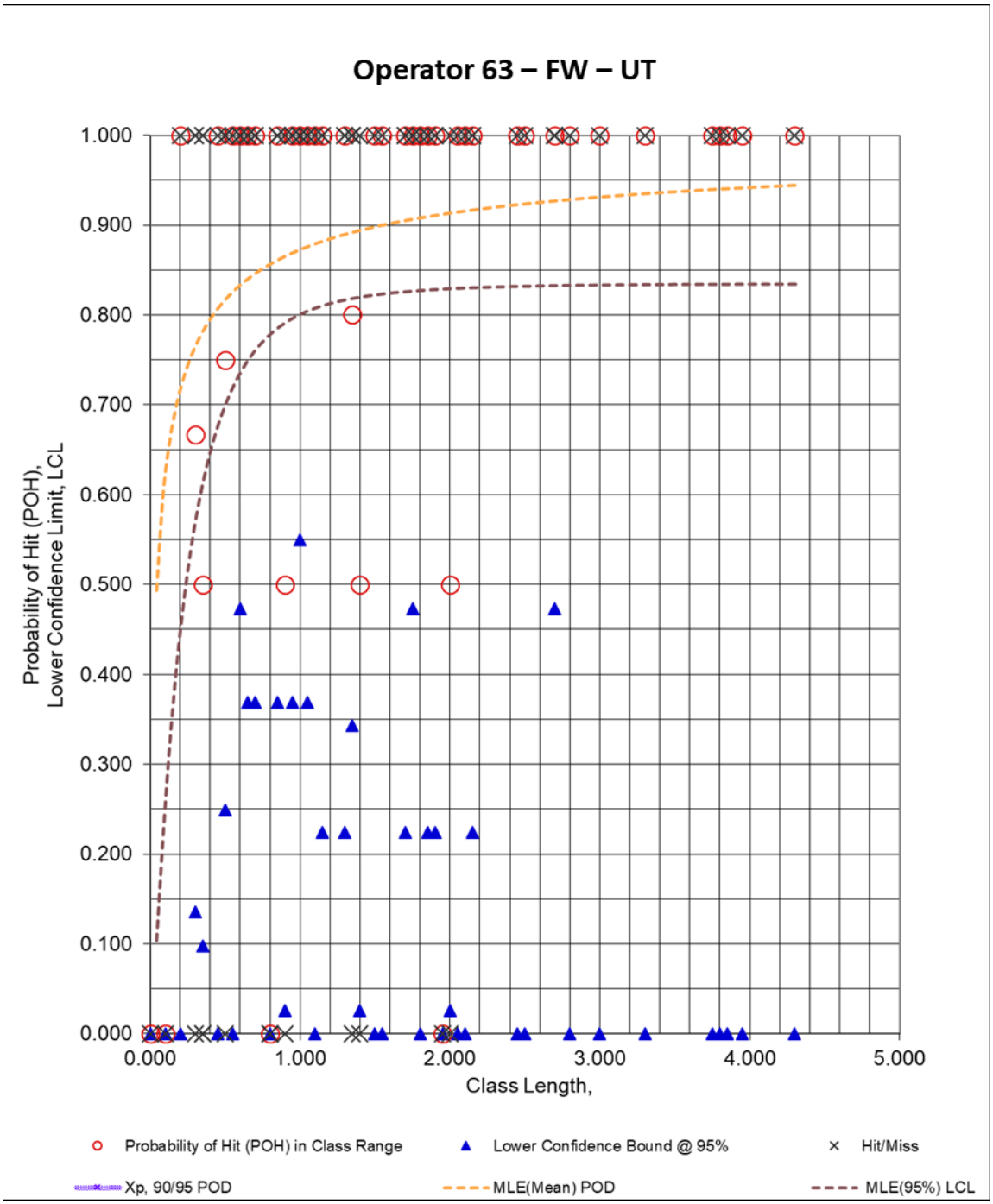

Figure 280. DOEPOD – FW – UT – Operator 63

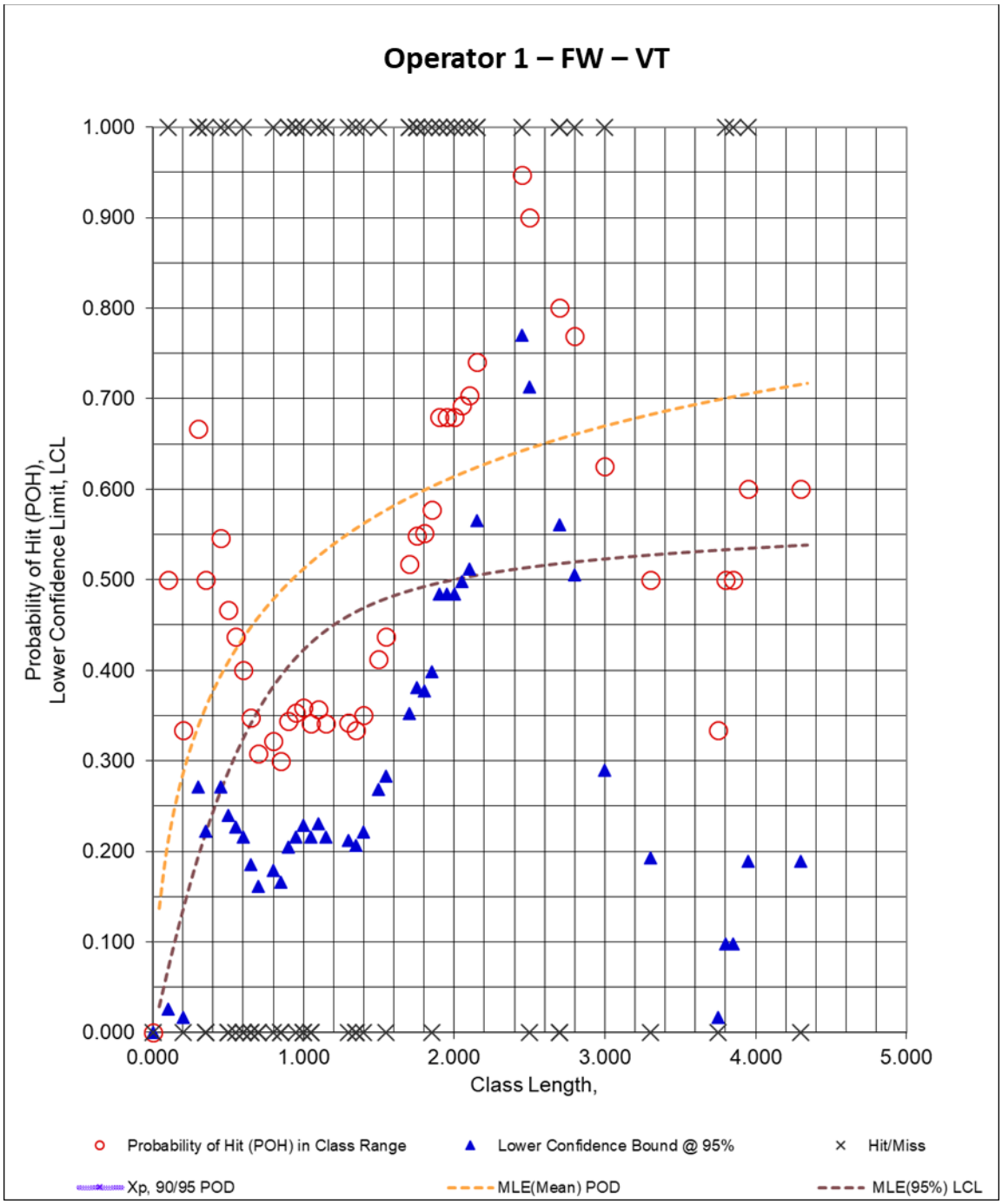

Figure 281. DOEPOD – FW – VT – Operator 1

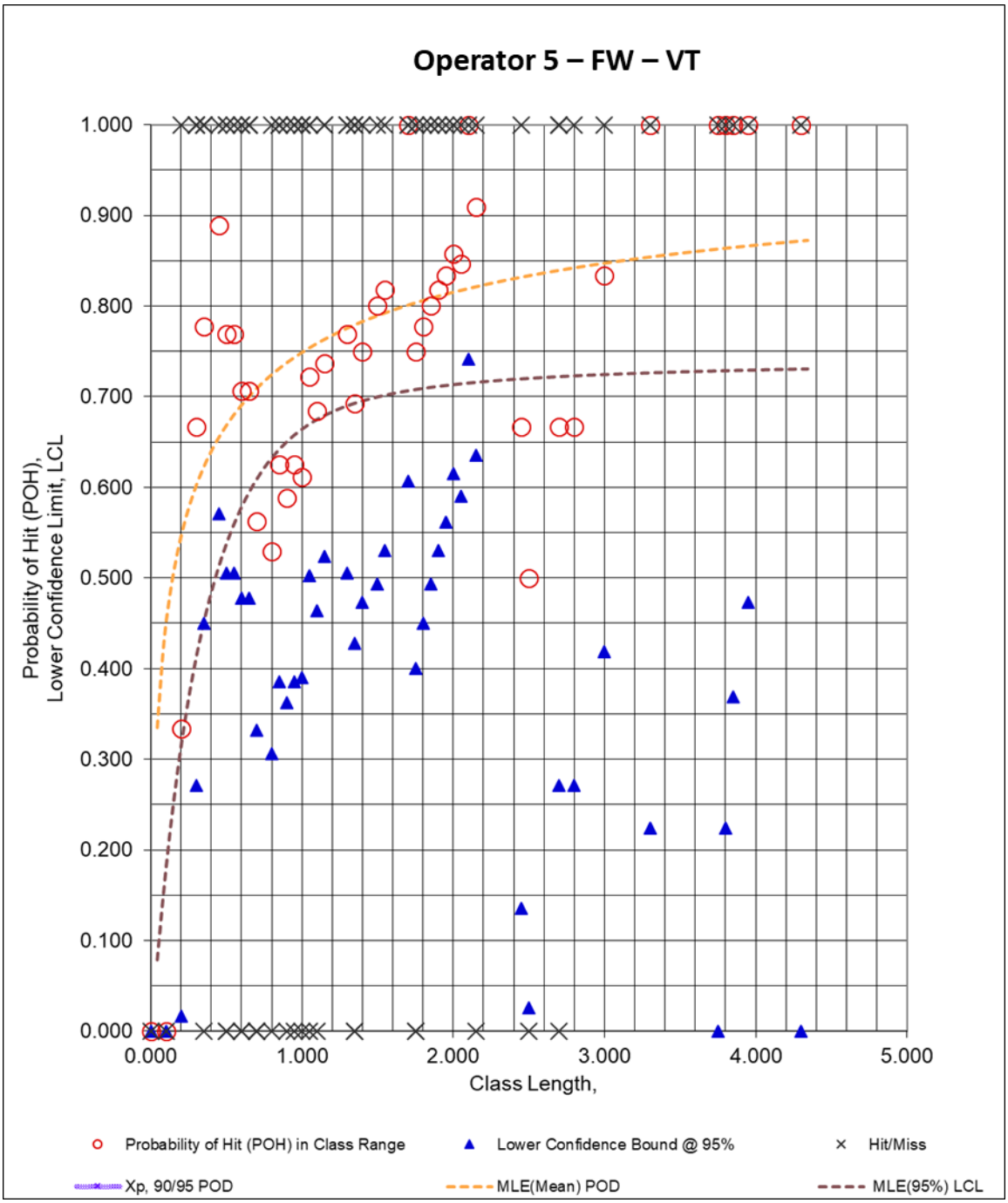

Figure 282. DOEPOD – FW – VT – Operator 5

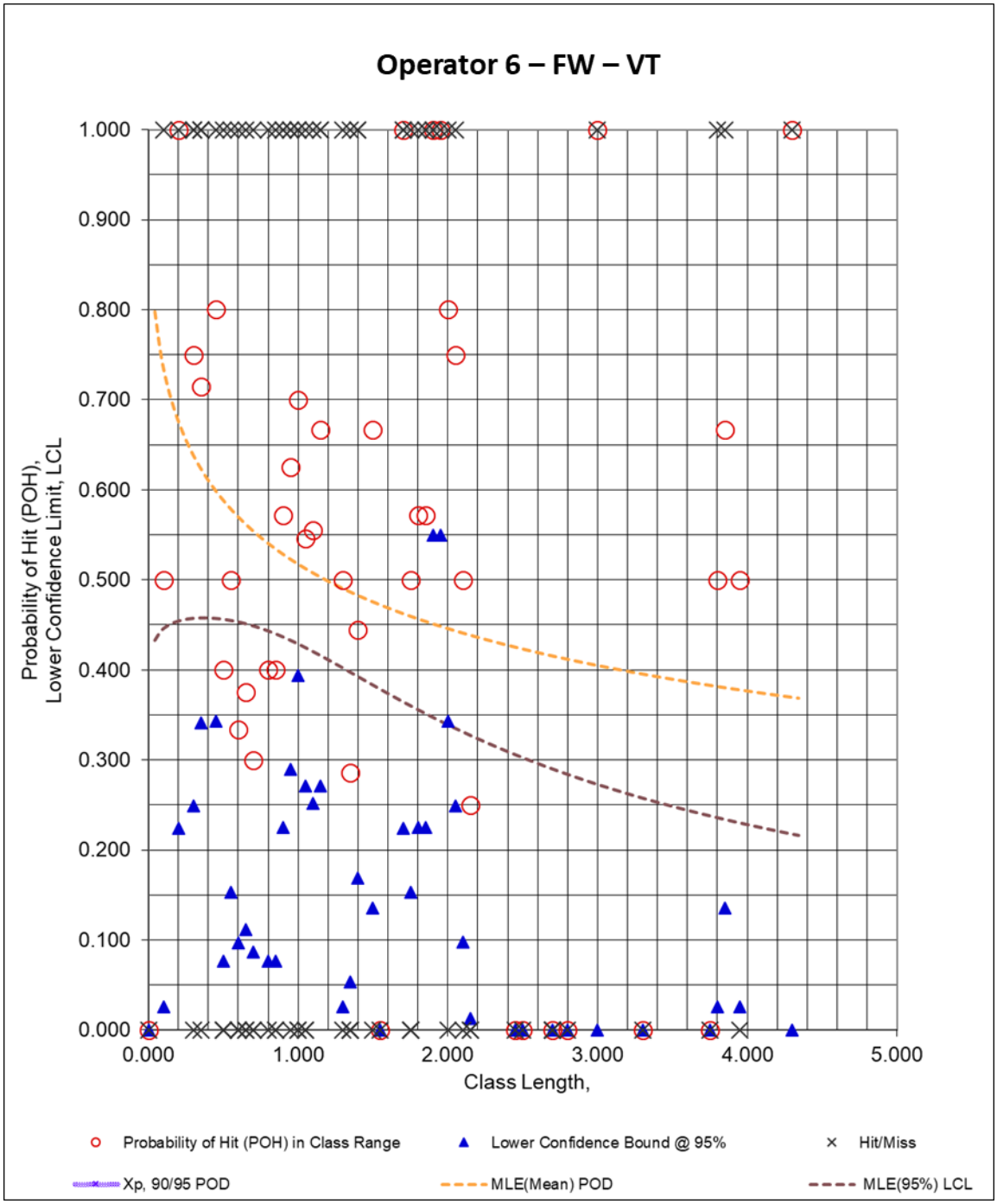

Figure 283. DOEPOD – FW – VT – Operator 6

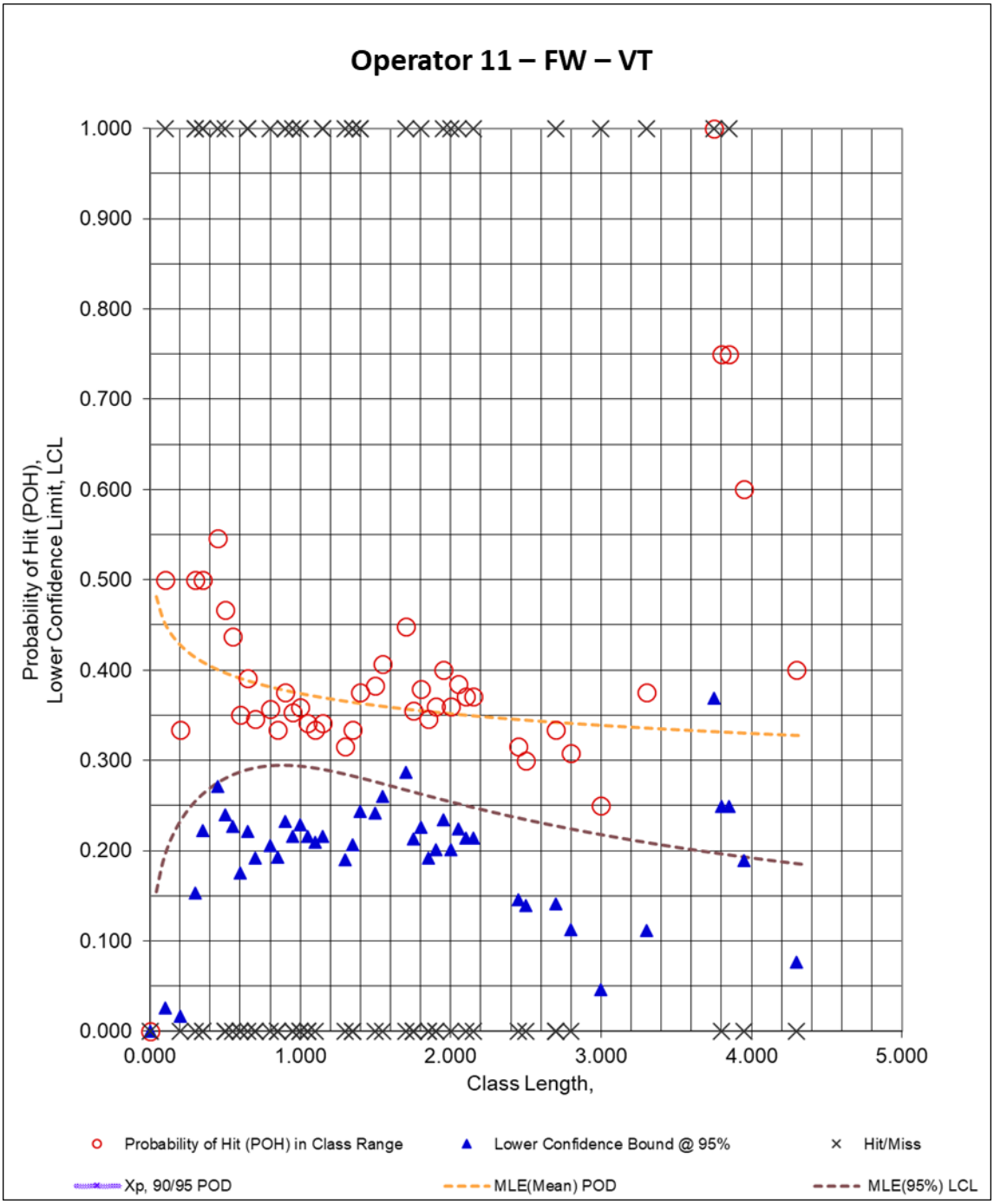

Figure 284. DOEPOD – FW – VT – Operator 11

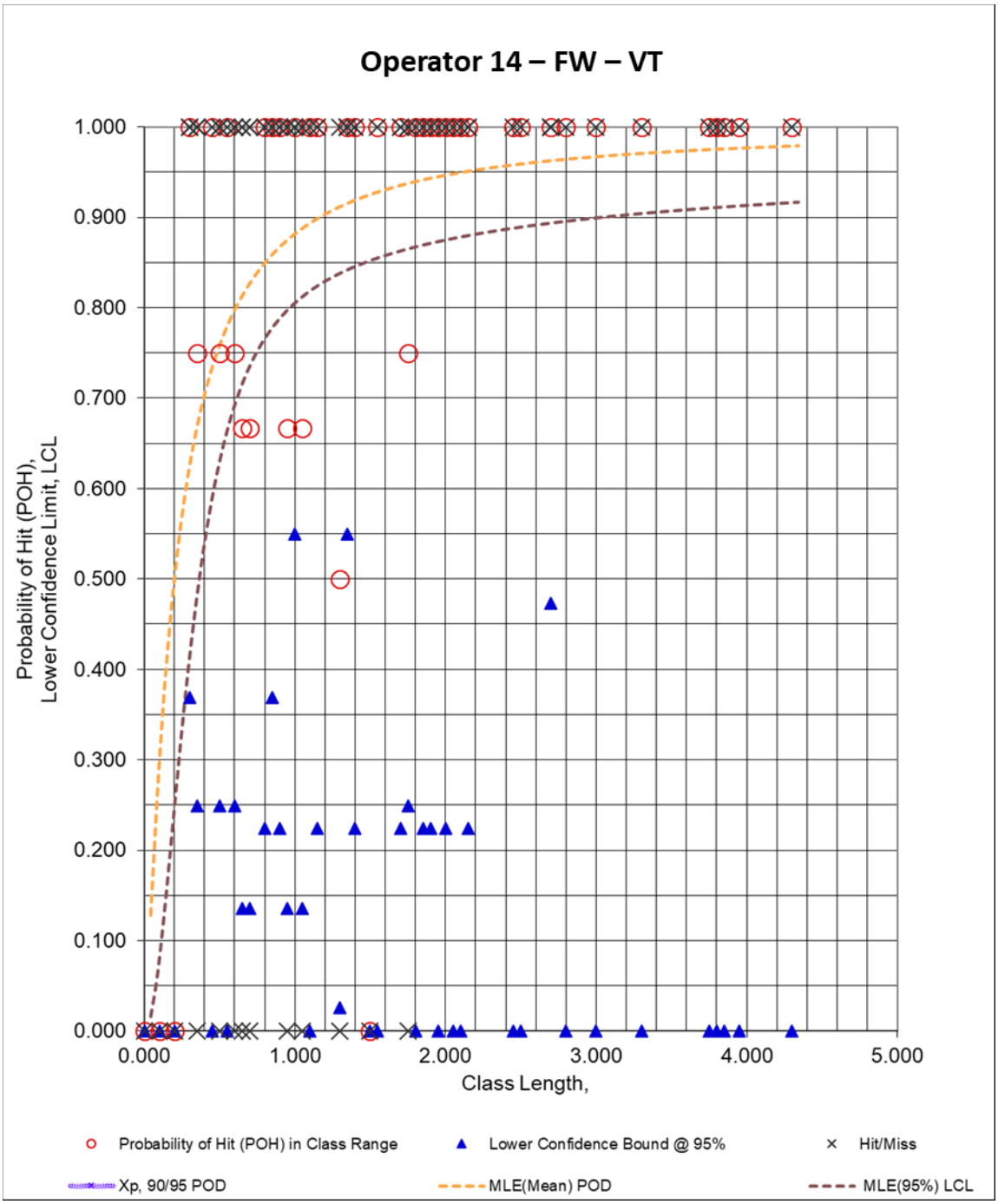

Figure 285. DOEPOD – FW – VT – Operator 14

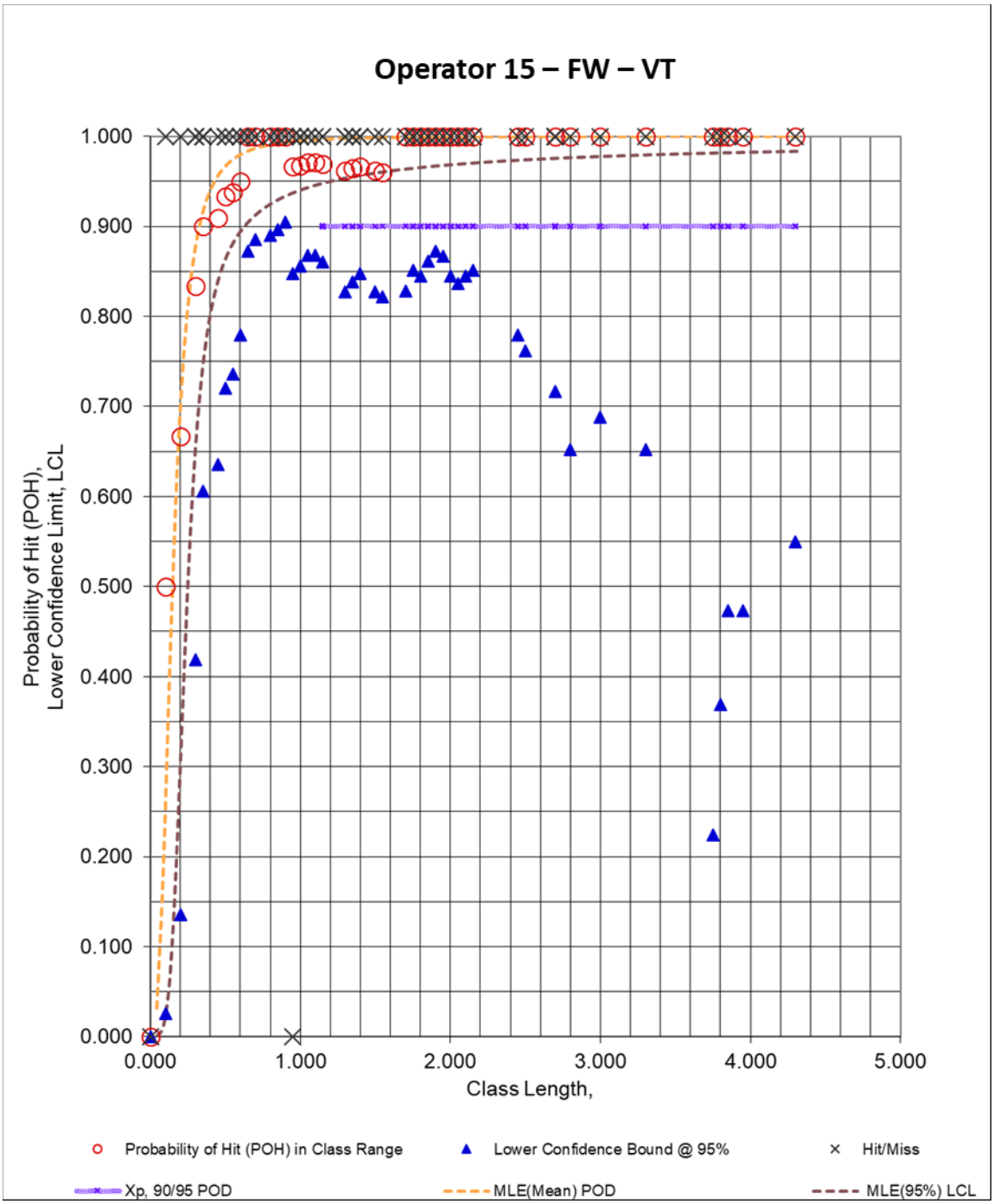

Figure 286. DOEPOD – FW – VT – Operator 15

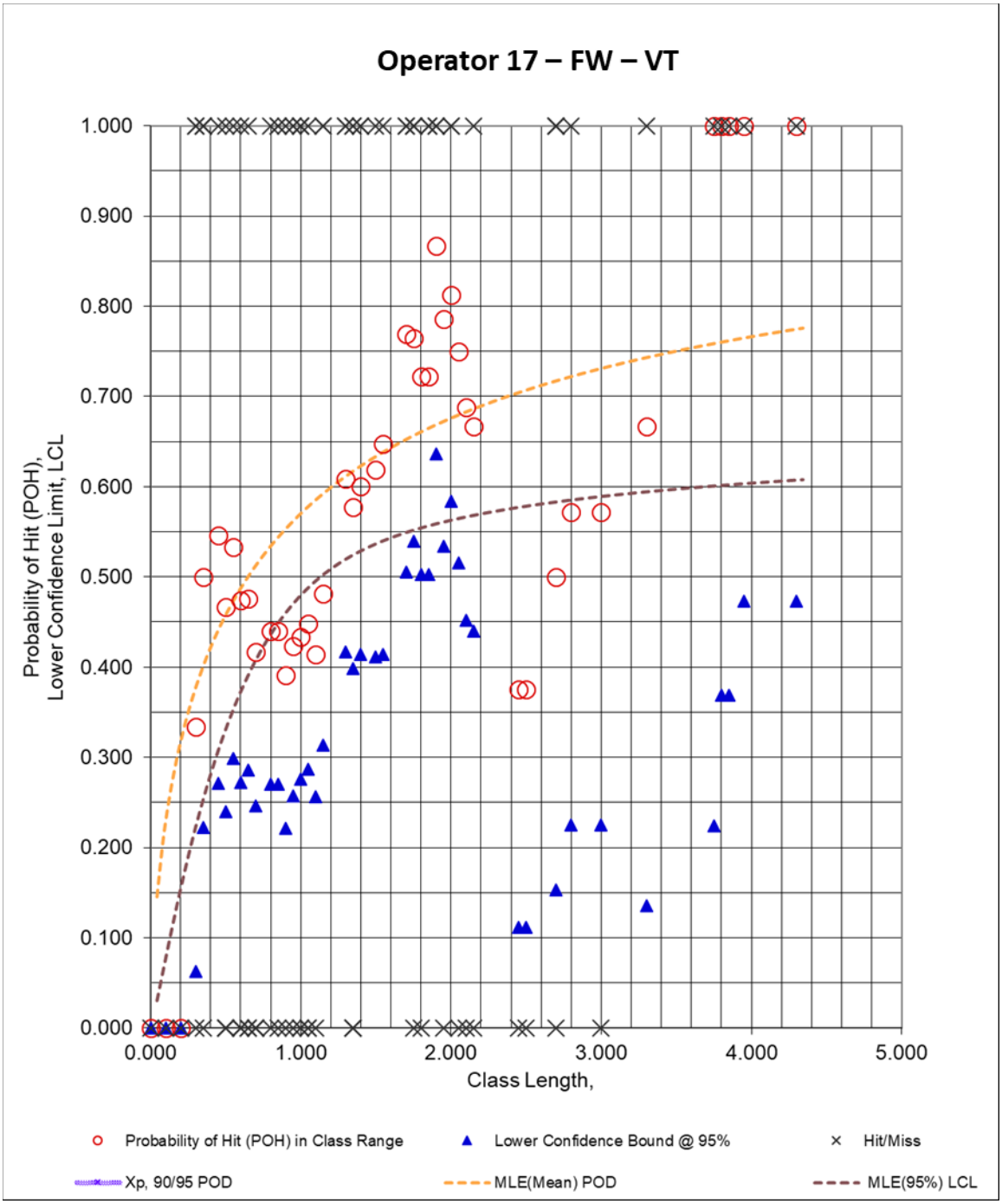

Figure 287. DOEPOD – FW – VT – Operator 17

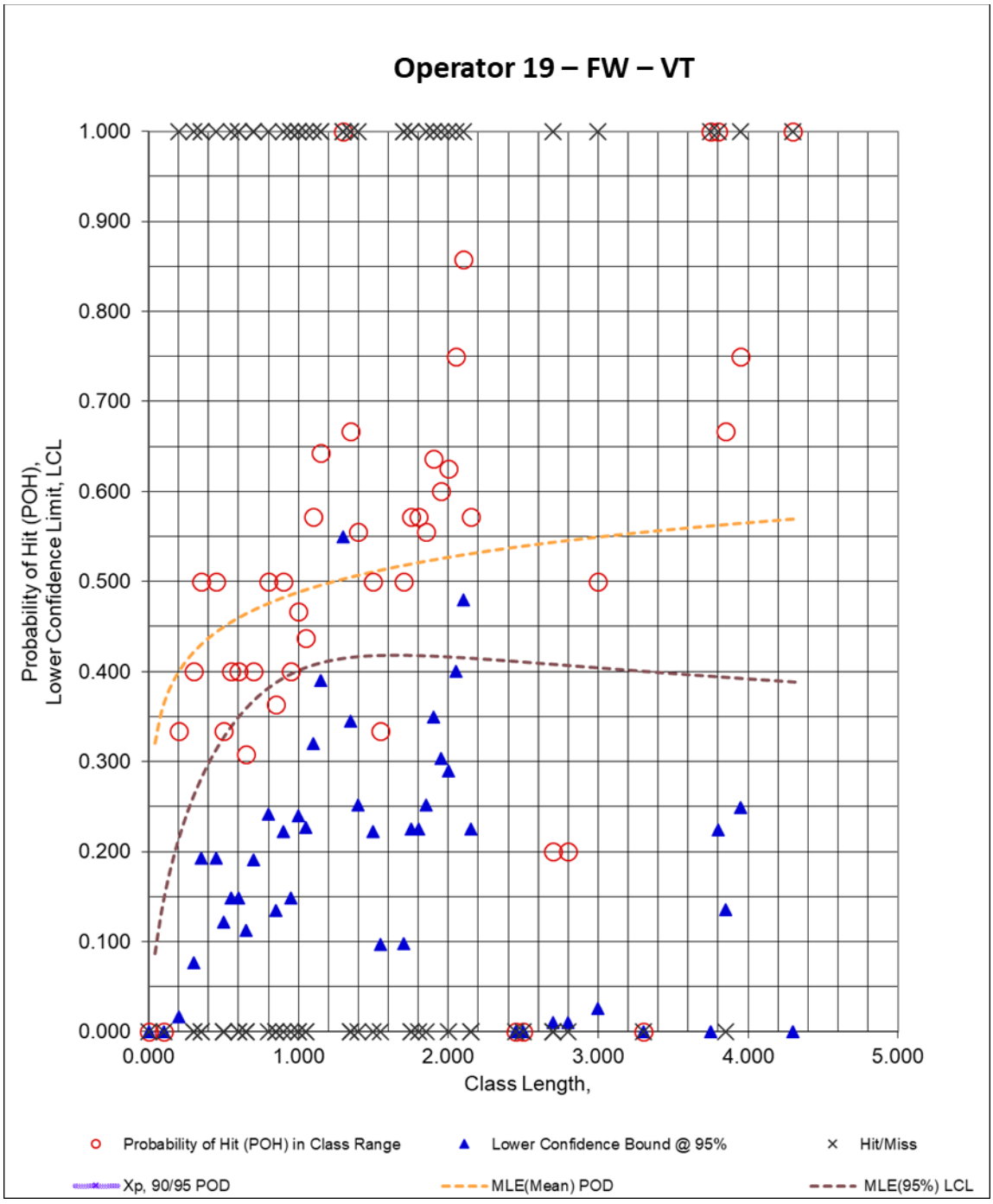

Figure 288. DOEPOD – FW – VT – Operator 19

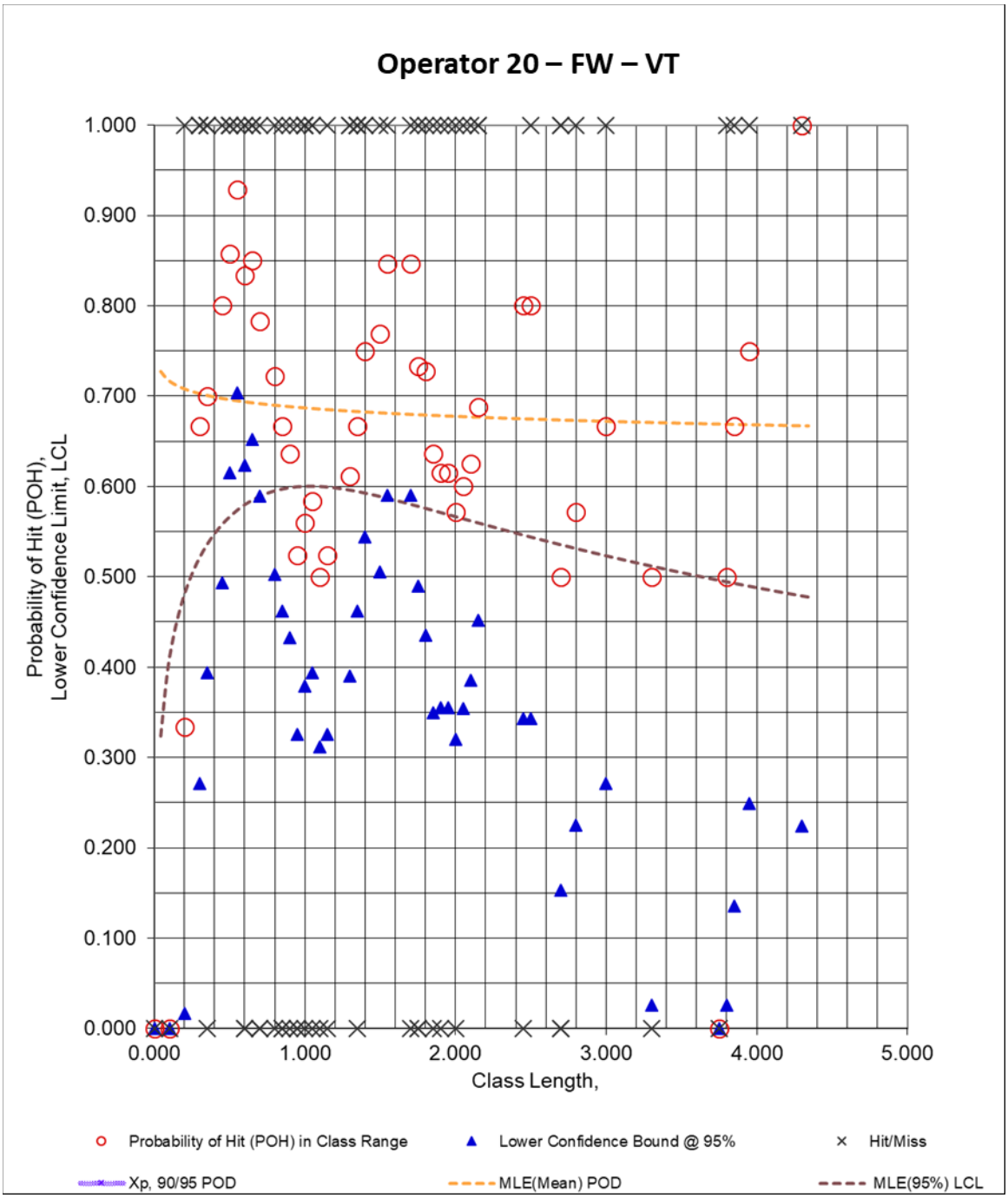

Figure 289. DOEPOD – FW – VT – Operator 20

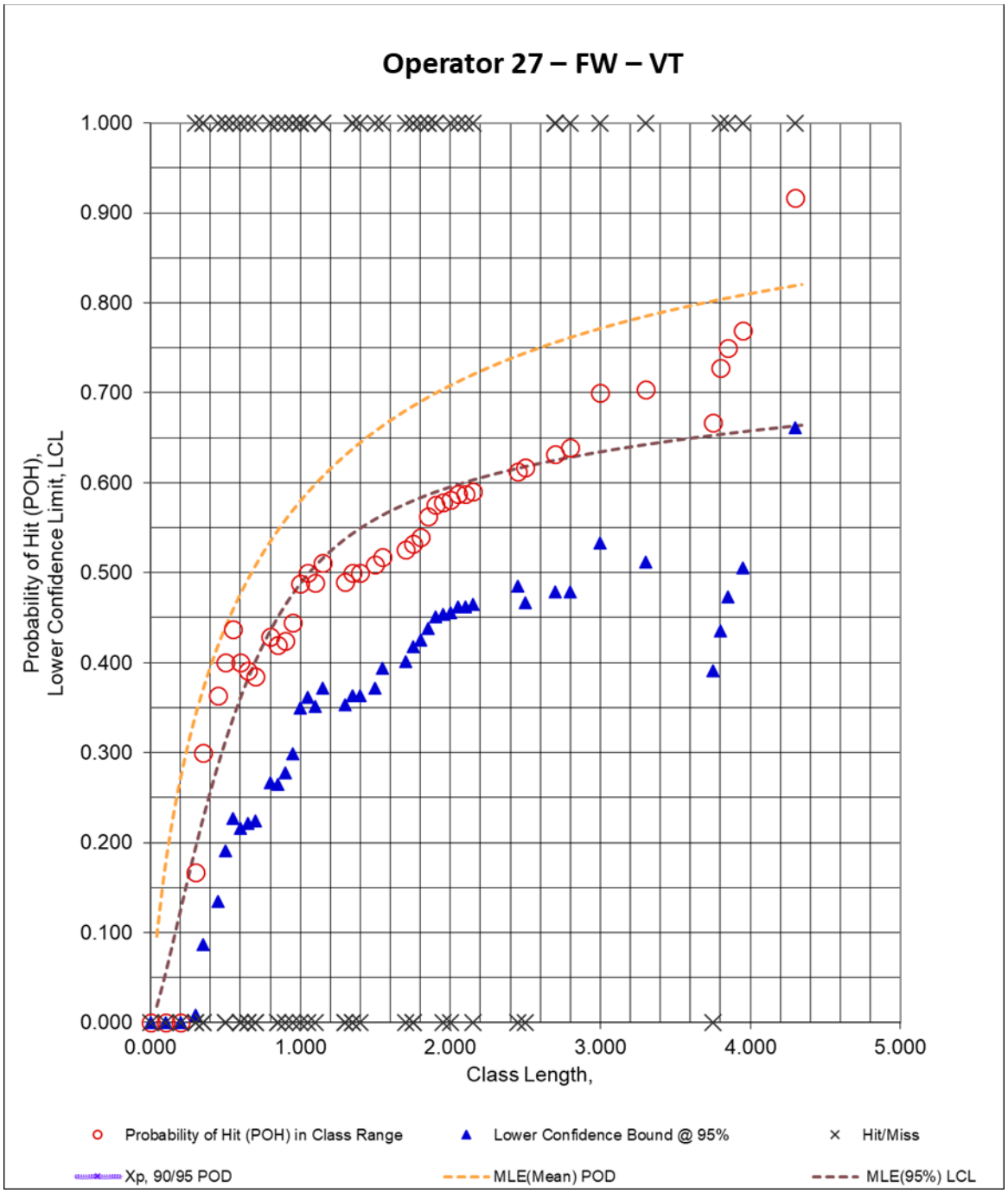

Figure 290. DOEPOD – FW – VT – Operator 27

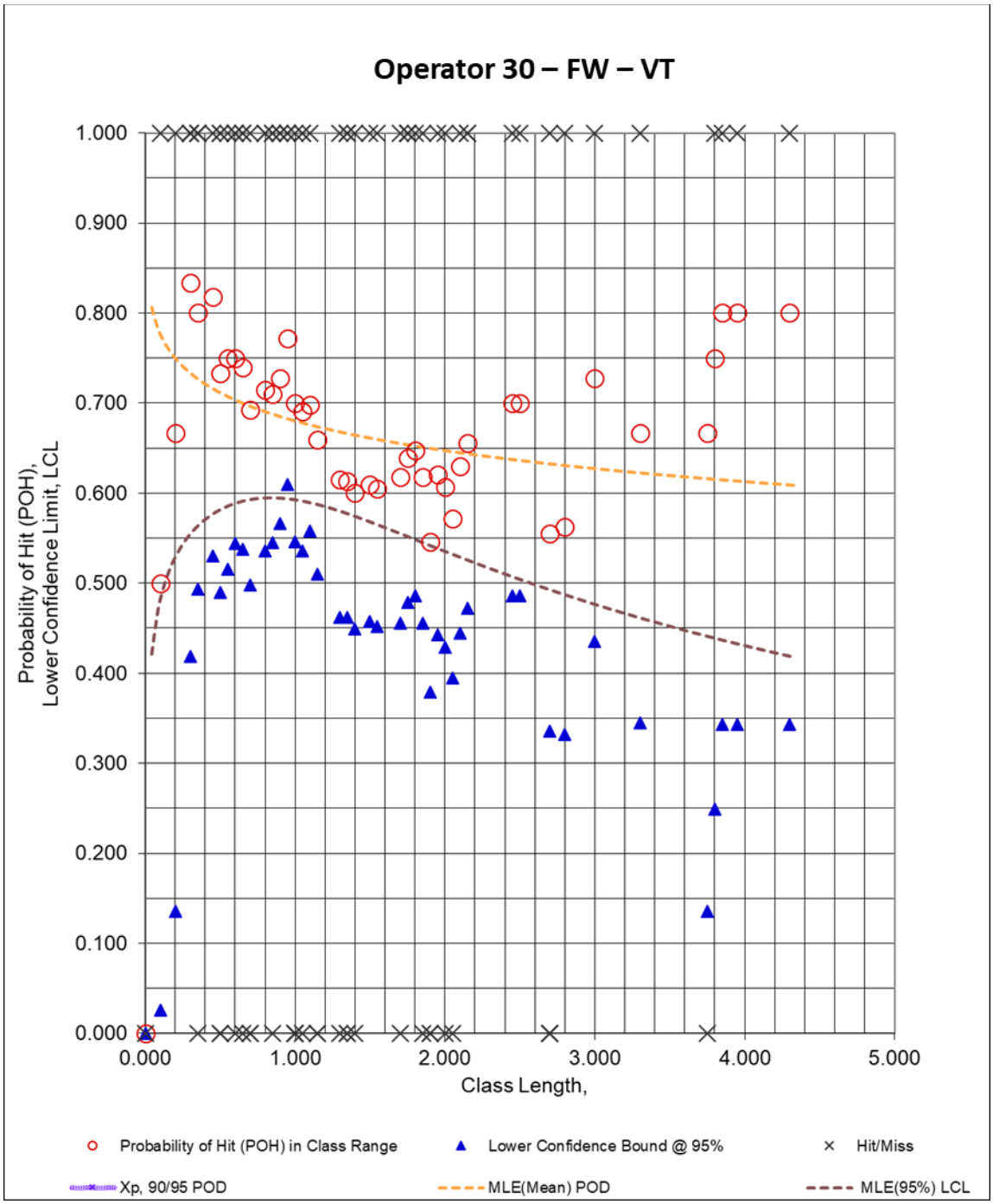

Figure 291. DOEPOD – FW – VT – Operator 30

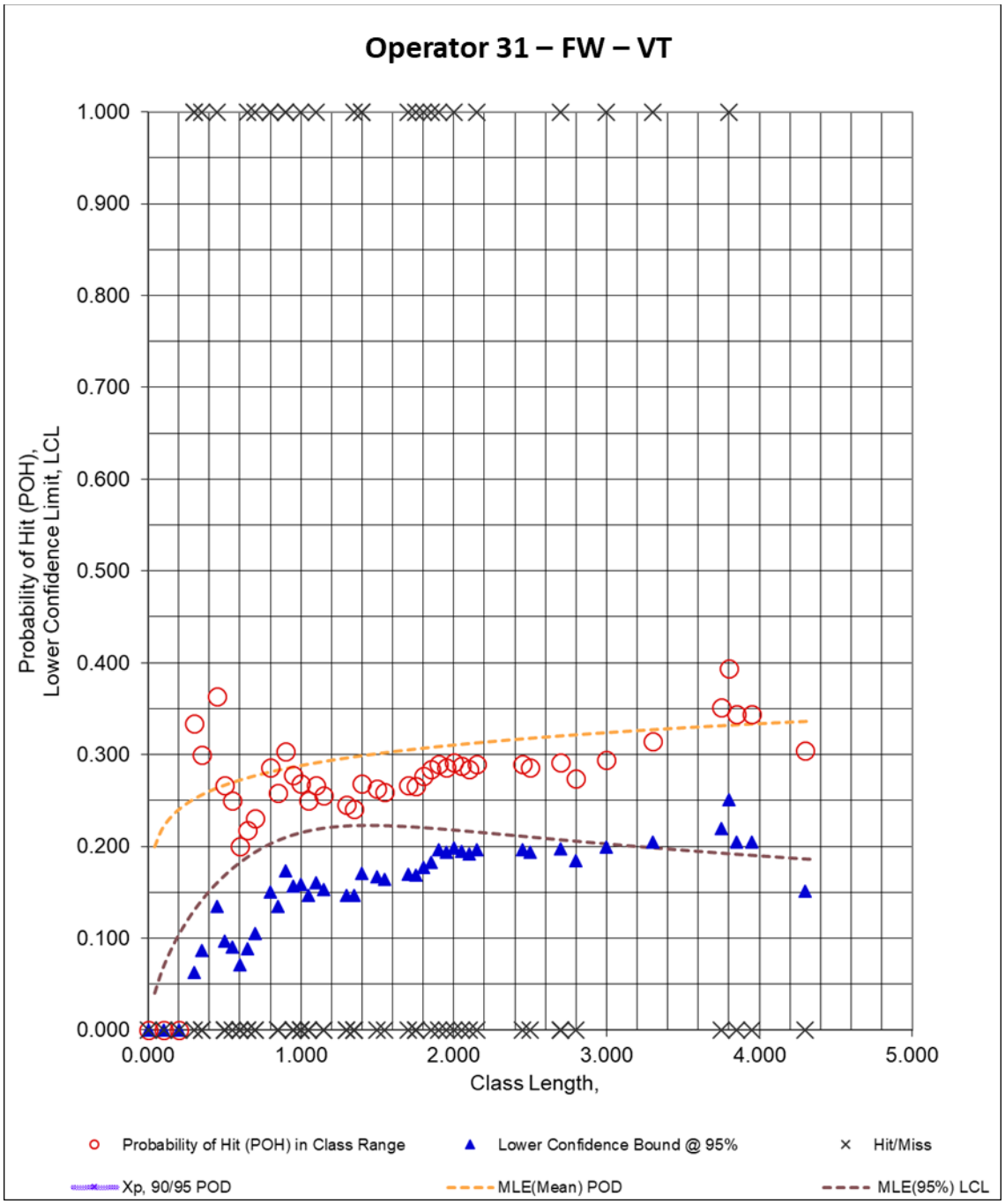

Figure 292. DOEPOD – FW – VT – Operator 31

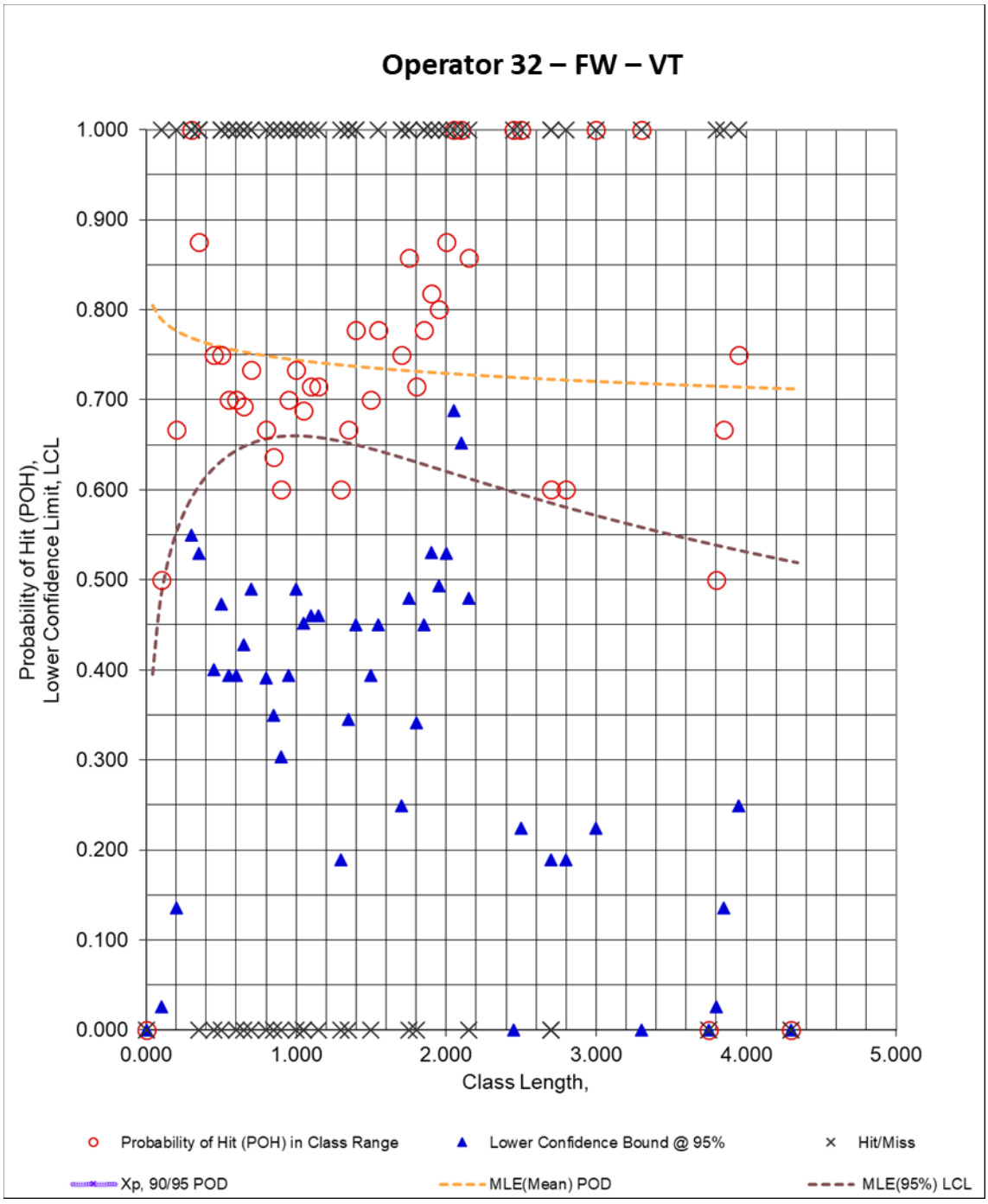

Figure 293. DOEPOD – FW – VT – Operator 32

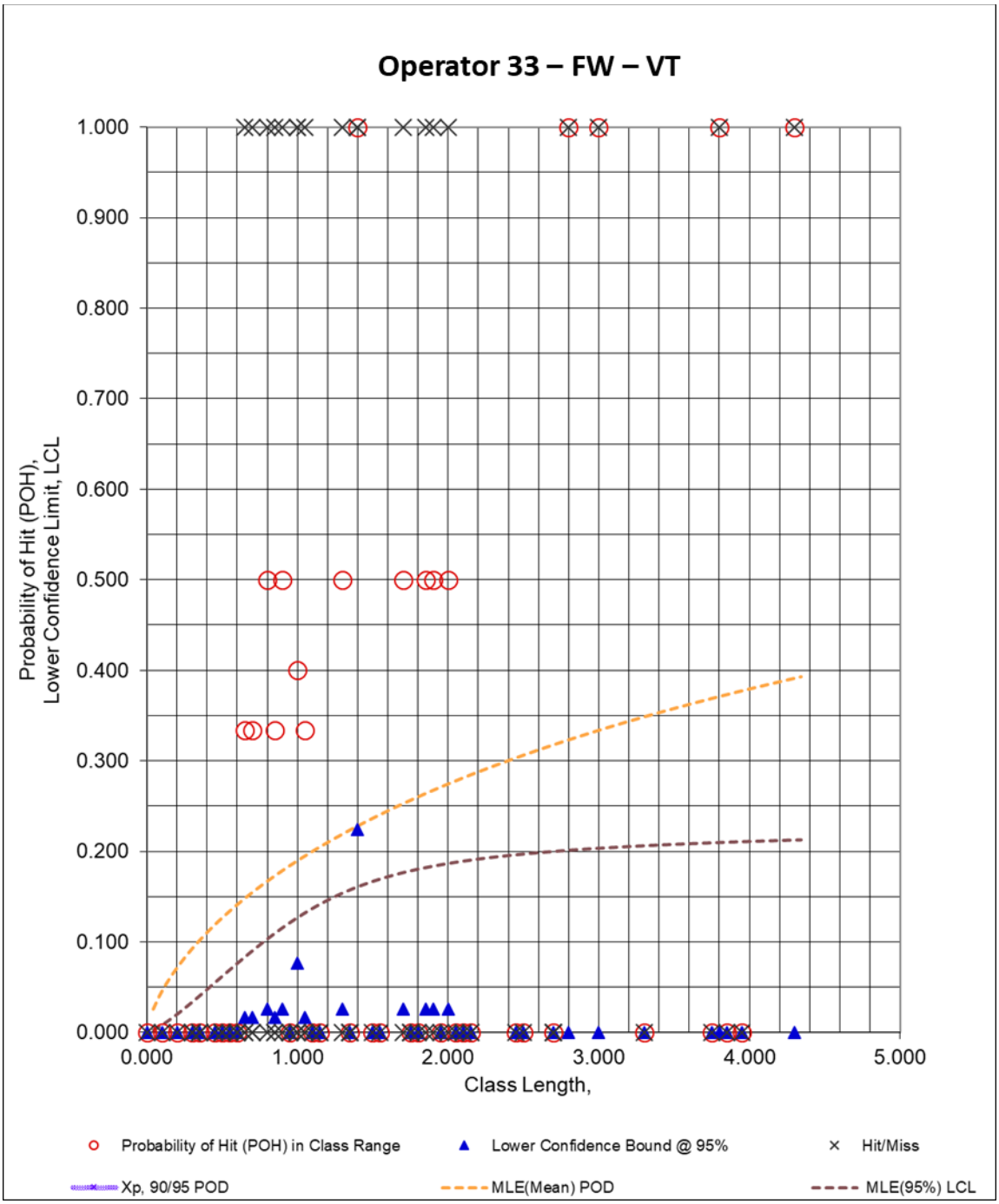

Figure 294. DOEPOD – FW – VT – Operator 33

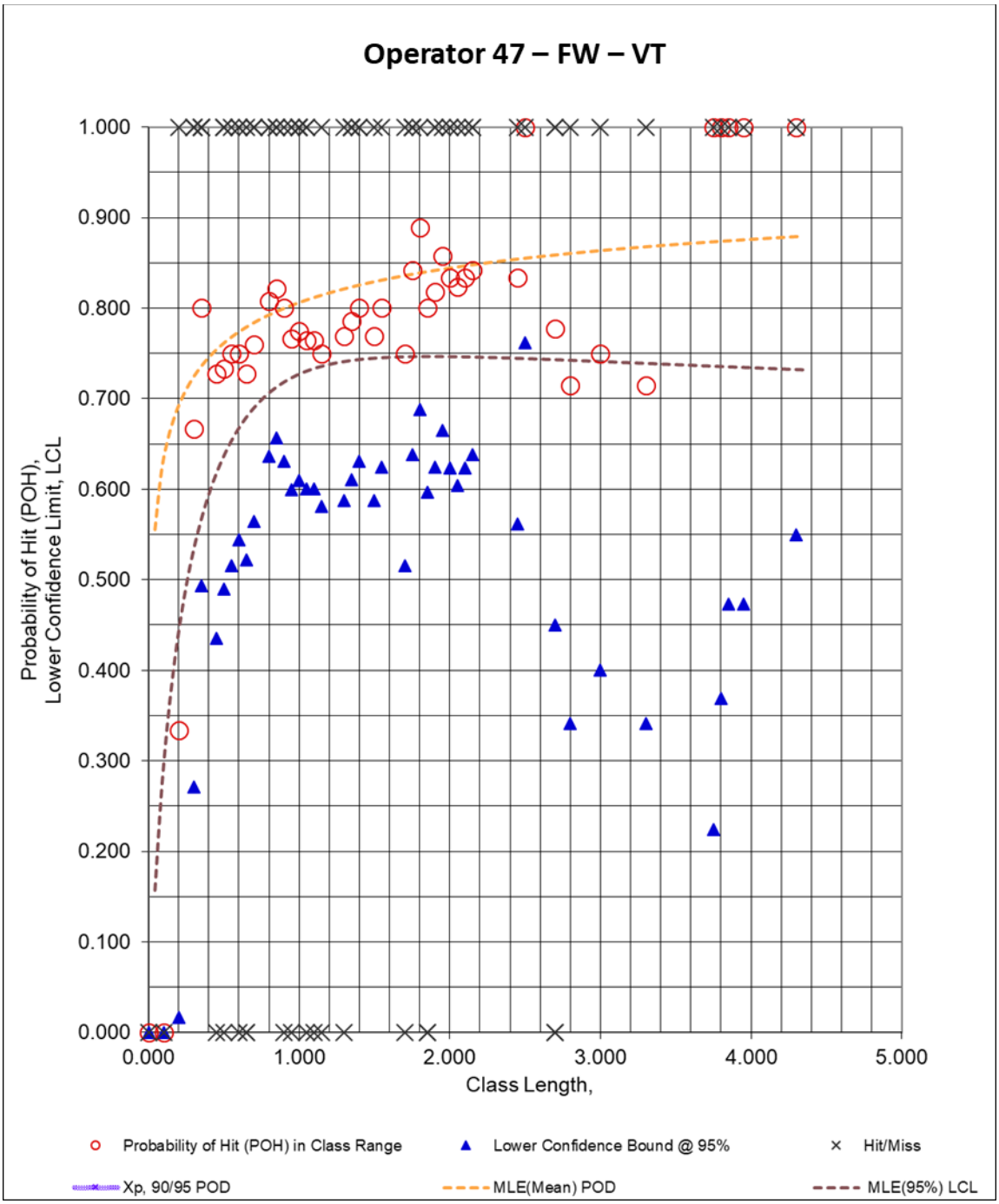

Figure 295. DOEPOD – FW – VT – Operator 47

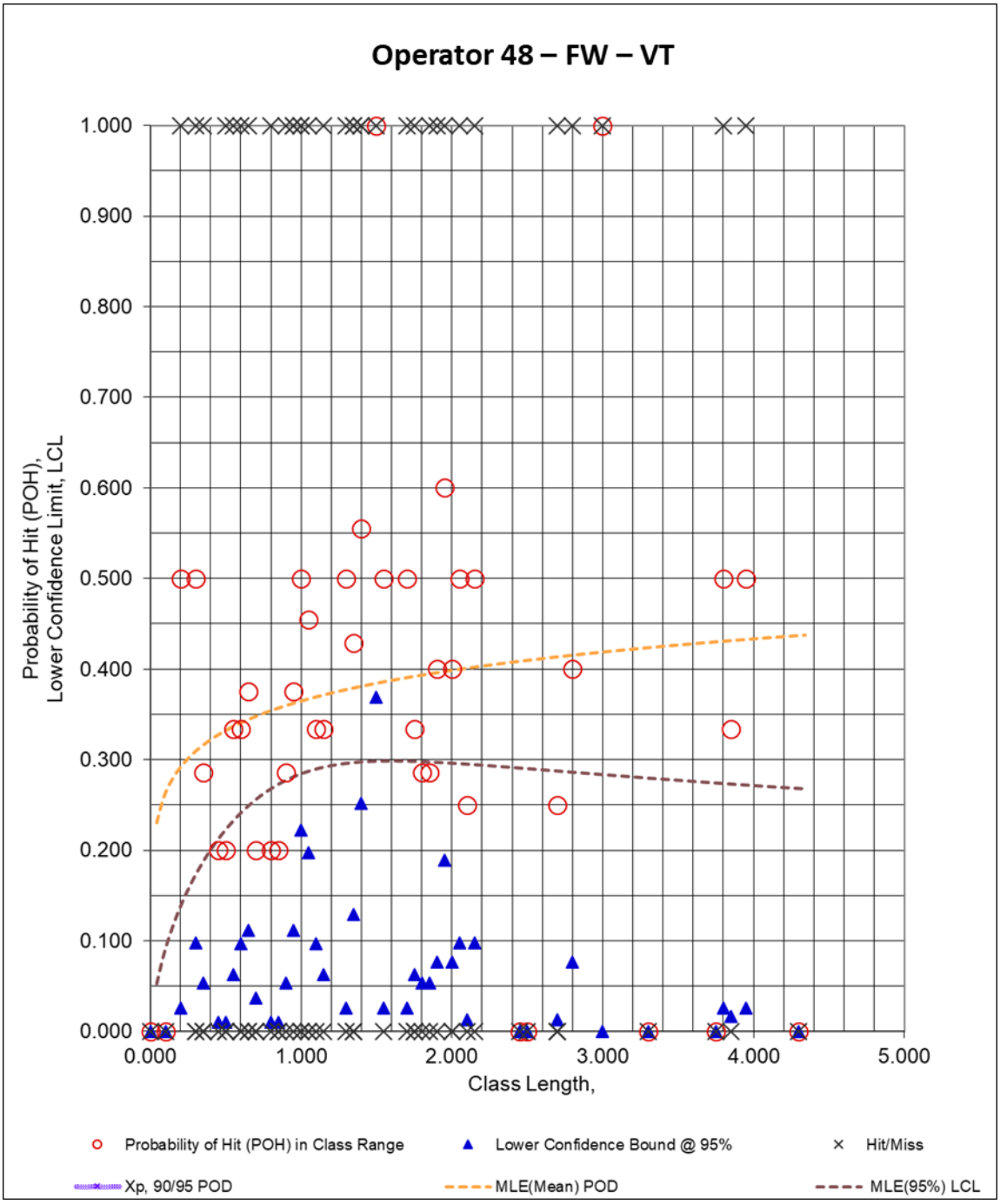

Figure 296. DOEPOD – FW – VT – Operator 48

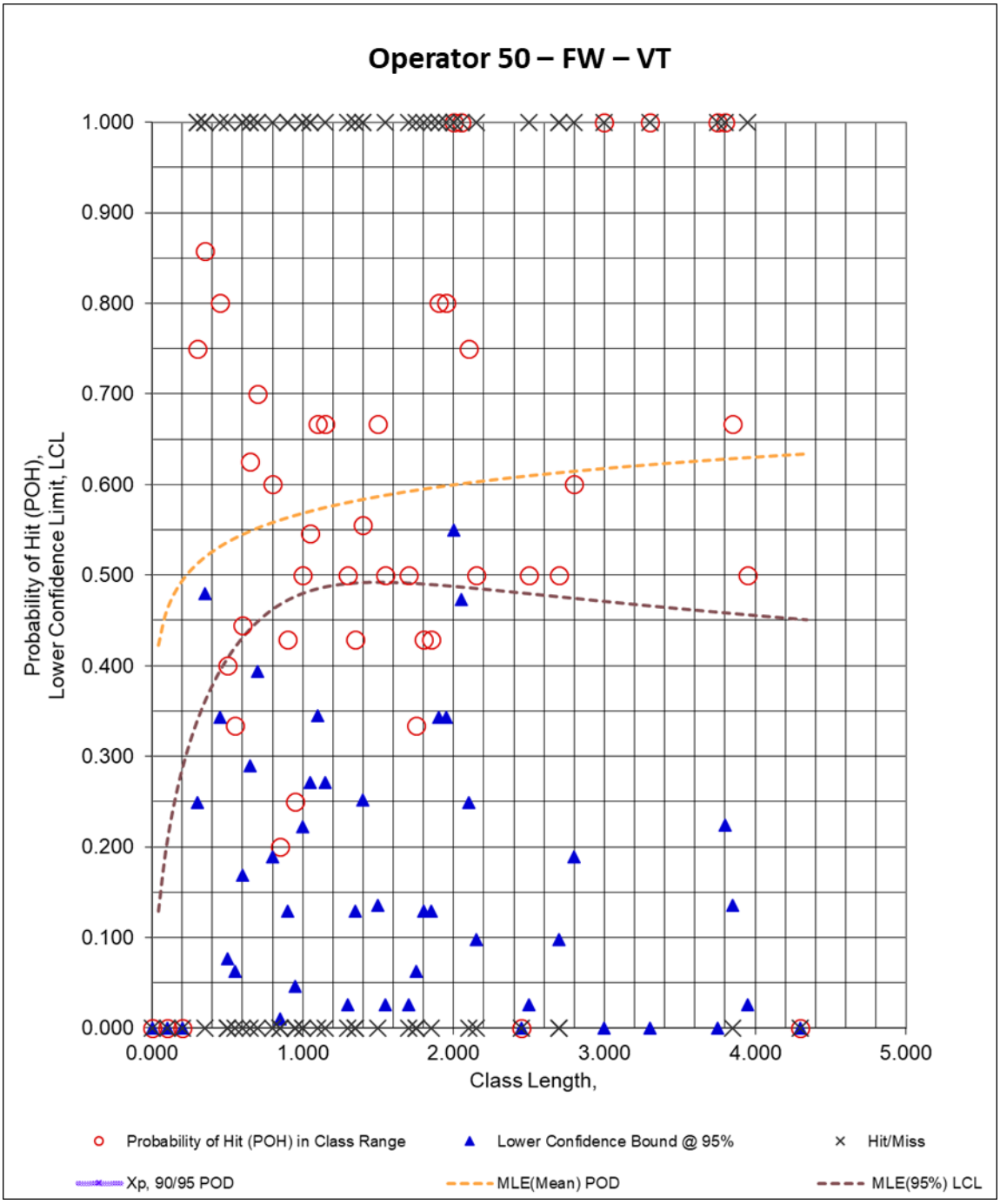

Figure 297. DOEPOD – FW – VT – Operator 50

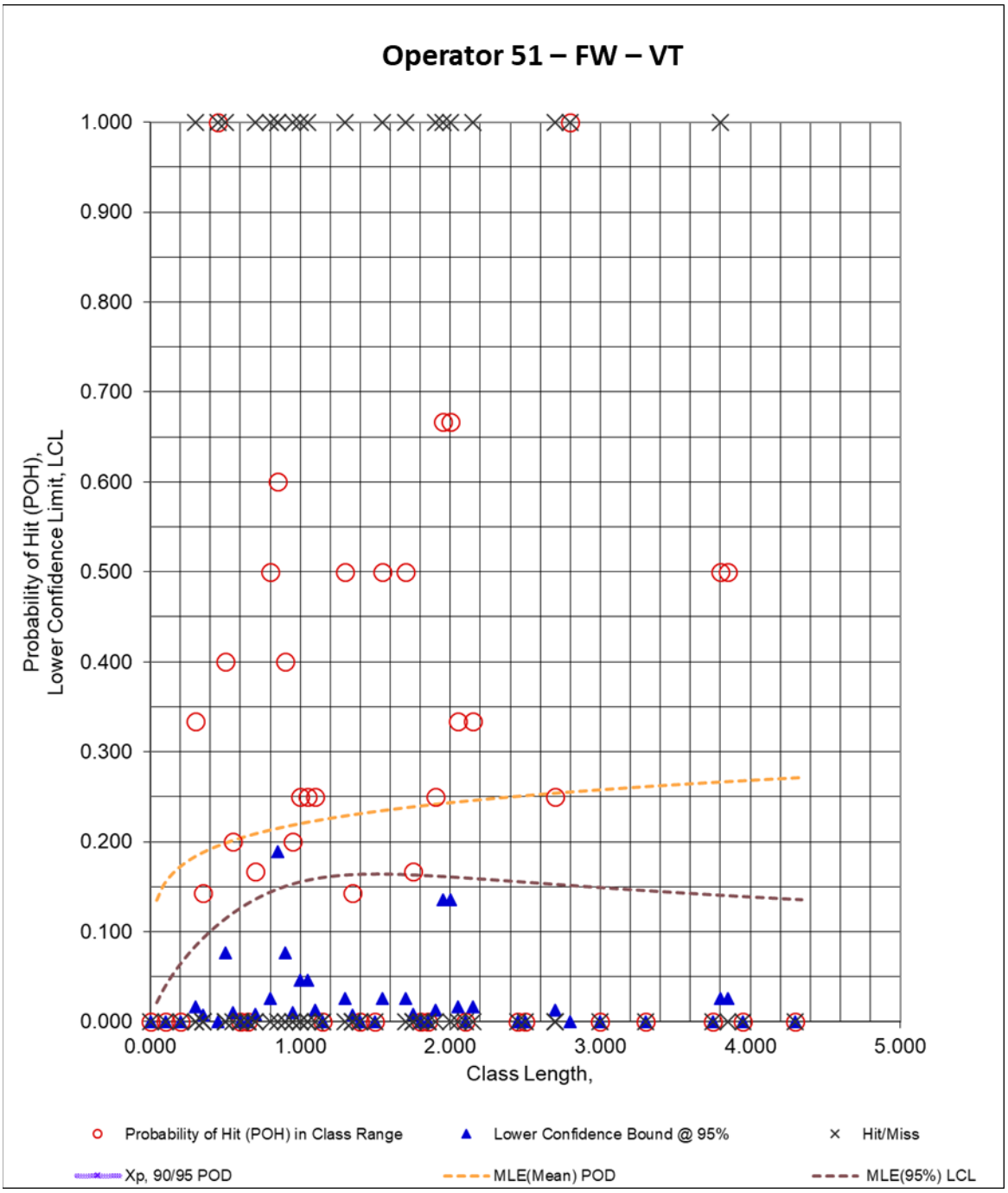

Figure 298. DOEPOD – FW – VT – Operator 51

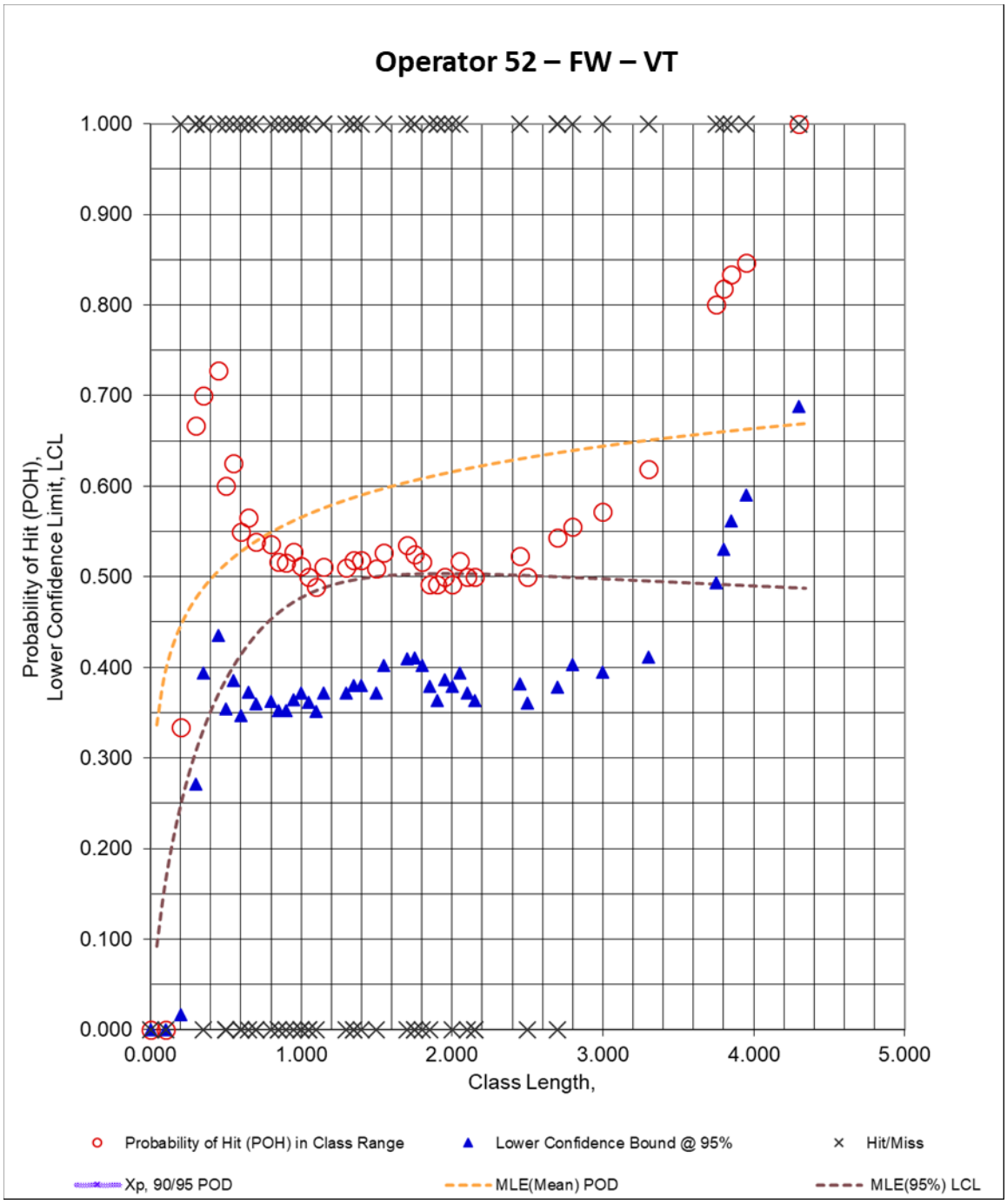

Figure 299. DOEPOD – FW – VT – Operator 52

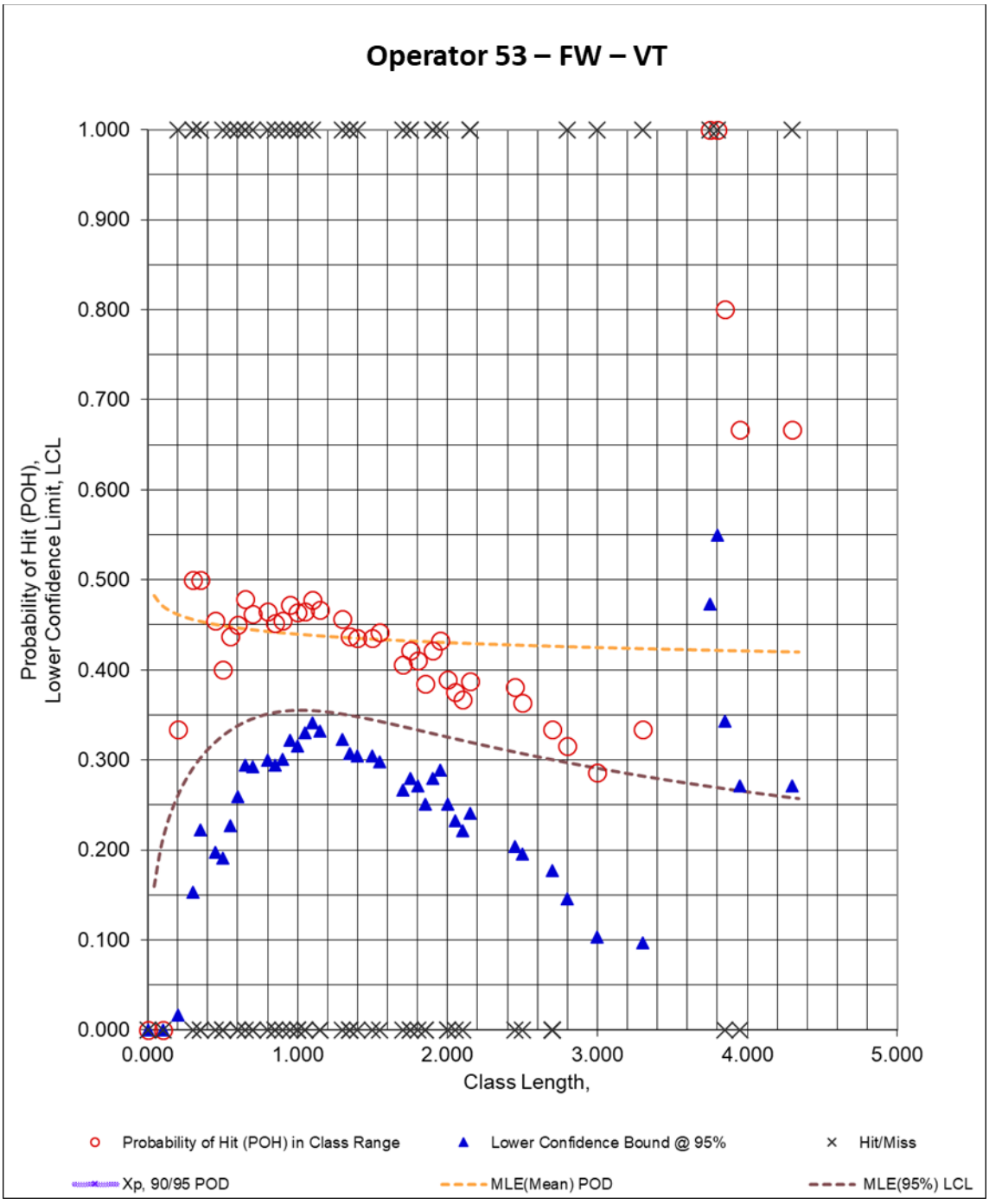

Figure 300. DOEPOD – FW – VT – Operator 53

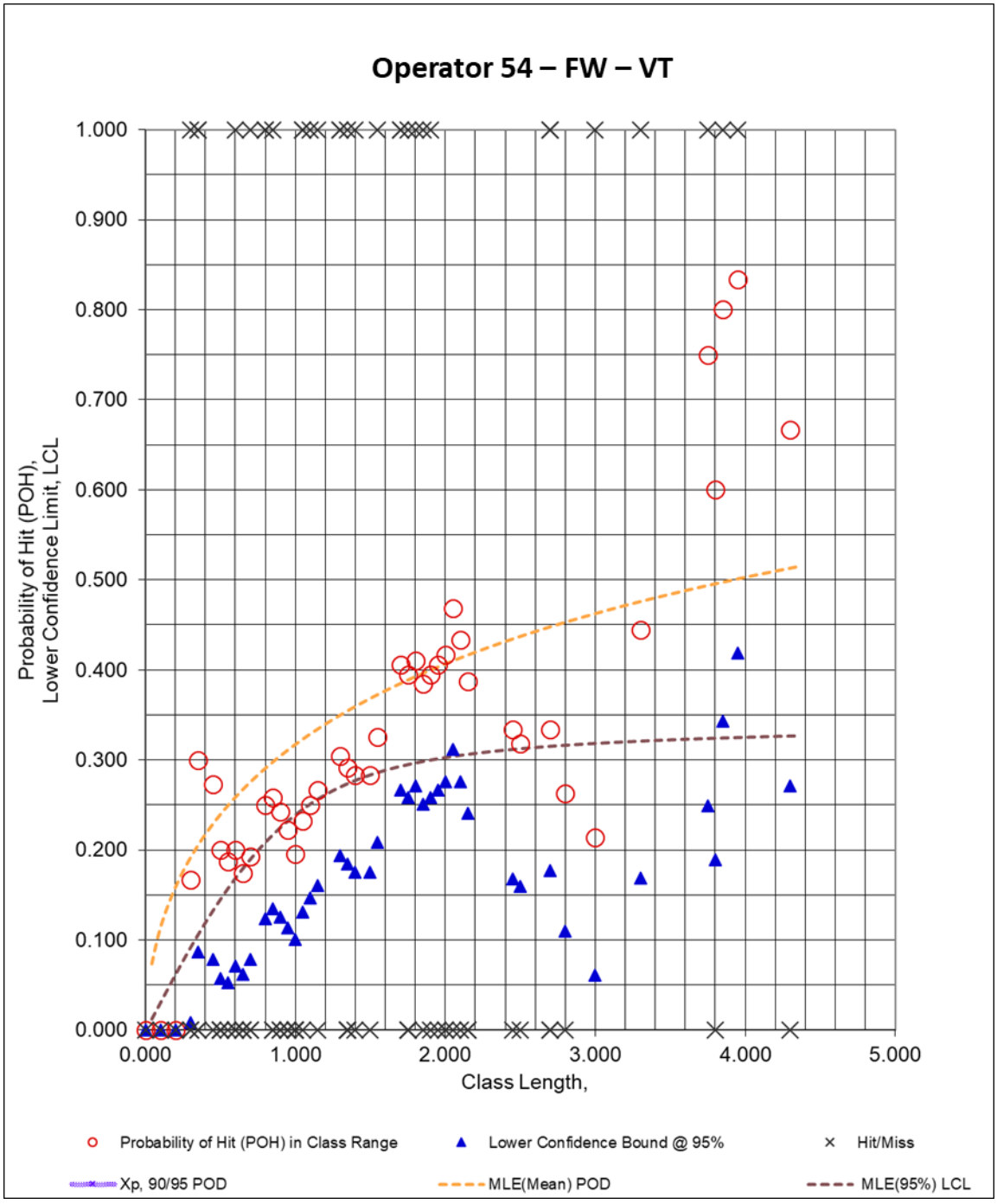

Figure 301. DOEPOD – FW – VT – Operator 54

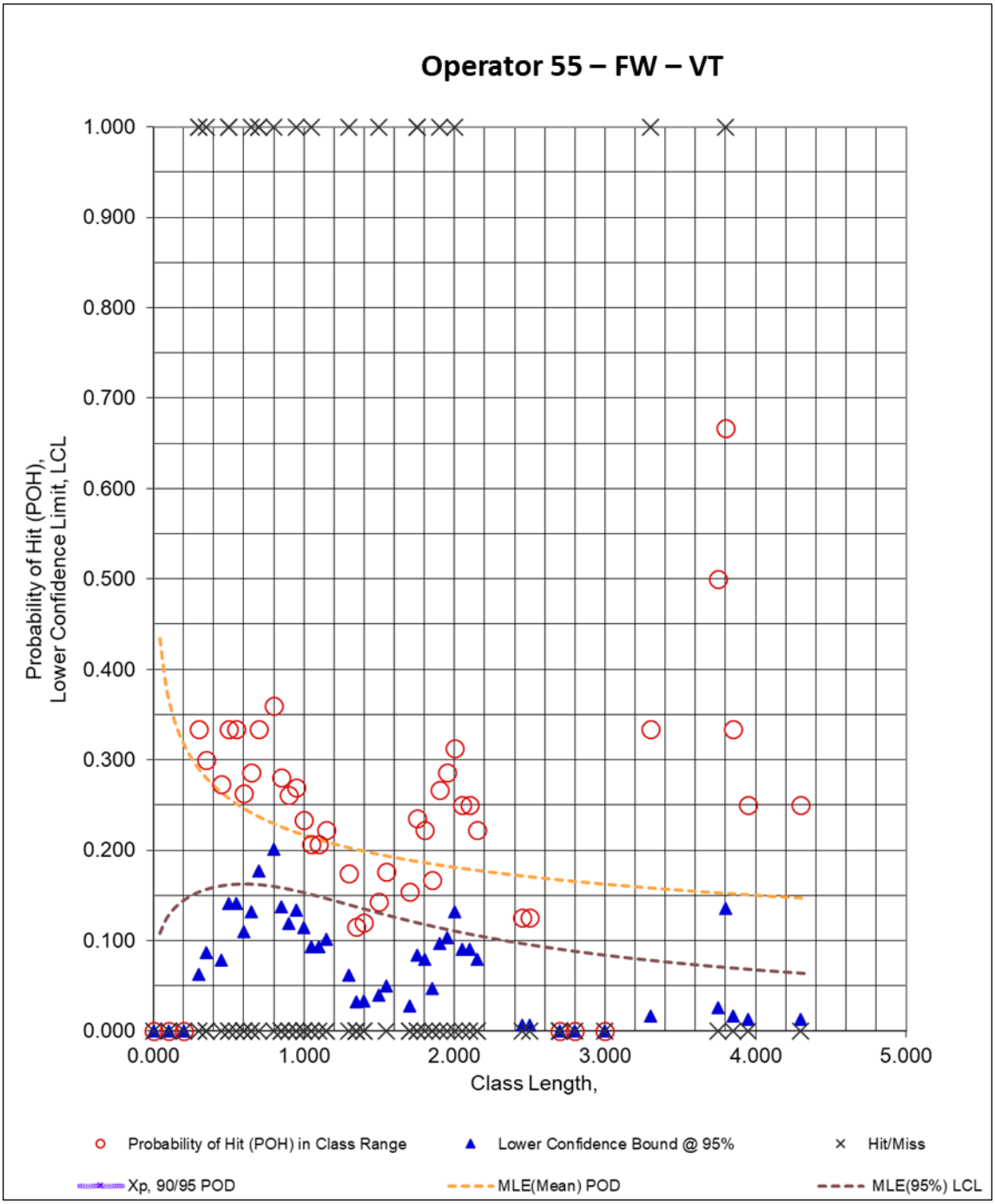

Figure 302. DOEPOD – FW – VT – Operator 55

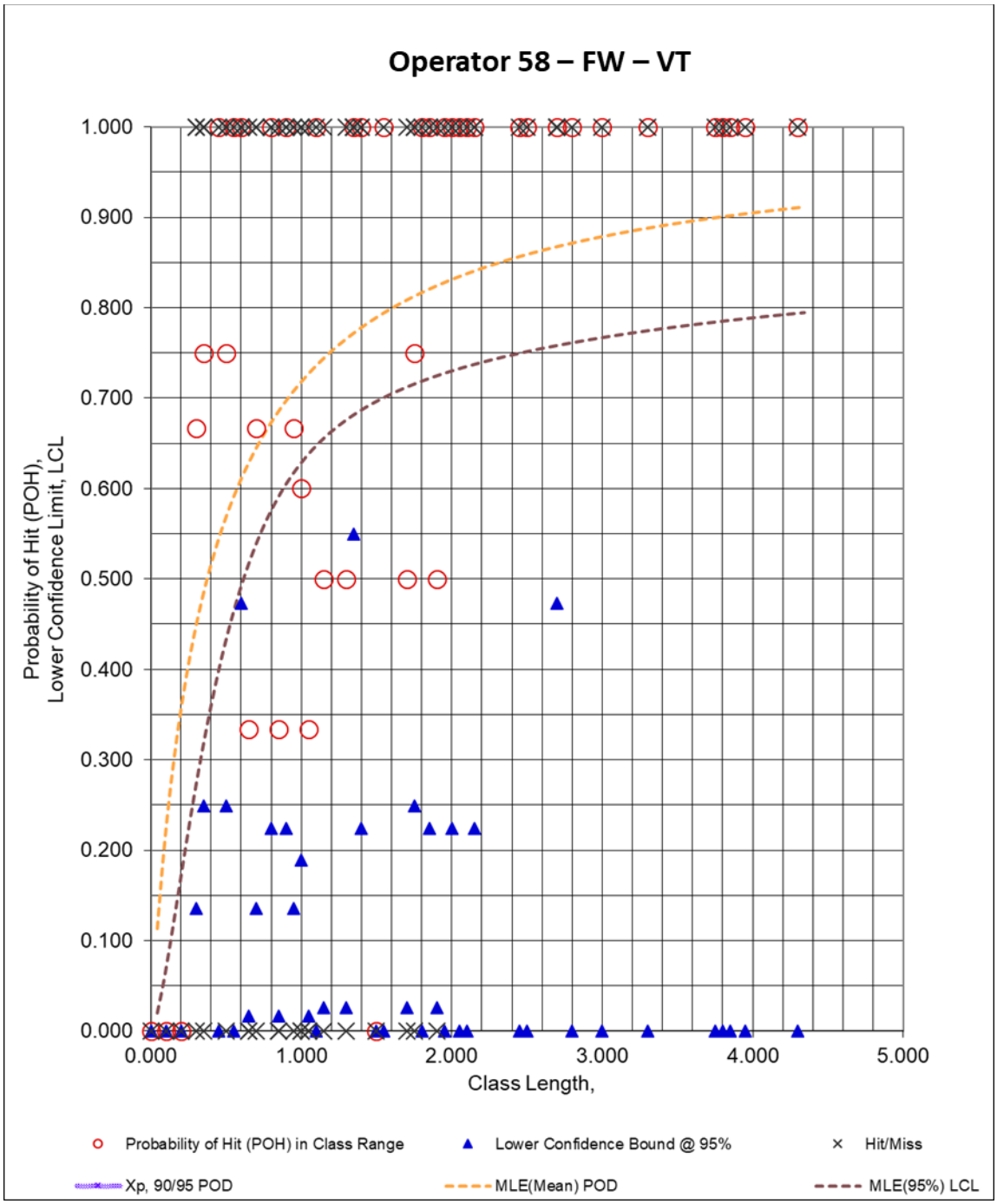

Figure 303. DOEPOD – FW – VT – Operator 58

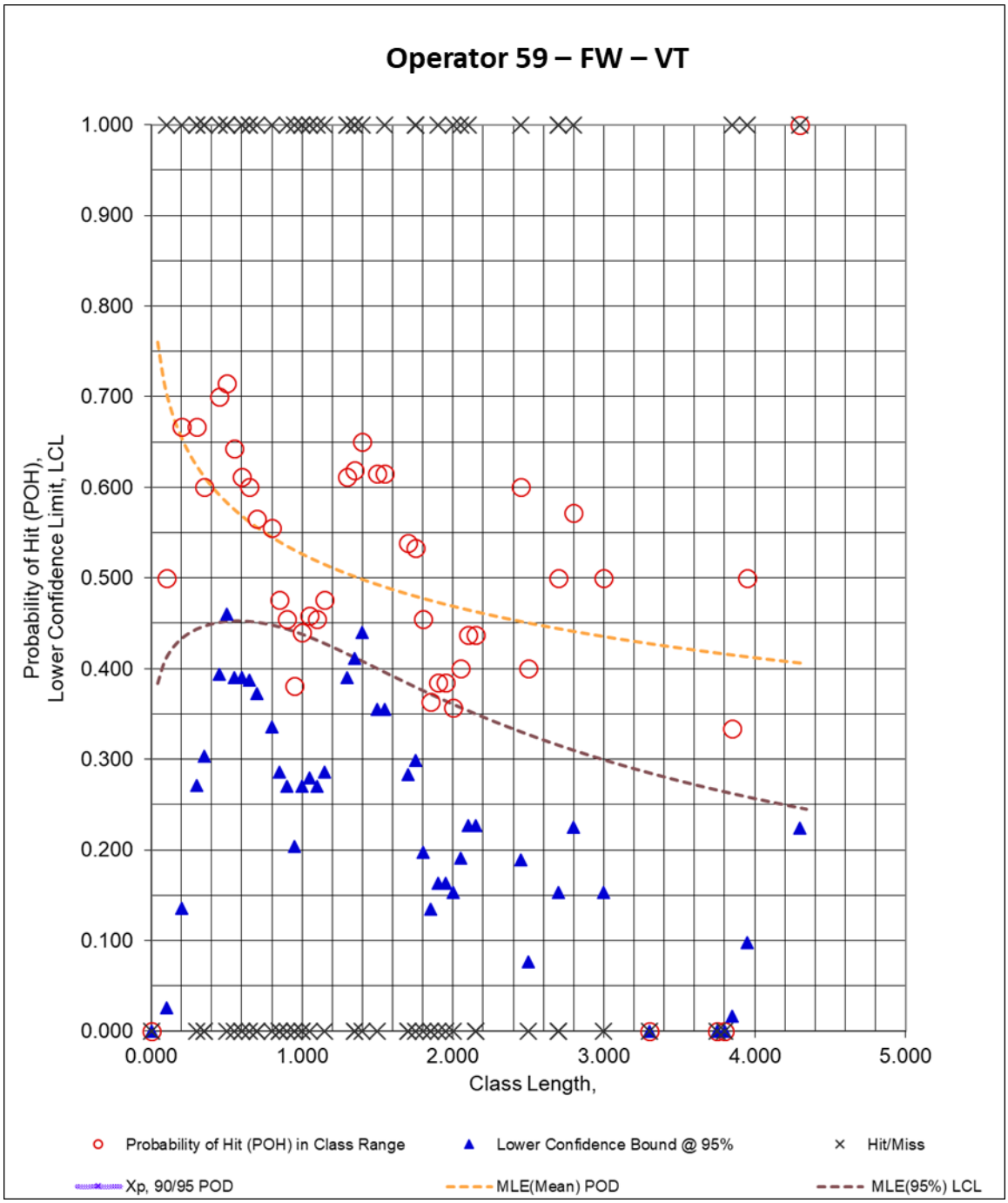

Figure 304. DOEPOD – FW – VT – Operator 59

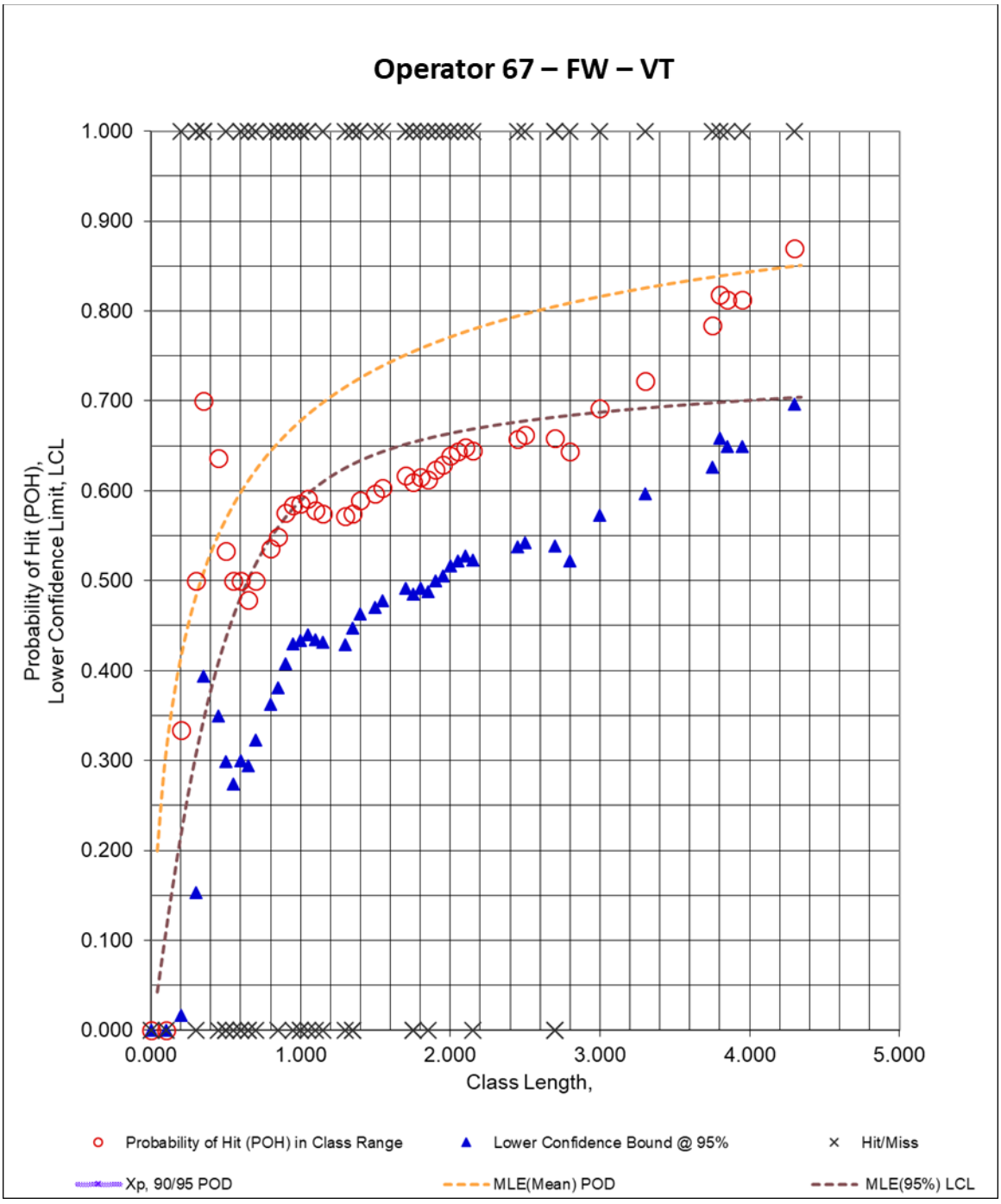

Figure 305. DOEPOD – FW – VT – Operator 67

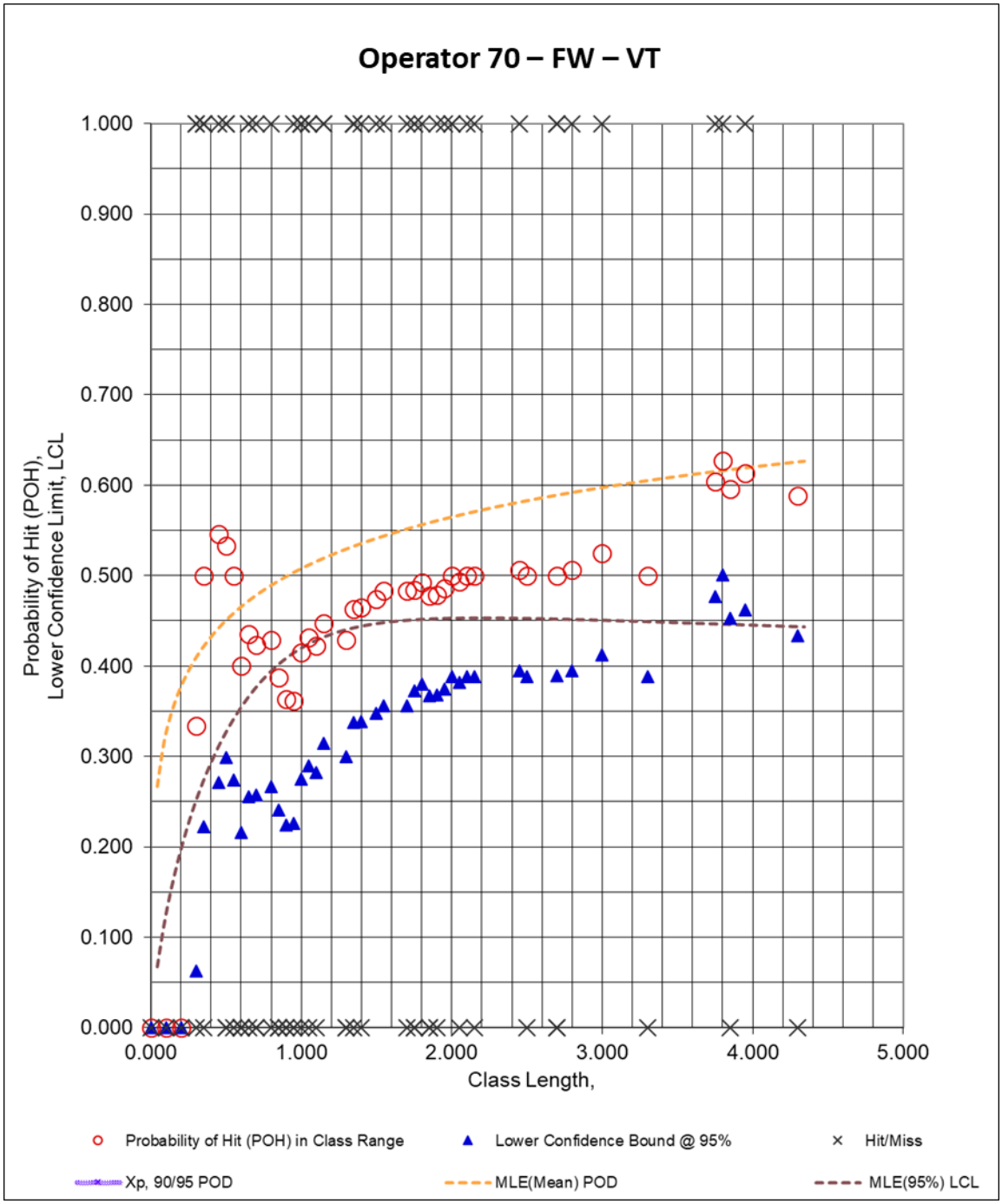

Figure 306. DOEPOD – FW – VT – Operator 70

Appendix F.
DOEPOD Plots – Butt Welds

This appendix illustrates DOEPOD plot-butt welds in Figure 307 through Figure 410.

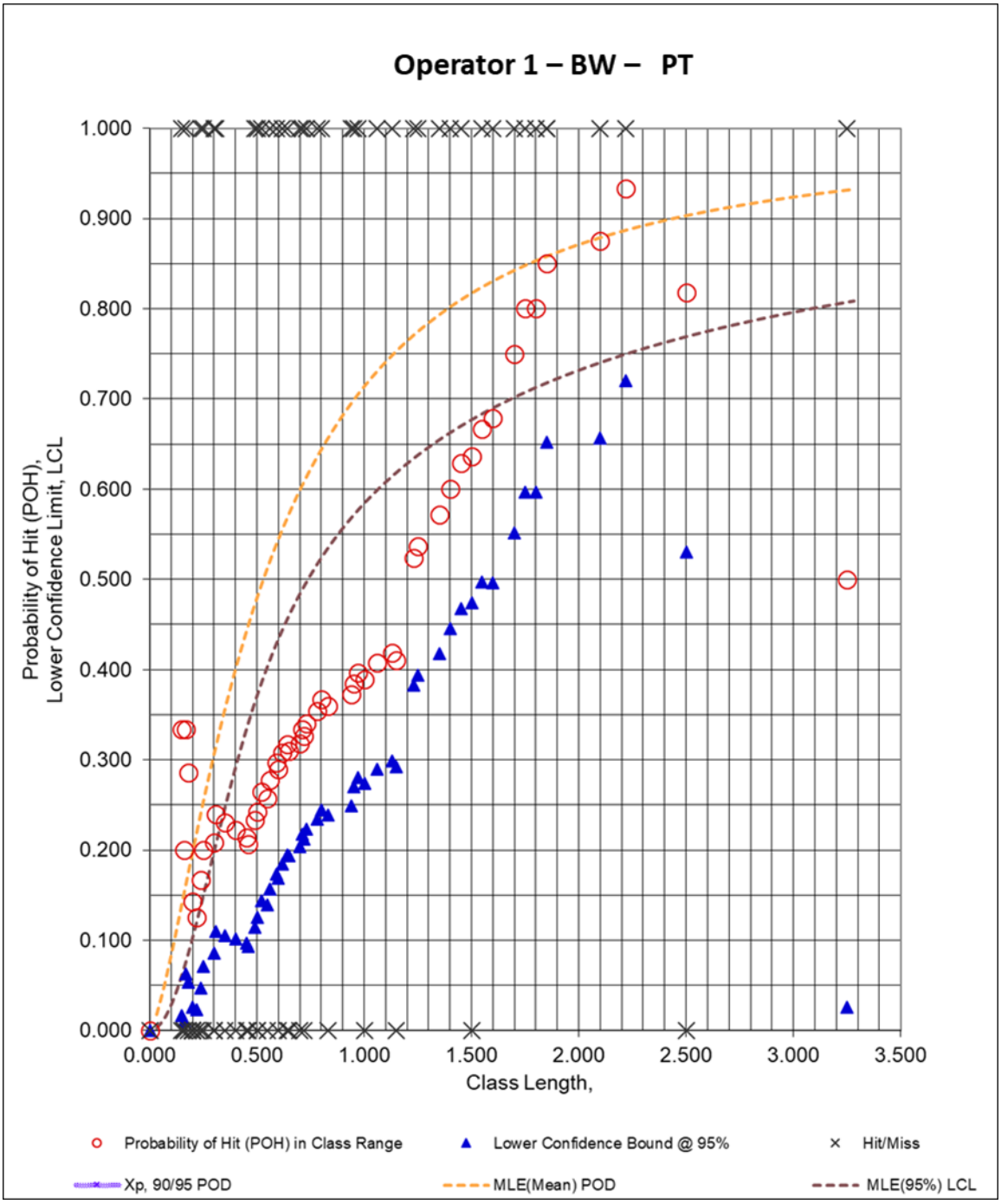

Figure 307. DOEPOD – BW – PT – Operator 1

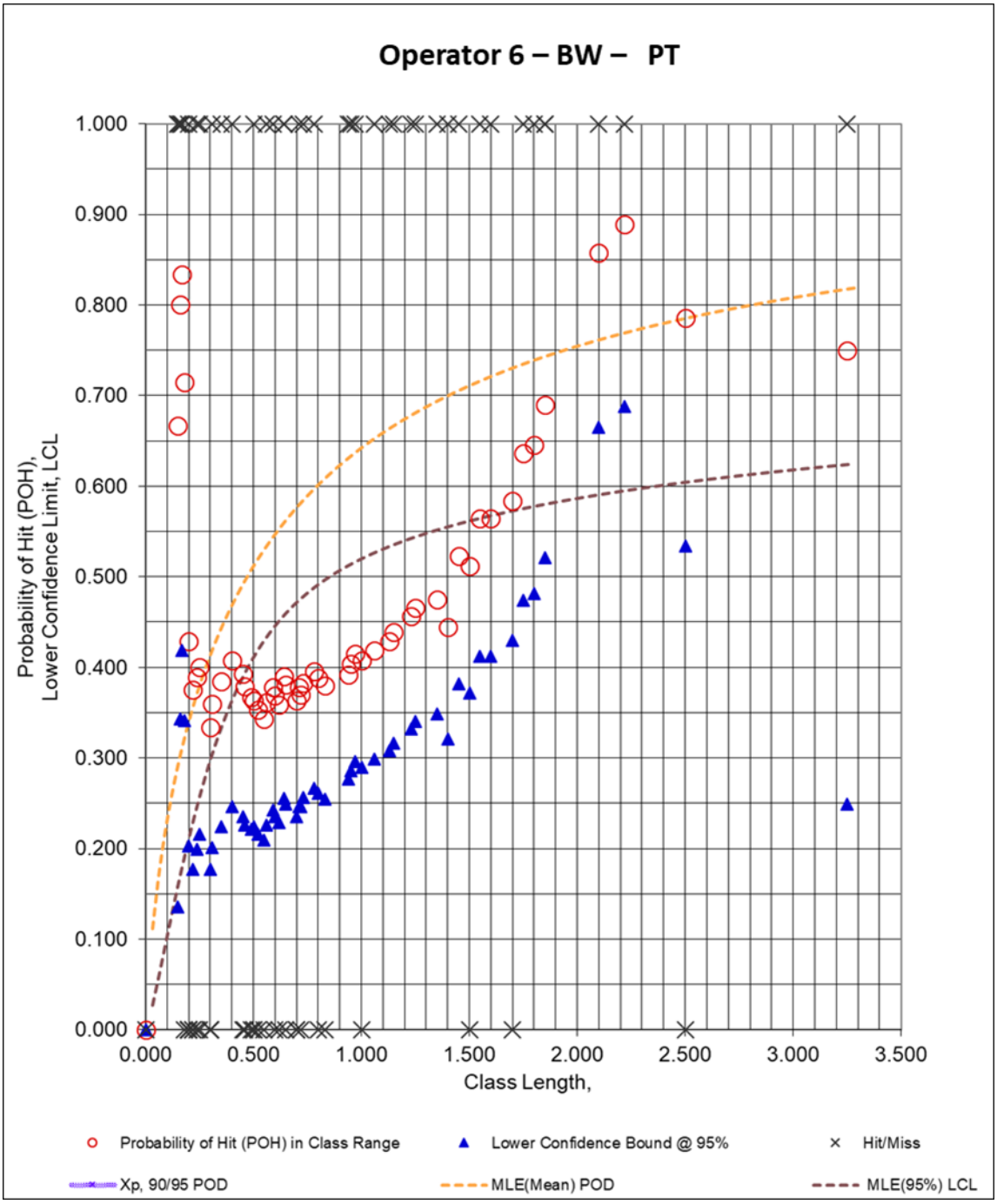

Figure 308. DOEPOD – BW – PT – Operator 6

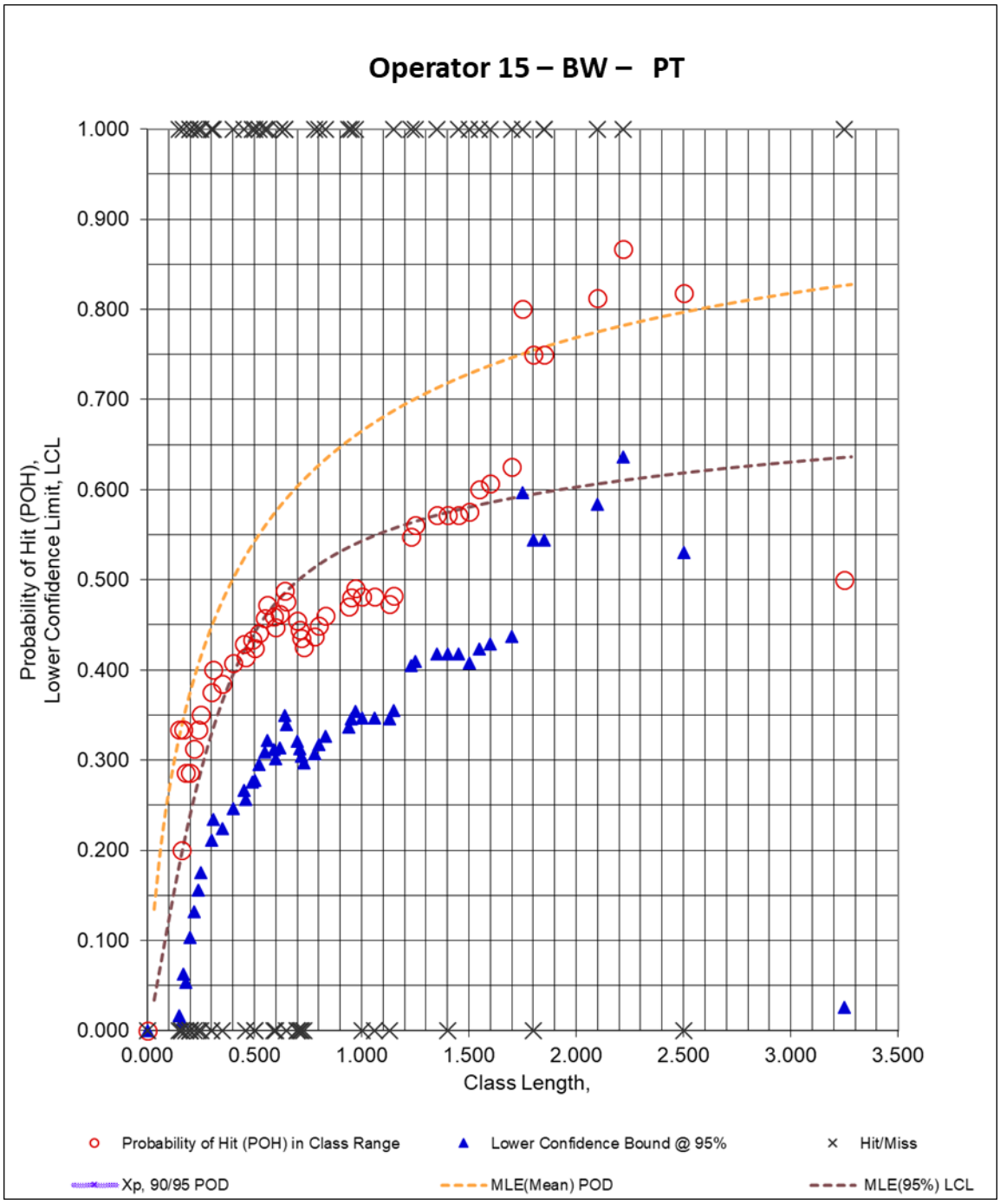

Figure 309. DOEPOD – BW – PT – Operator 15

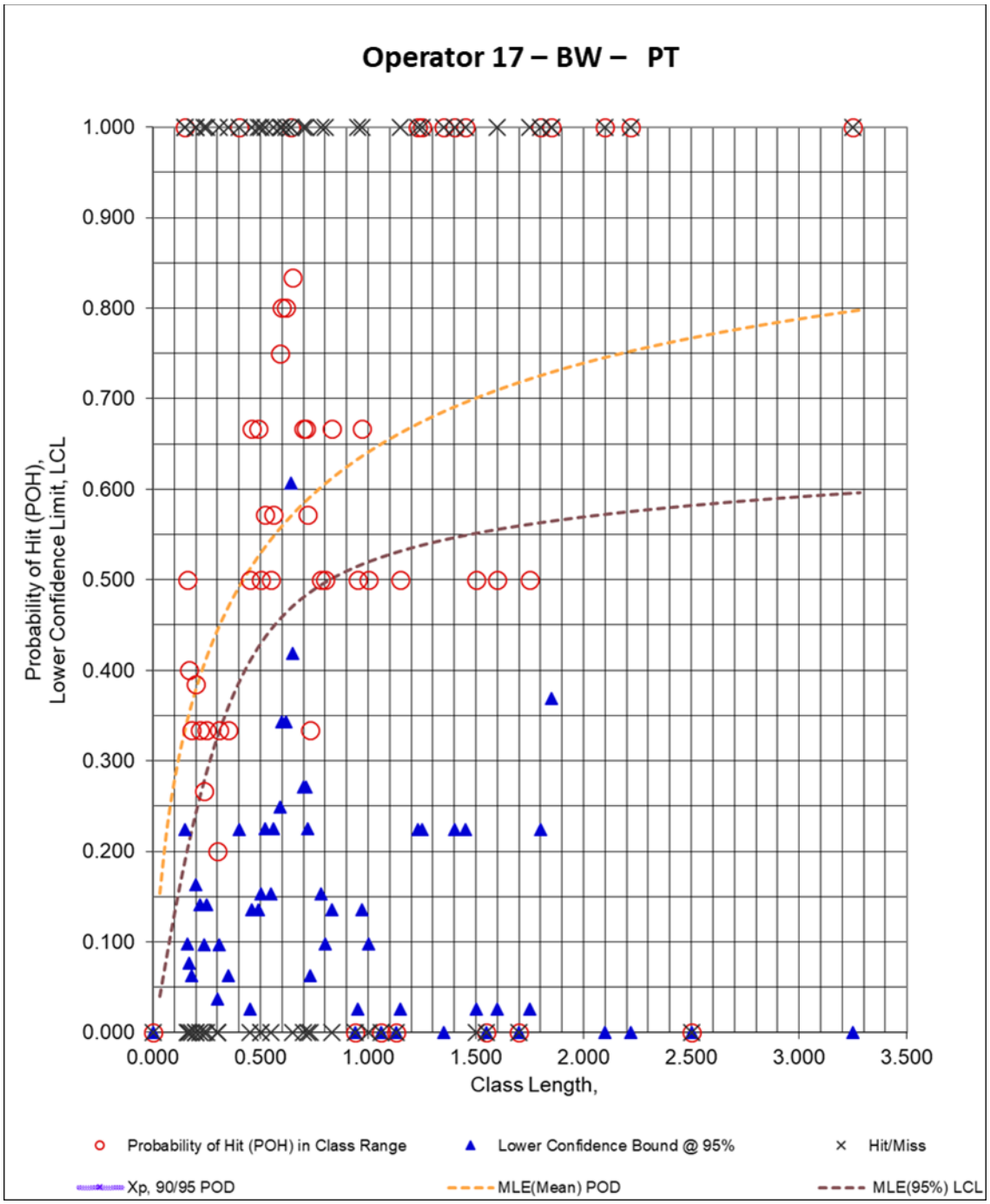

Figure 310. DOEPOD – BW – PT – Operator 17

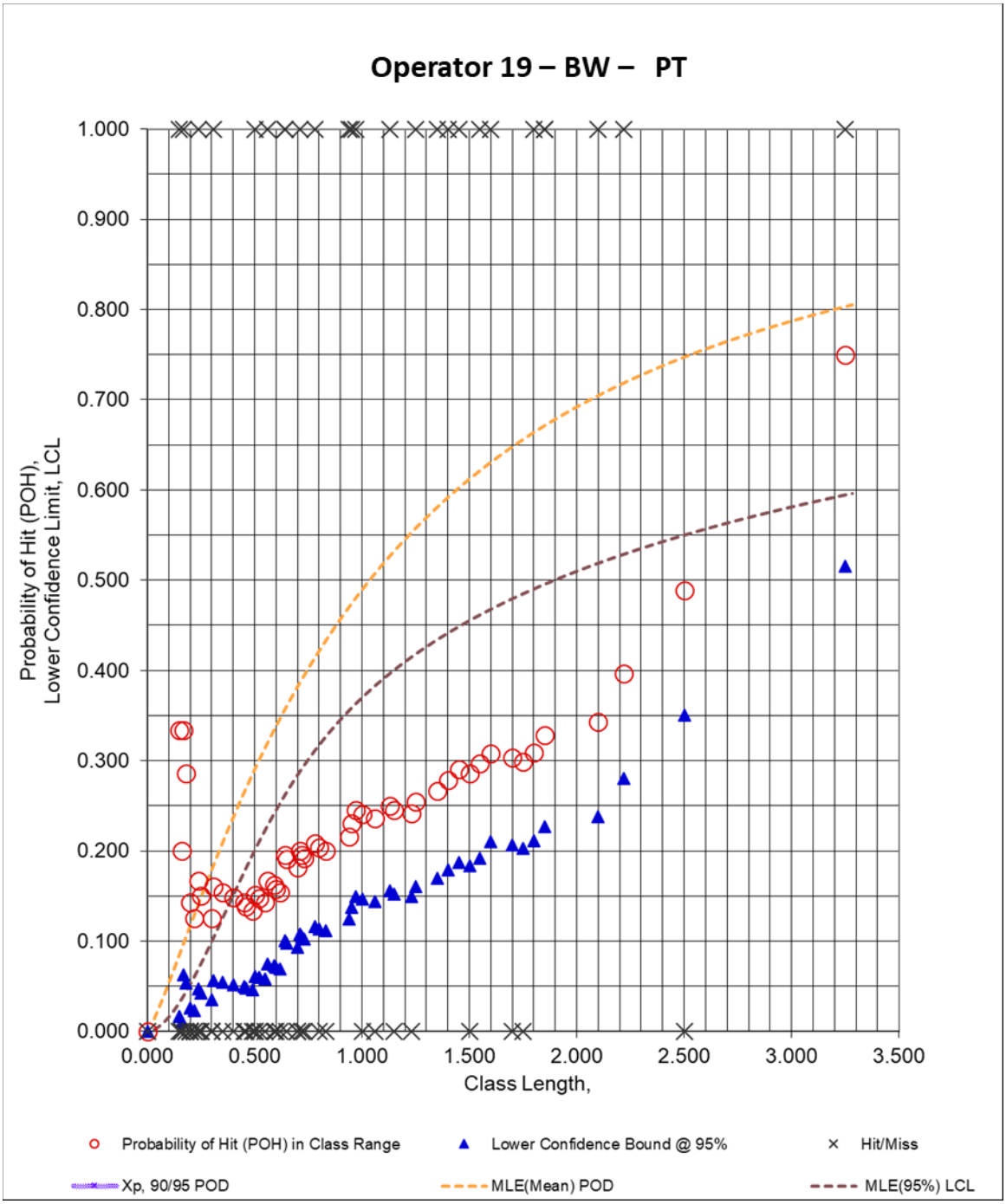

Figure 311. DOEPOD – BW – PT – Operator 19

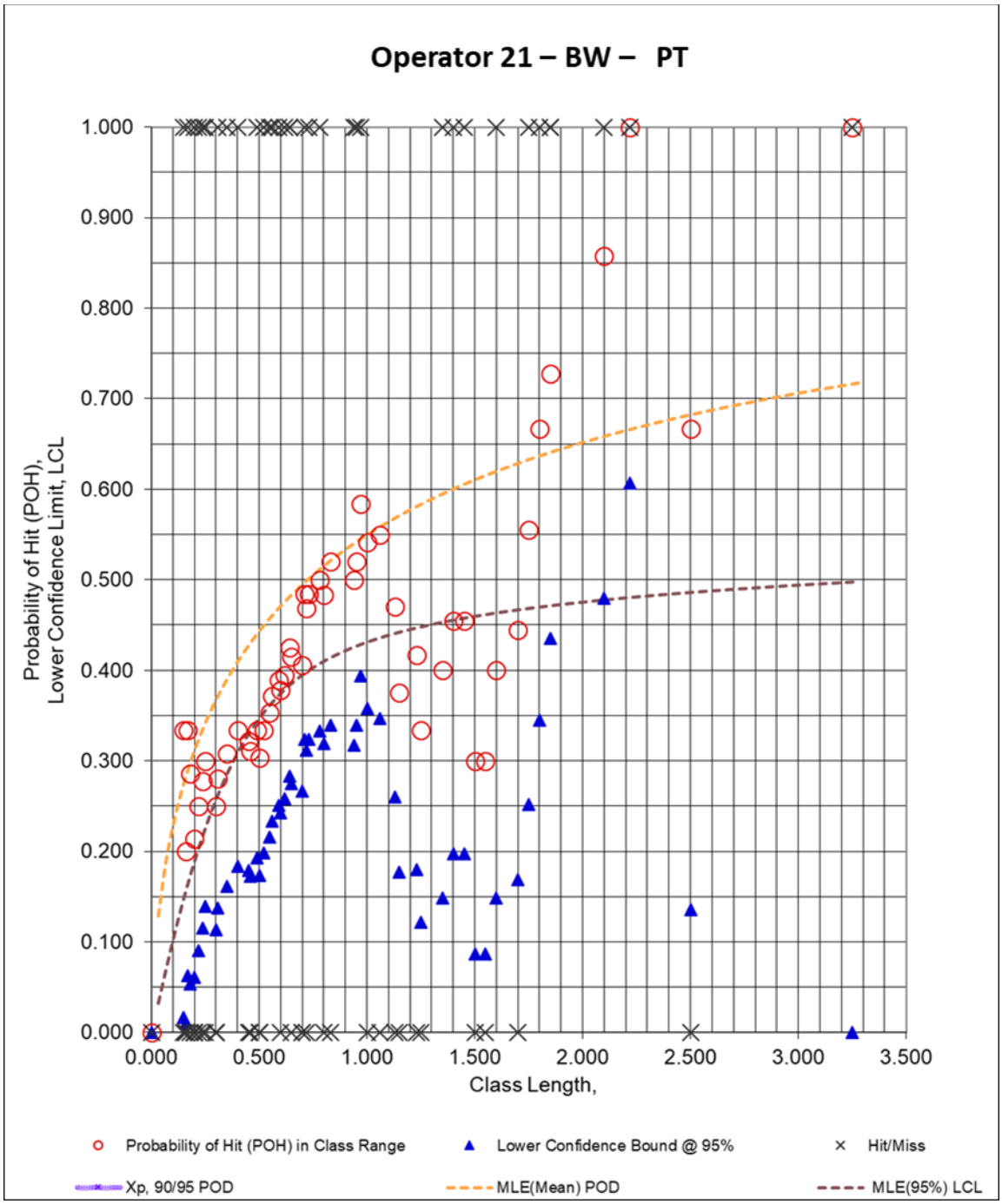

Figure 312. DOEPOD – BW – PT – Operator 21

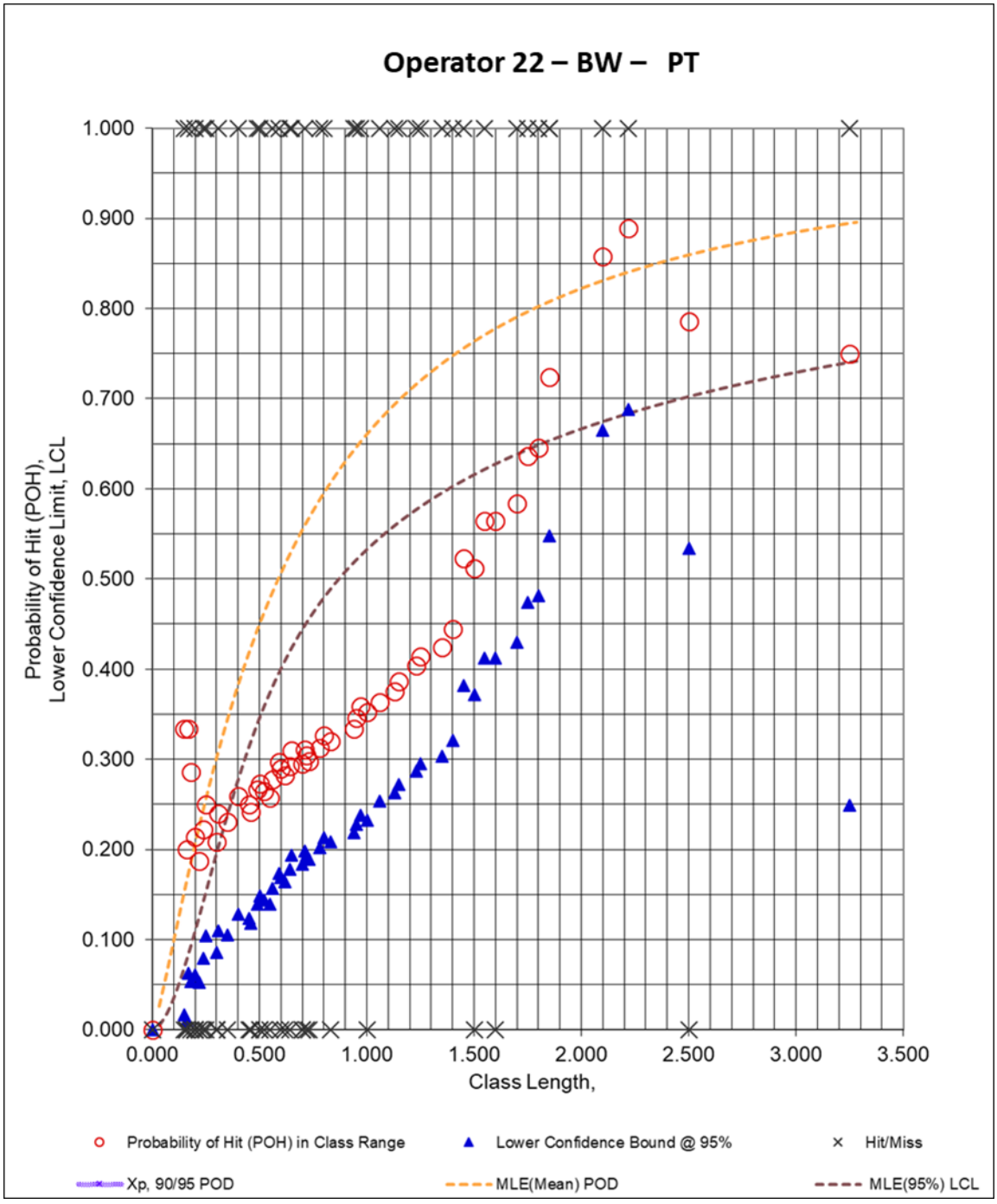

Figure 313. DOEPOD – BW – PT – Operator 22

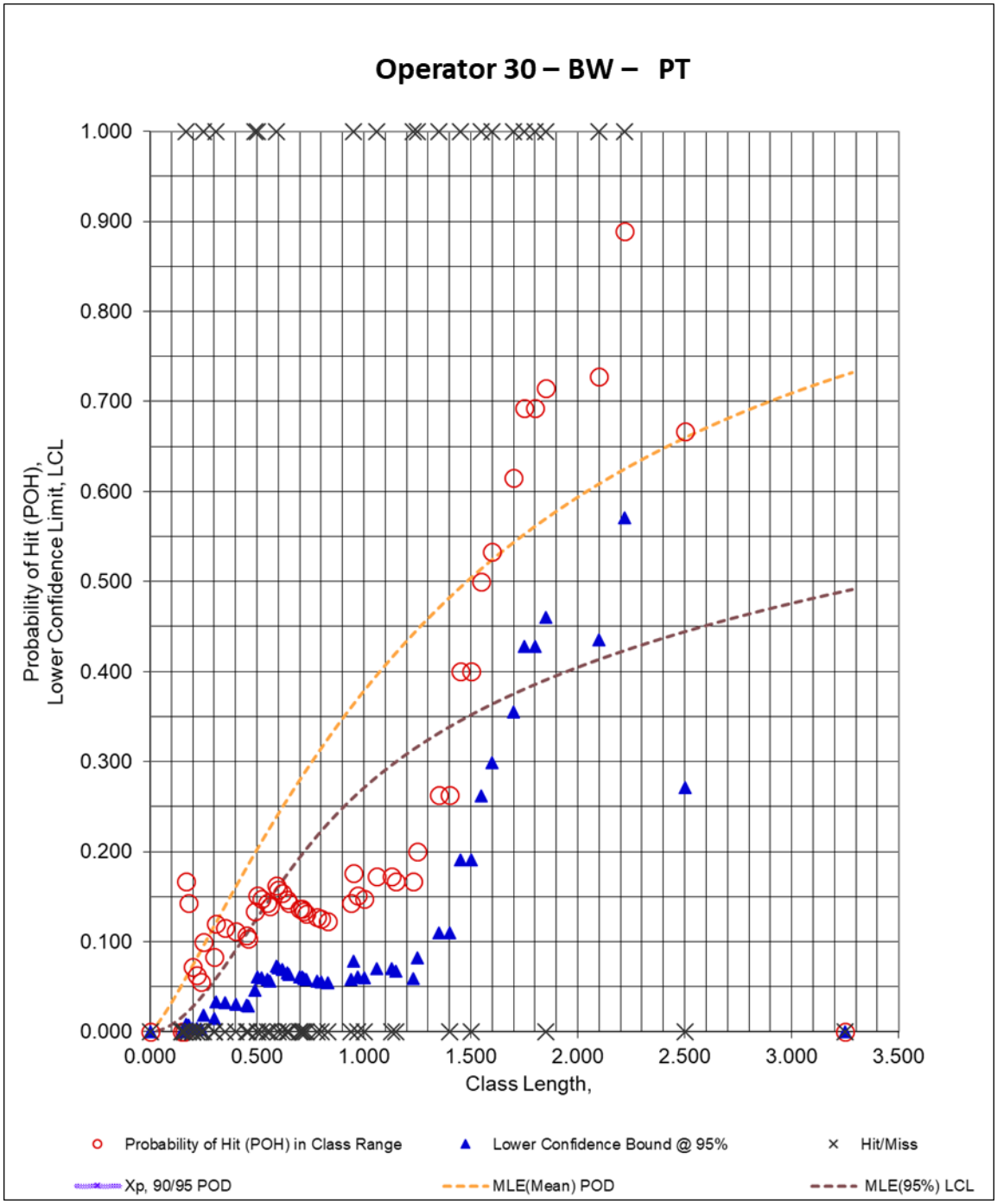

Figure 314. DOEPOD – BW – PT – Operator 30

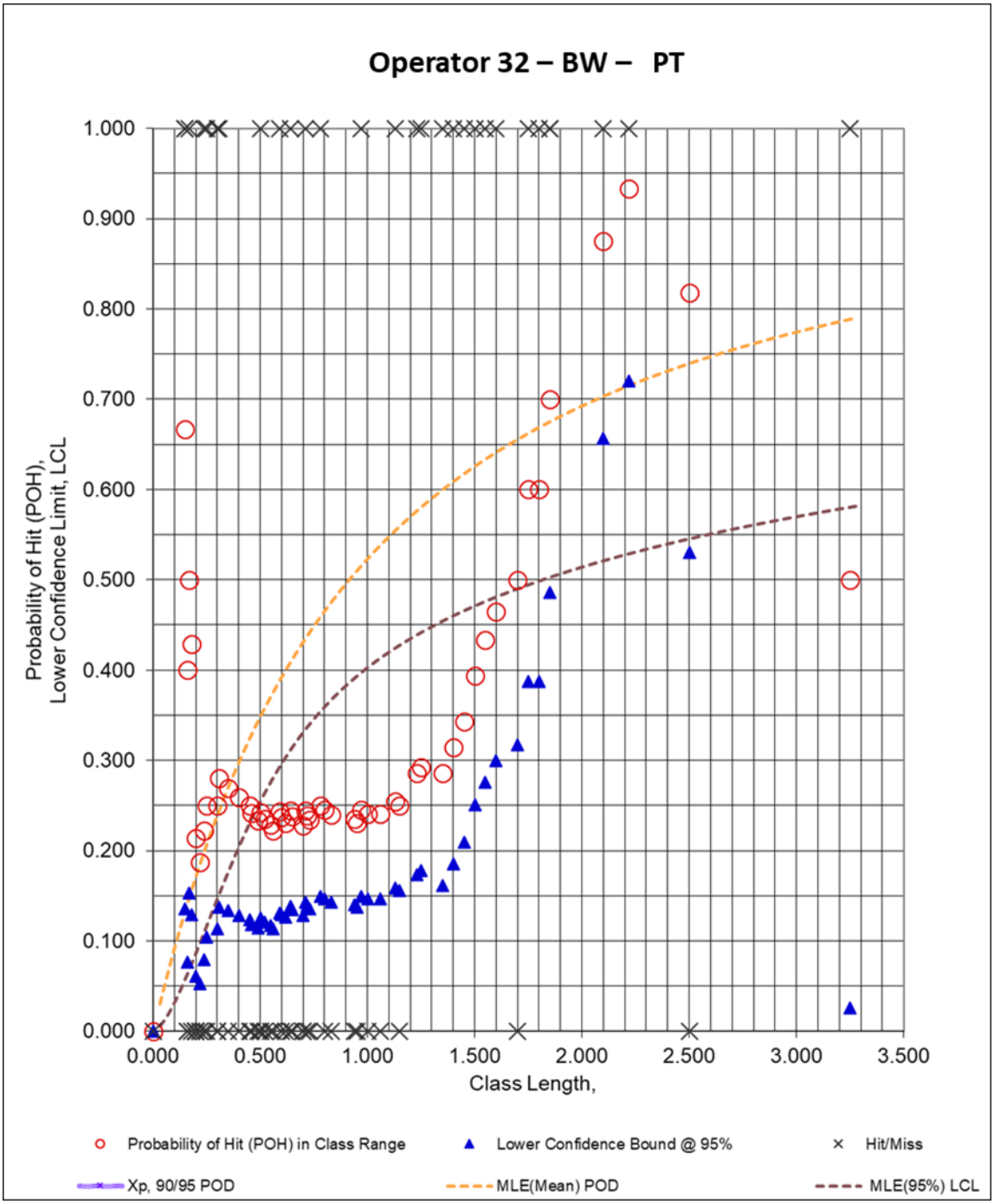

Figure 315. DOEPOD – BW – PT – Operator 32

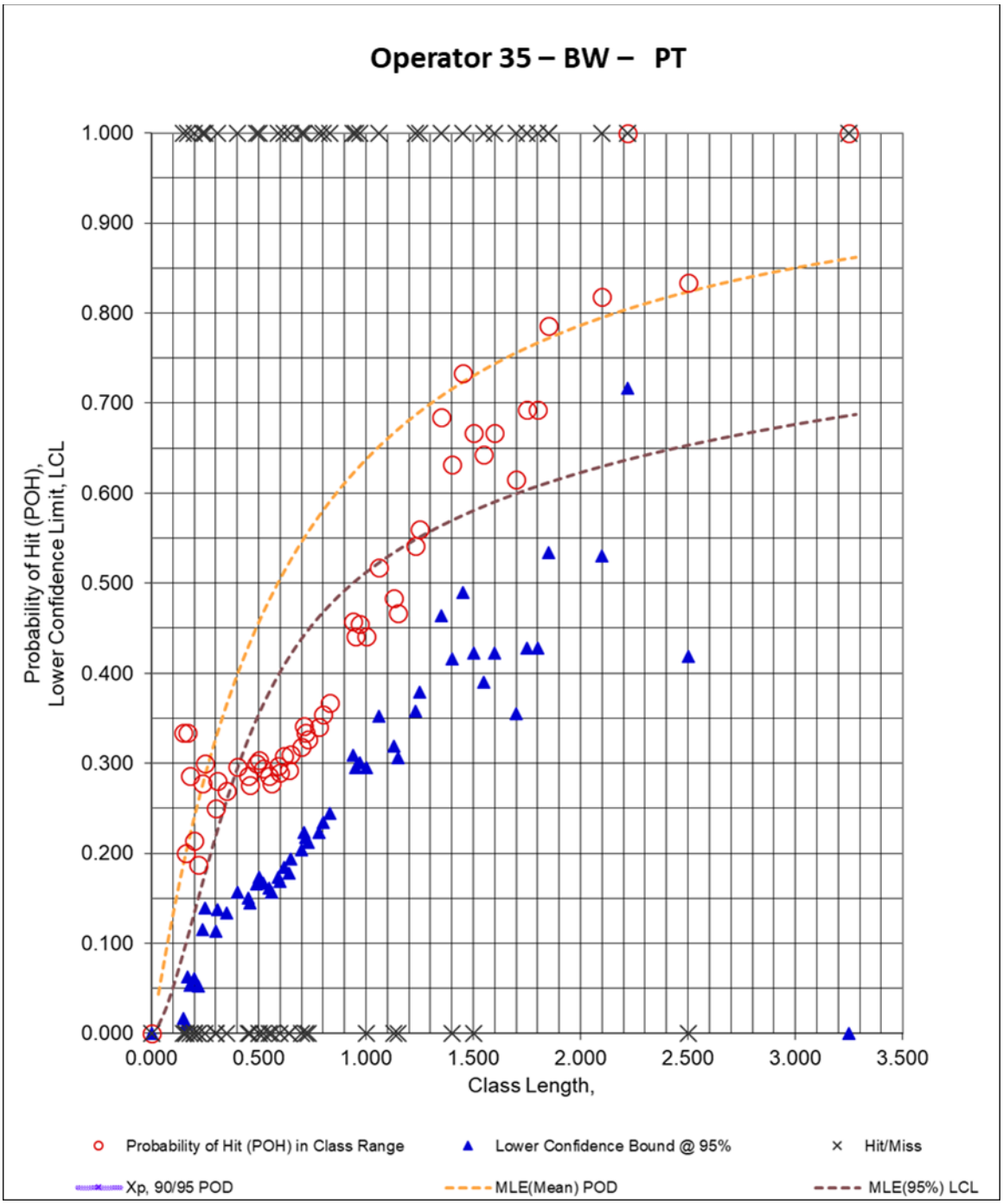

Figure 316. DOEPOD – BW – PT – Operator 35

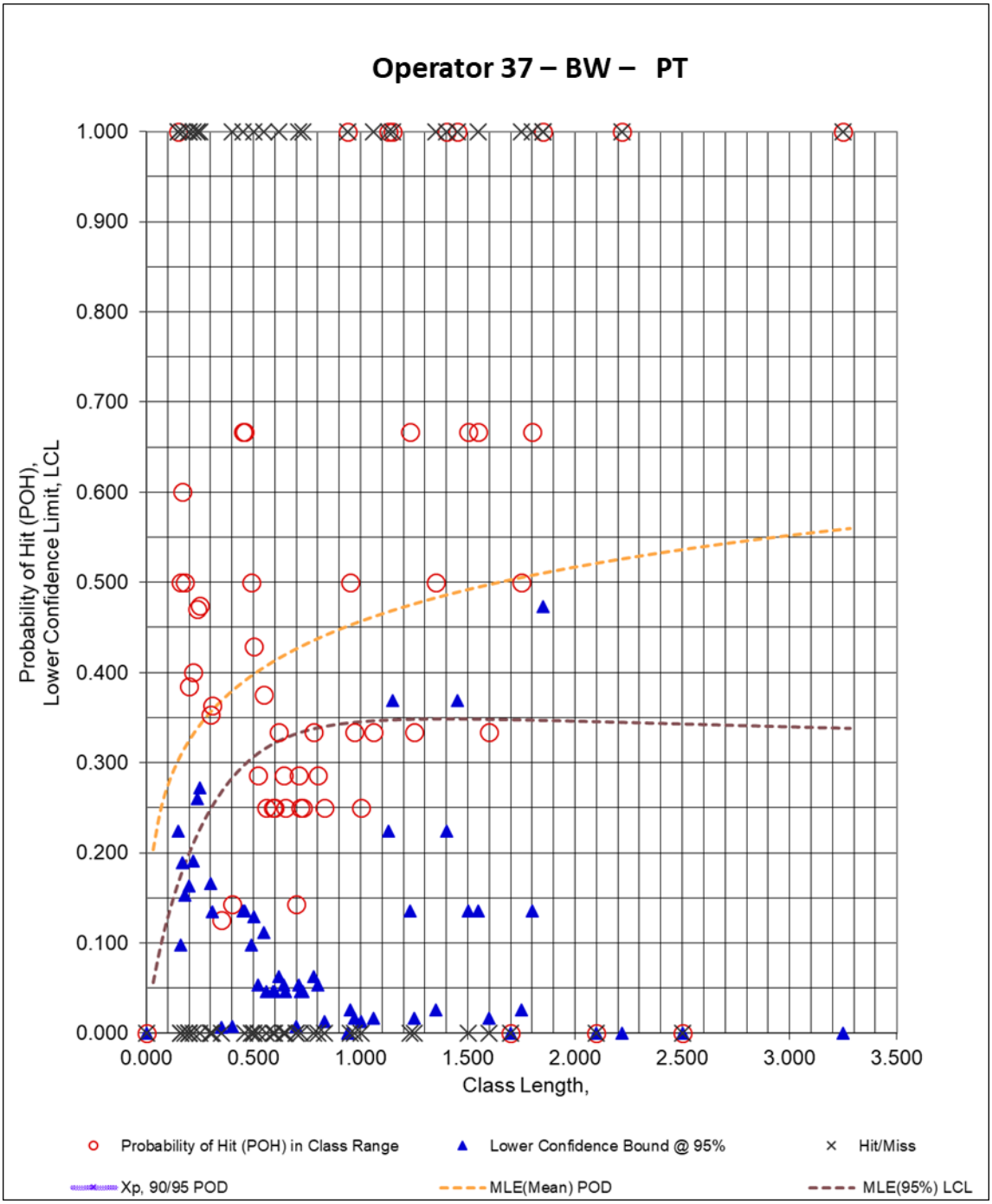

Figure 317. DOEPOD – BW – PT – Operator 37

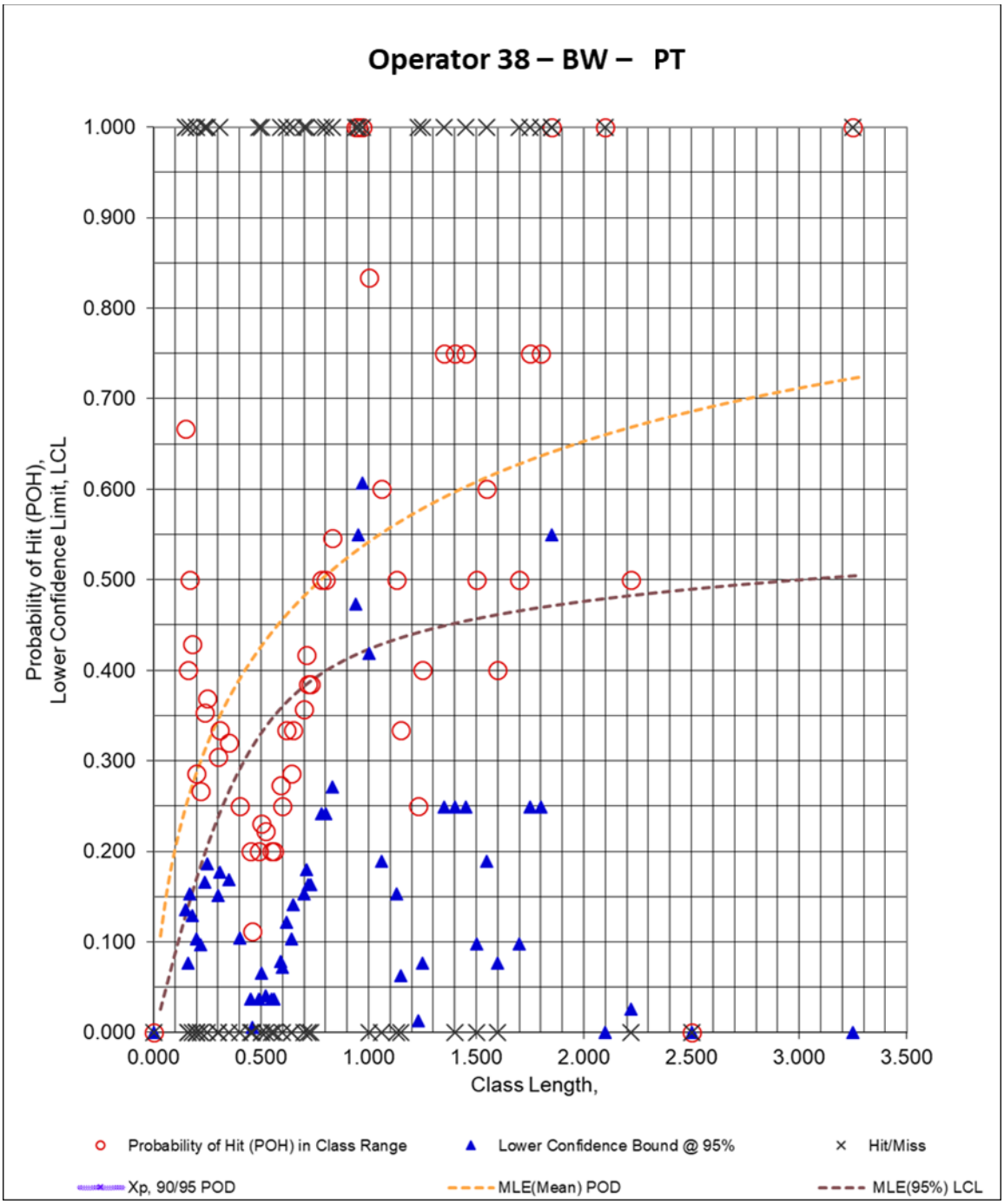

Figure 318. DOEPOD – BW – PT – Operator 38

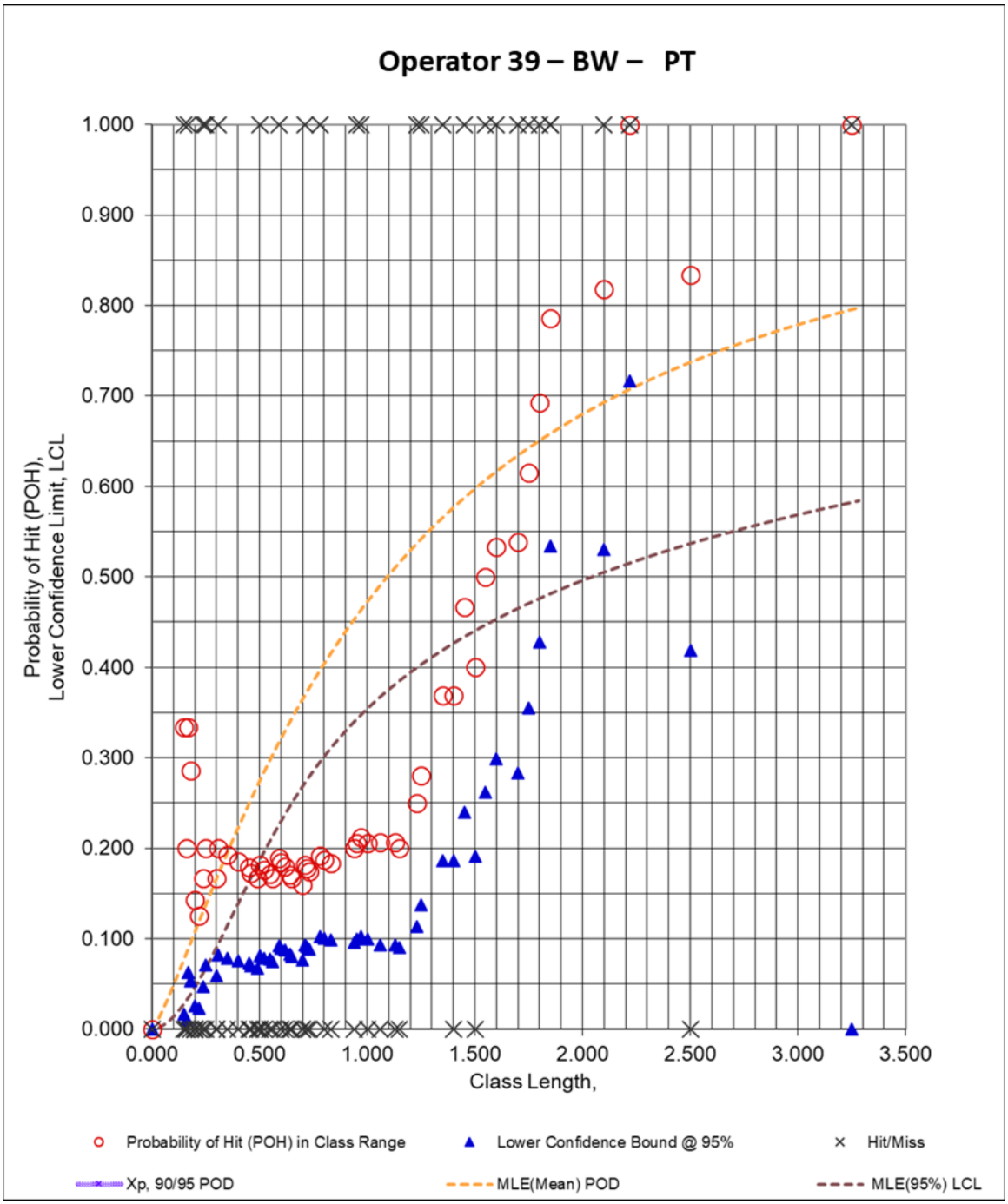

Figure 319. DOEPOD – BW – PT – Operator 39

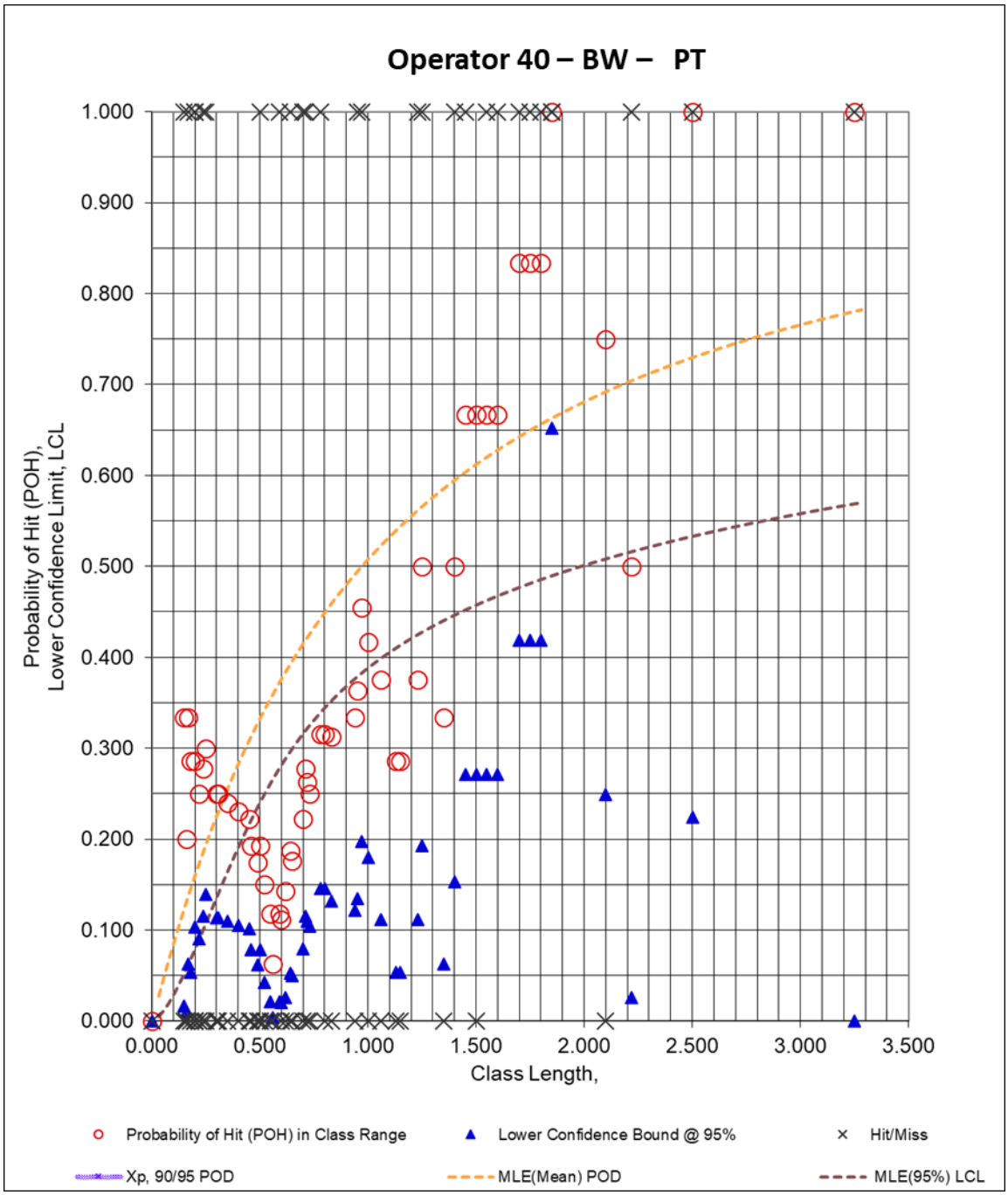

Figure 320. DOEPOD – BW – PT – Operator 40

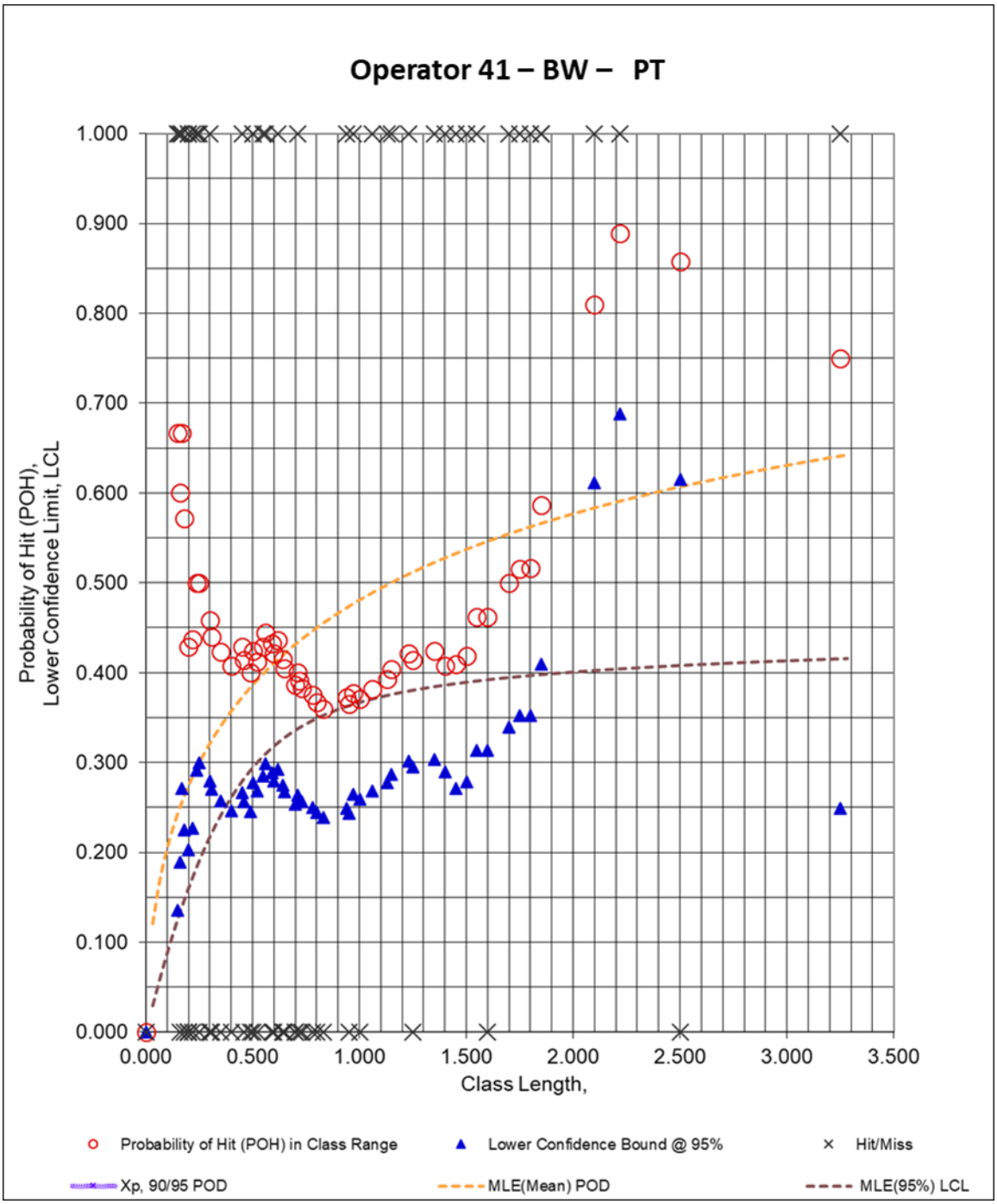

Figure 321. DOEPOD – BW – PT – Operator 41

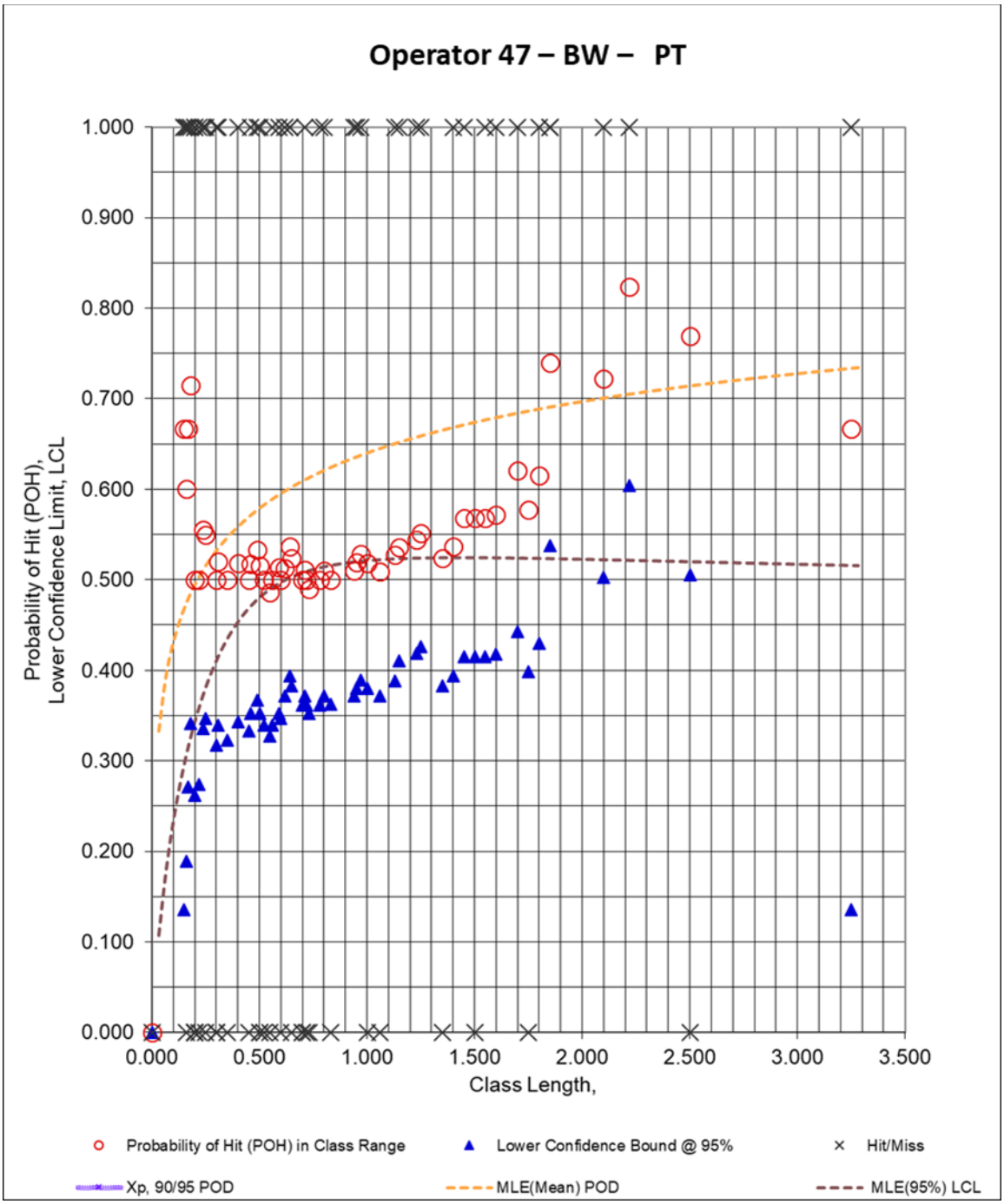

Figure 322. DOEPOD – BW – PT – Operator 47

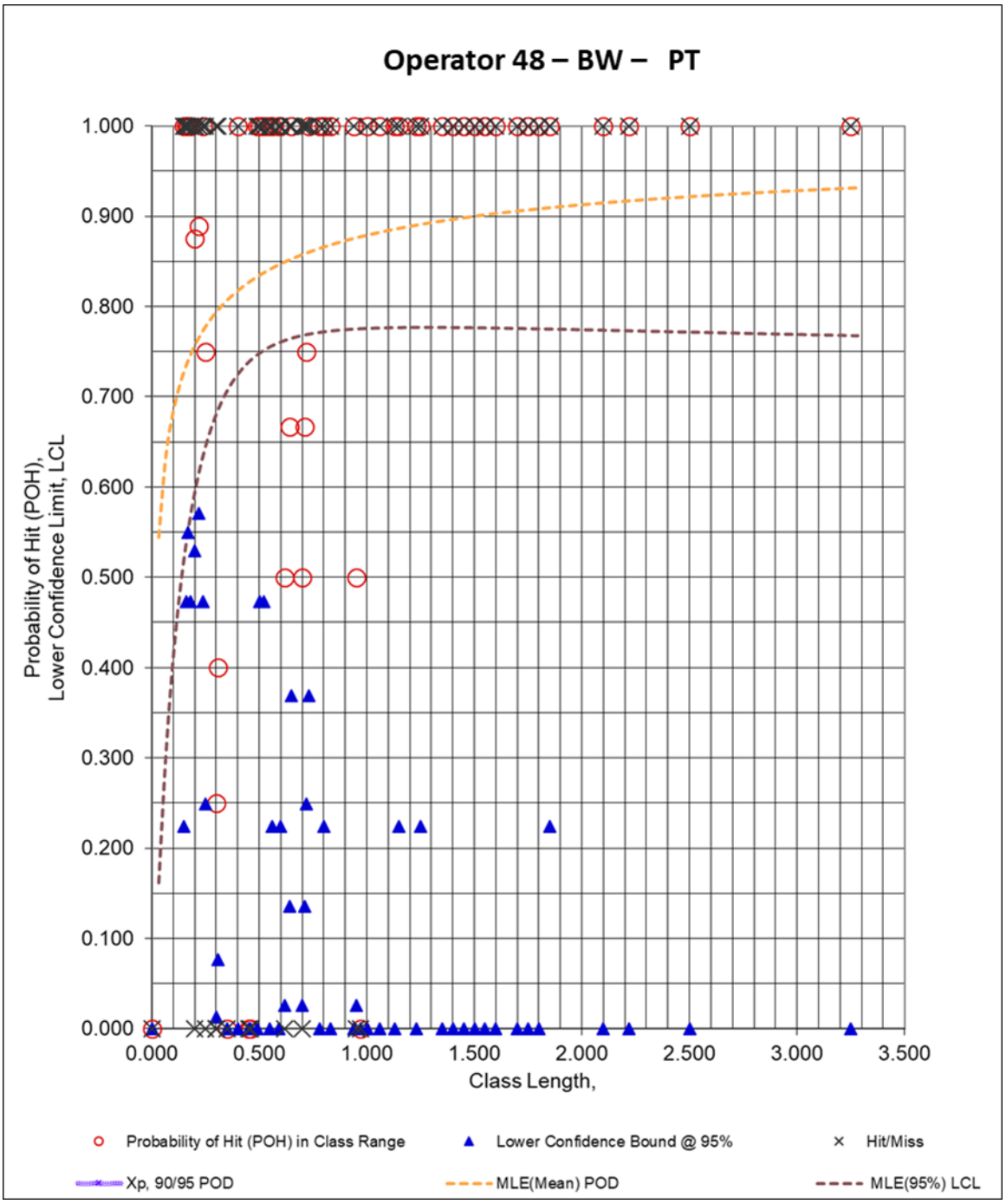

Figure 323. DOEPOD – BW – PT – Operator 48

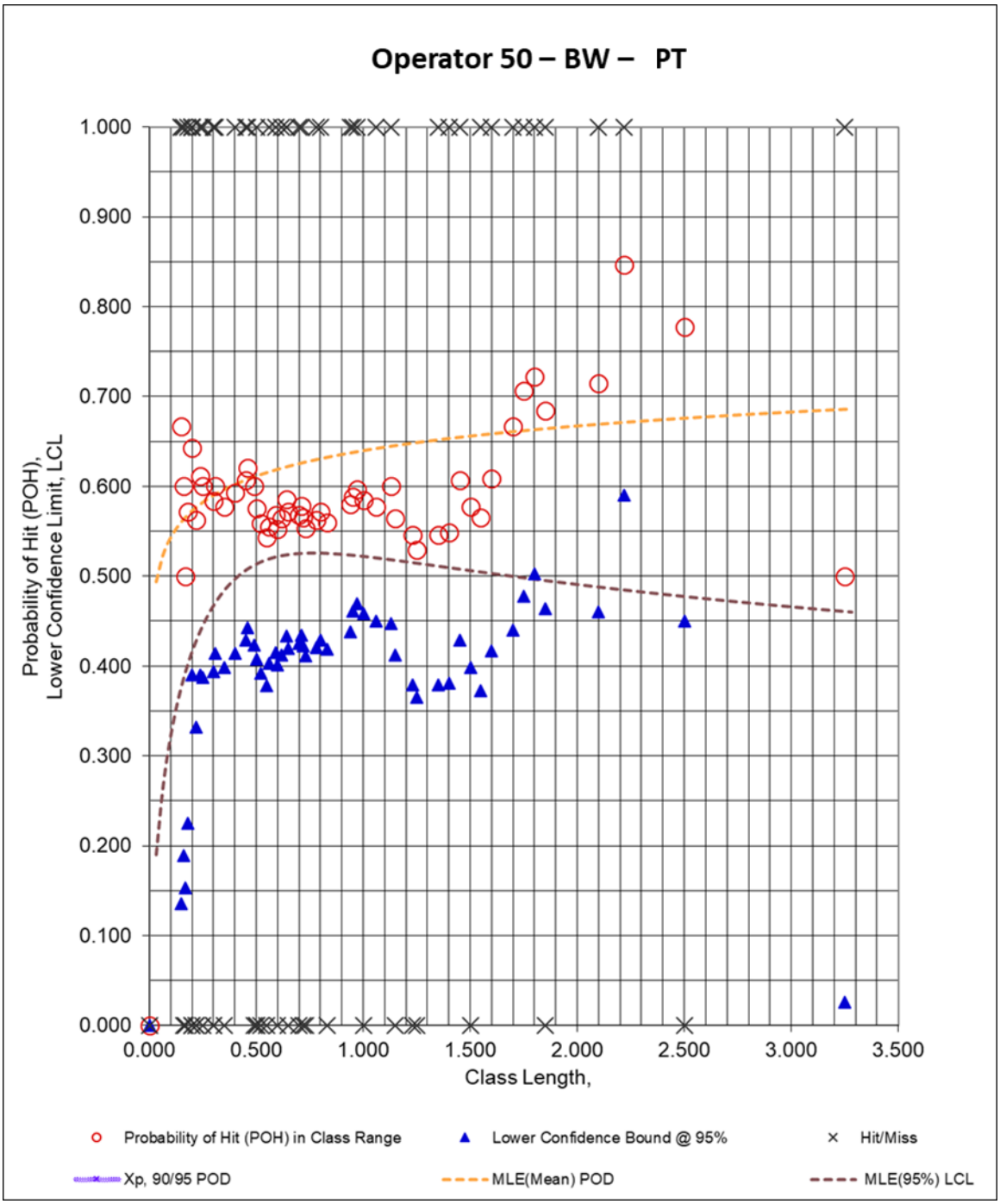

Figure 324. DOEPOD – BW – PT – Operator 50

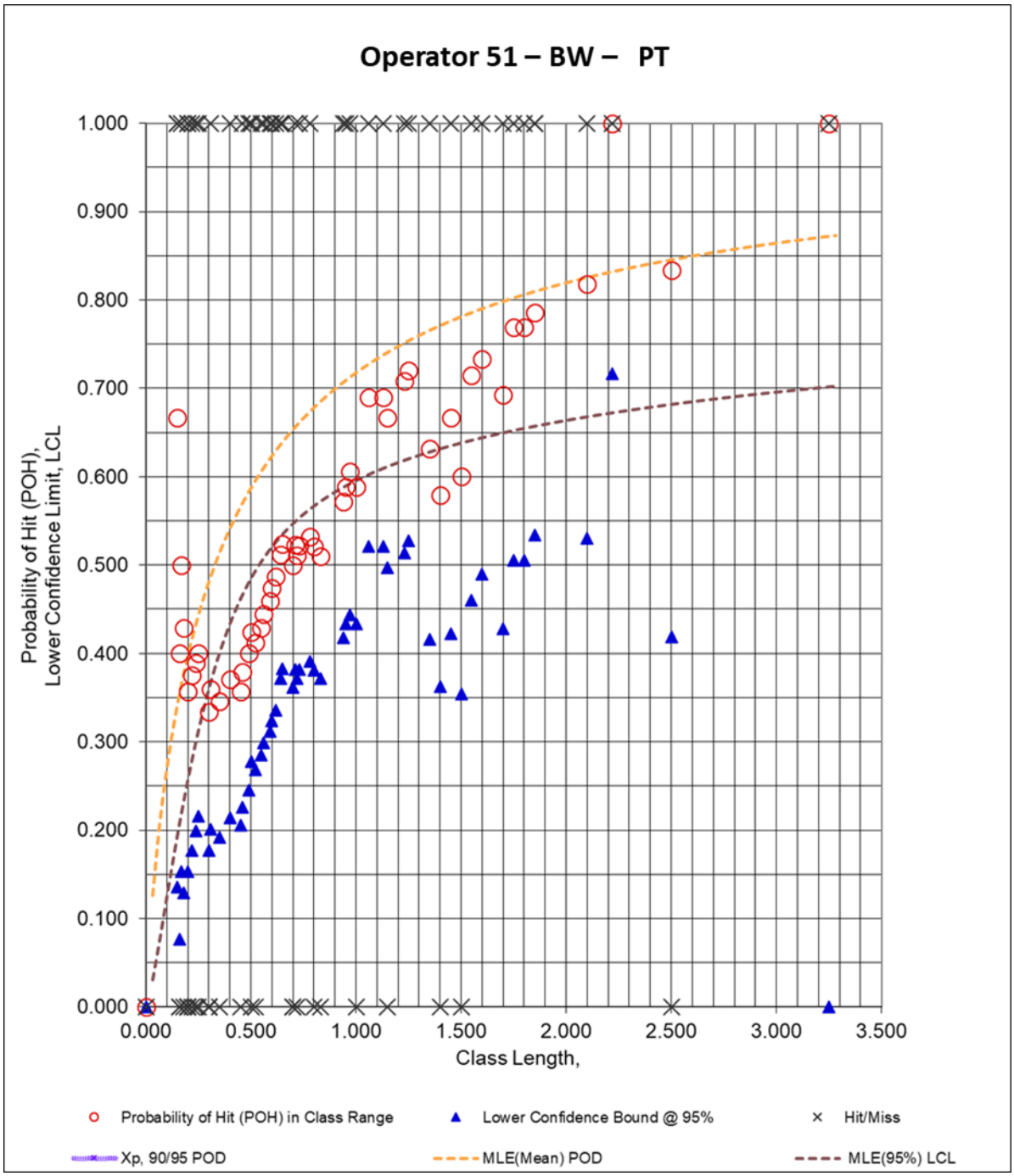

Figure 325. DOEPOD – BW – PT – Operator 51

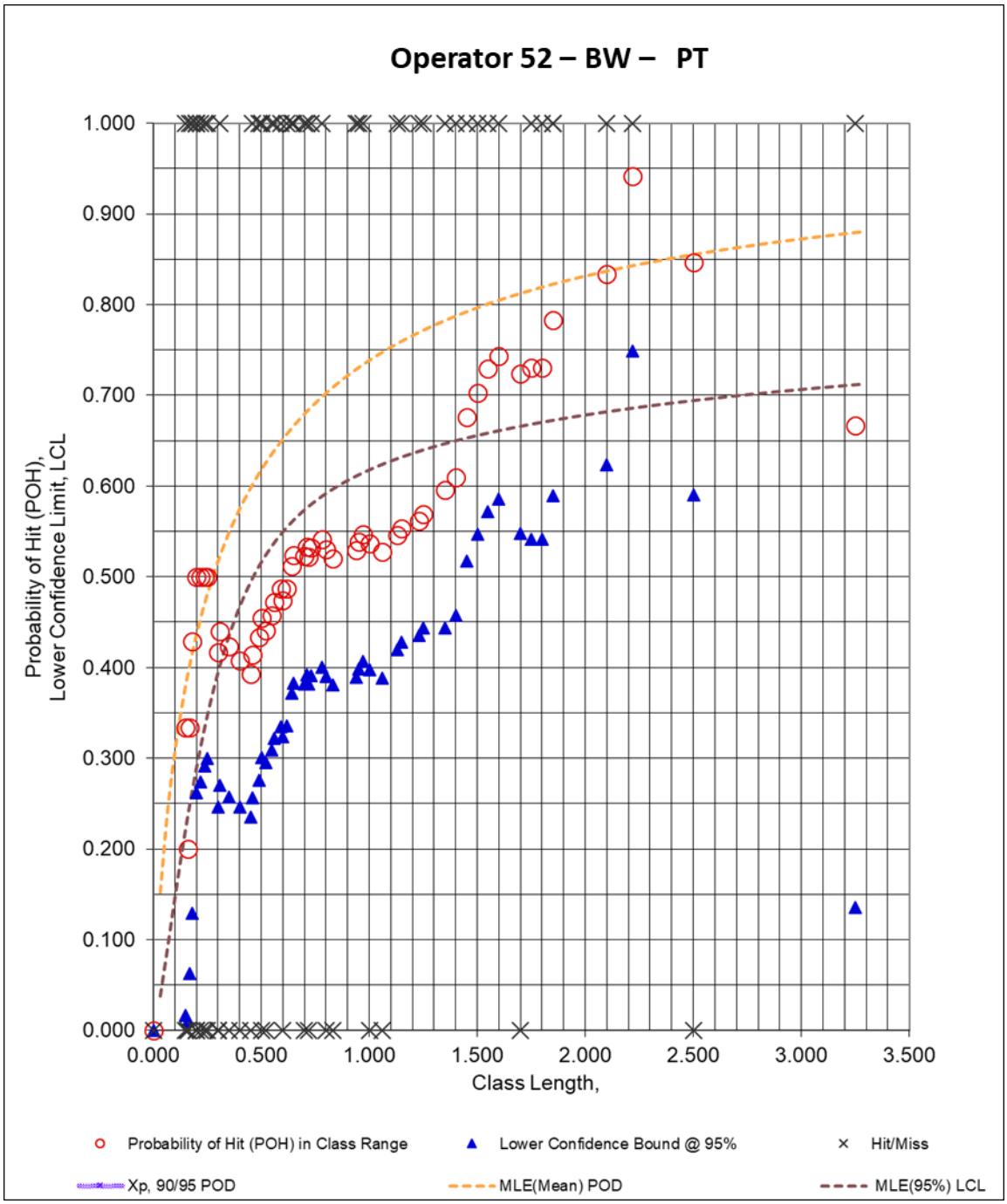

Figure 326. DOEPOD – BW – PT – Operator 52

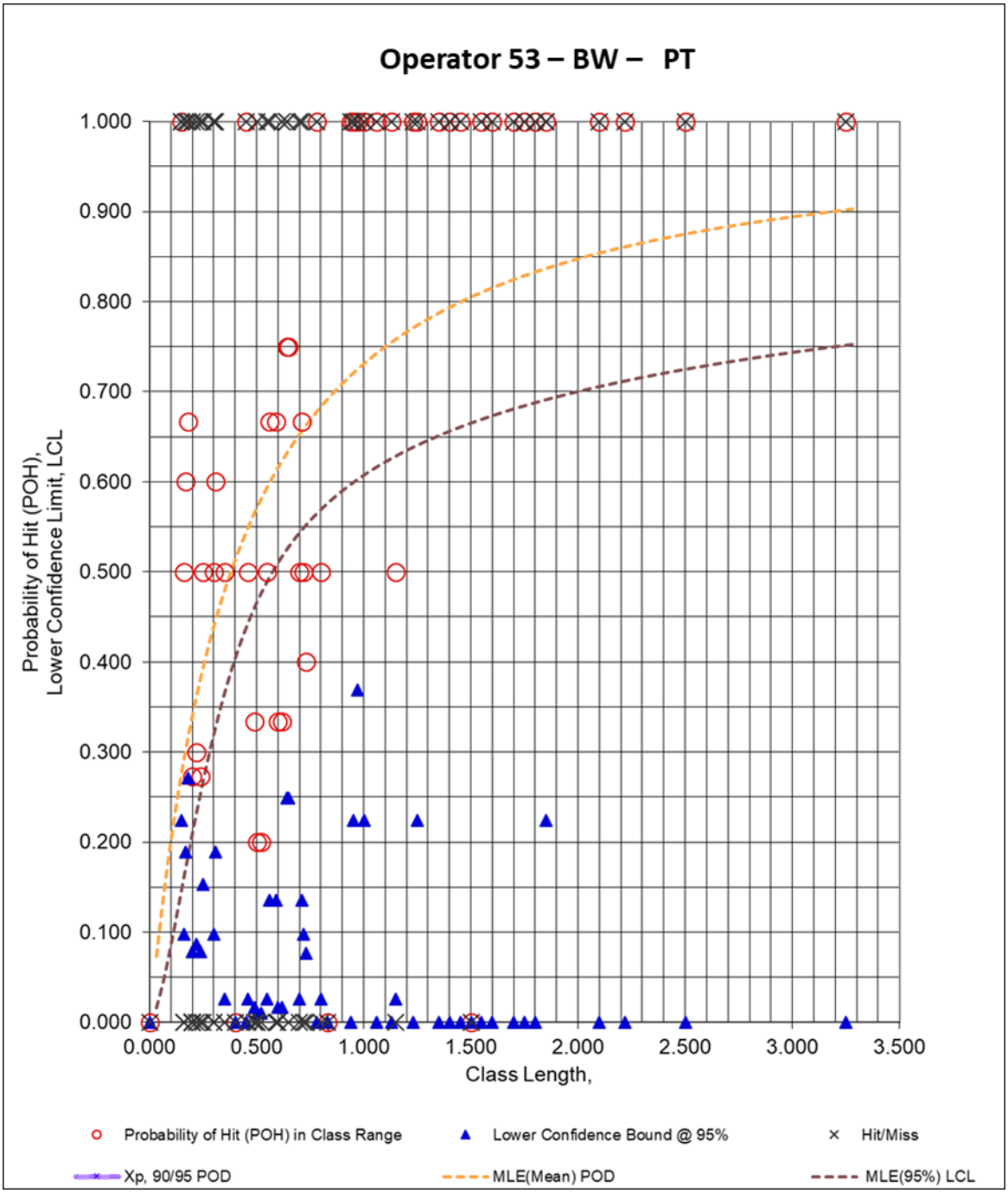

Figure 327. DOEPOD – BW – PT – Operator 53

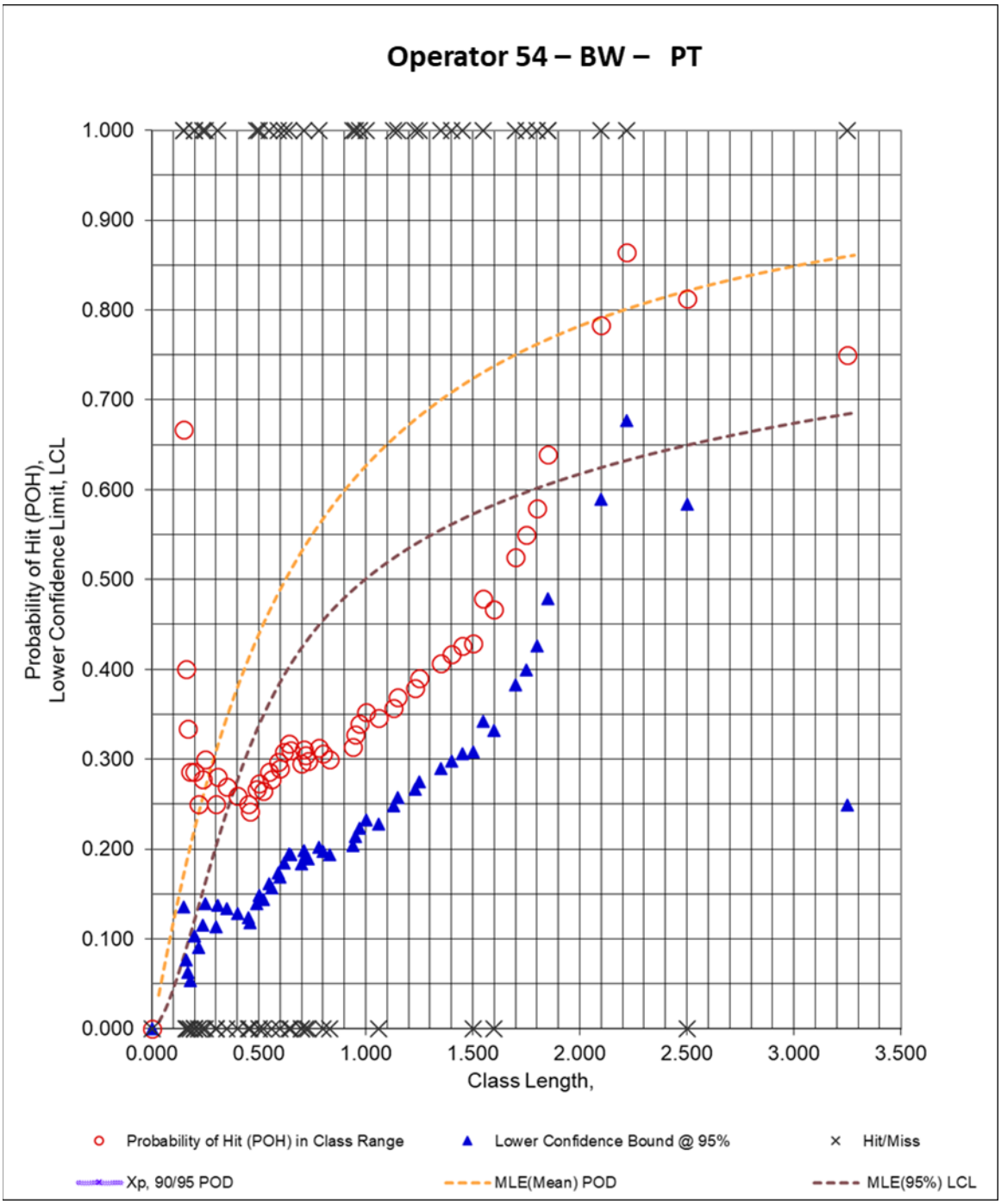

Figure 328. DOEPOD – BW – PT – Operator 54

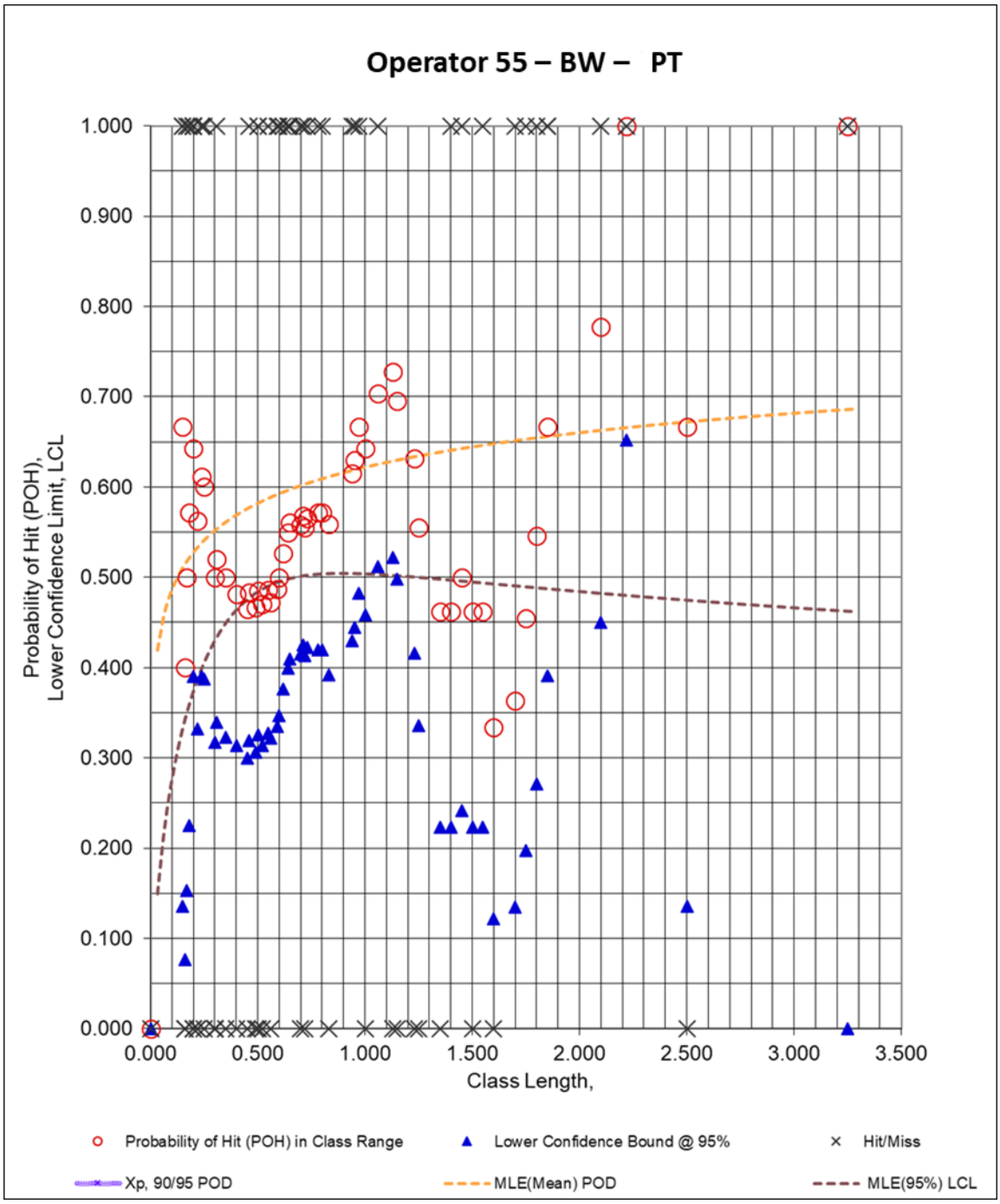

Figure 329. DOEPOD – BW – PT – Operator 55

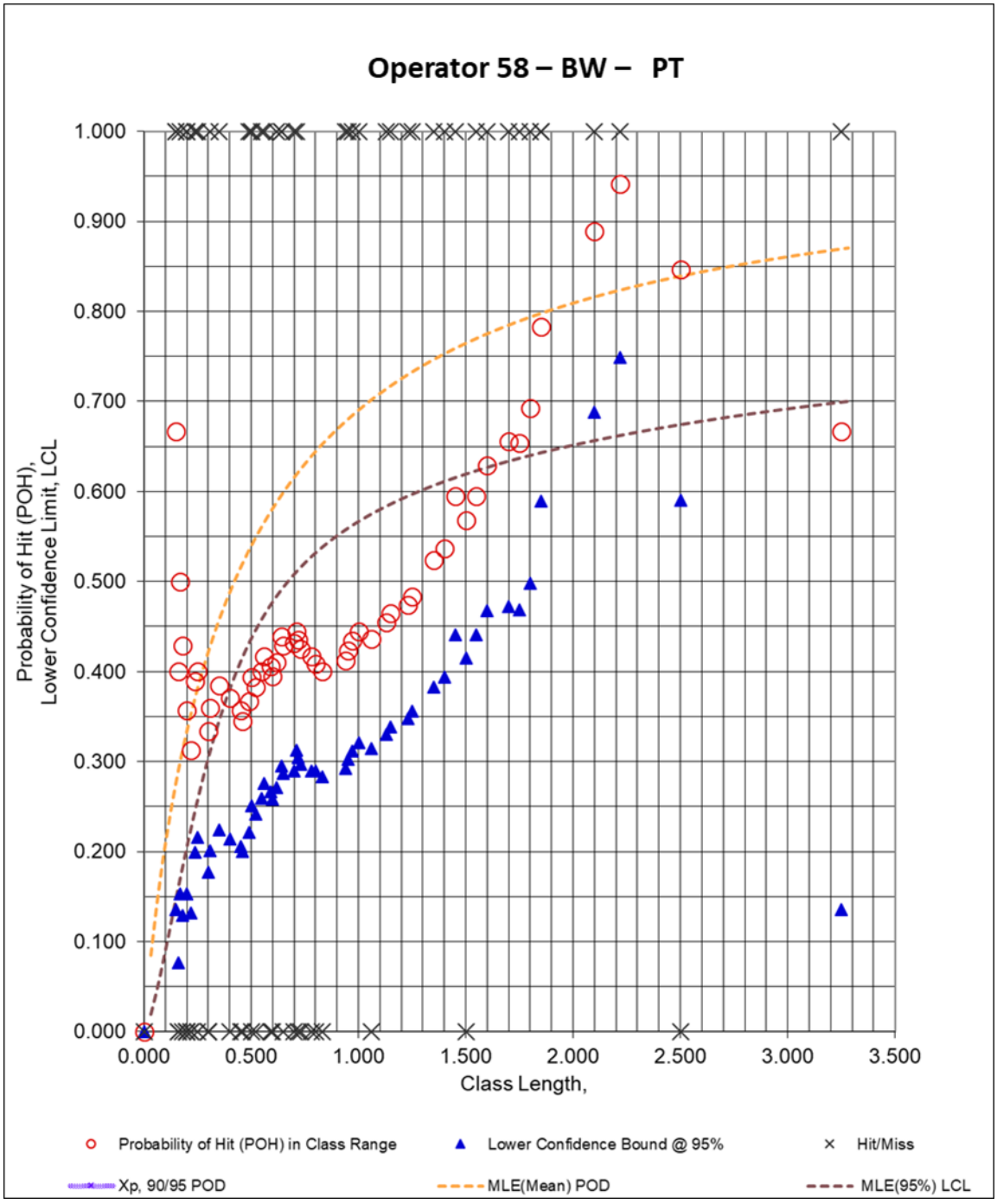

Figure 330. DOEPOD – BW – PT – Operator 58

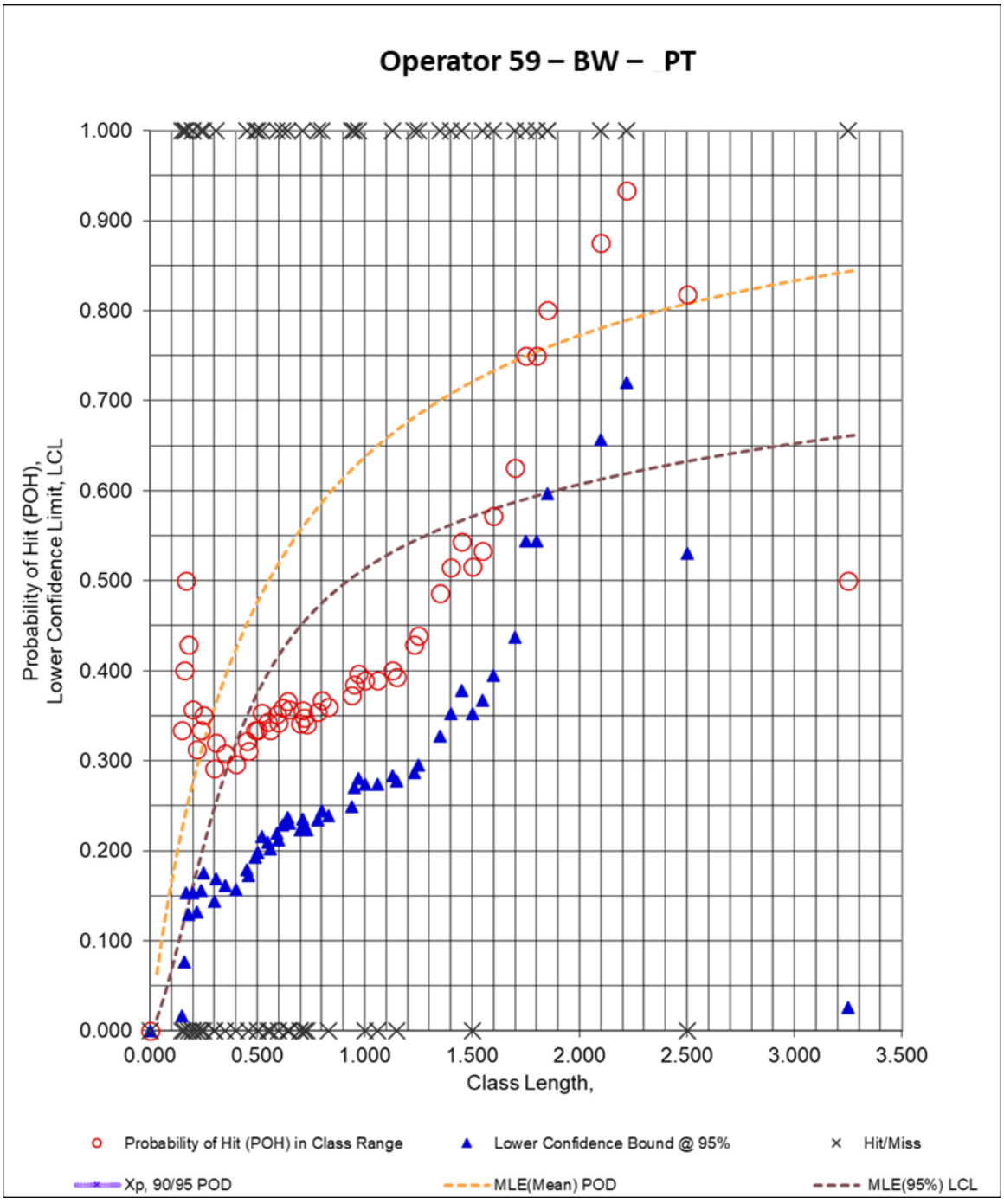

Figure 331. DOEPOD – BW – PT – Operator 59

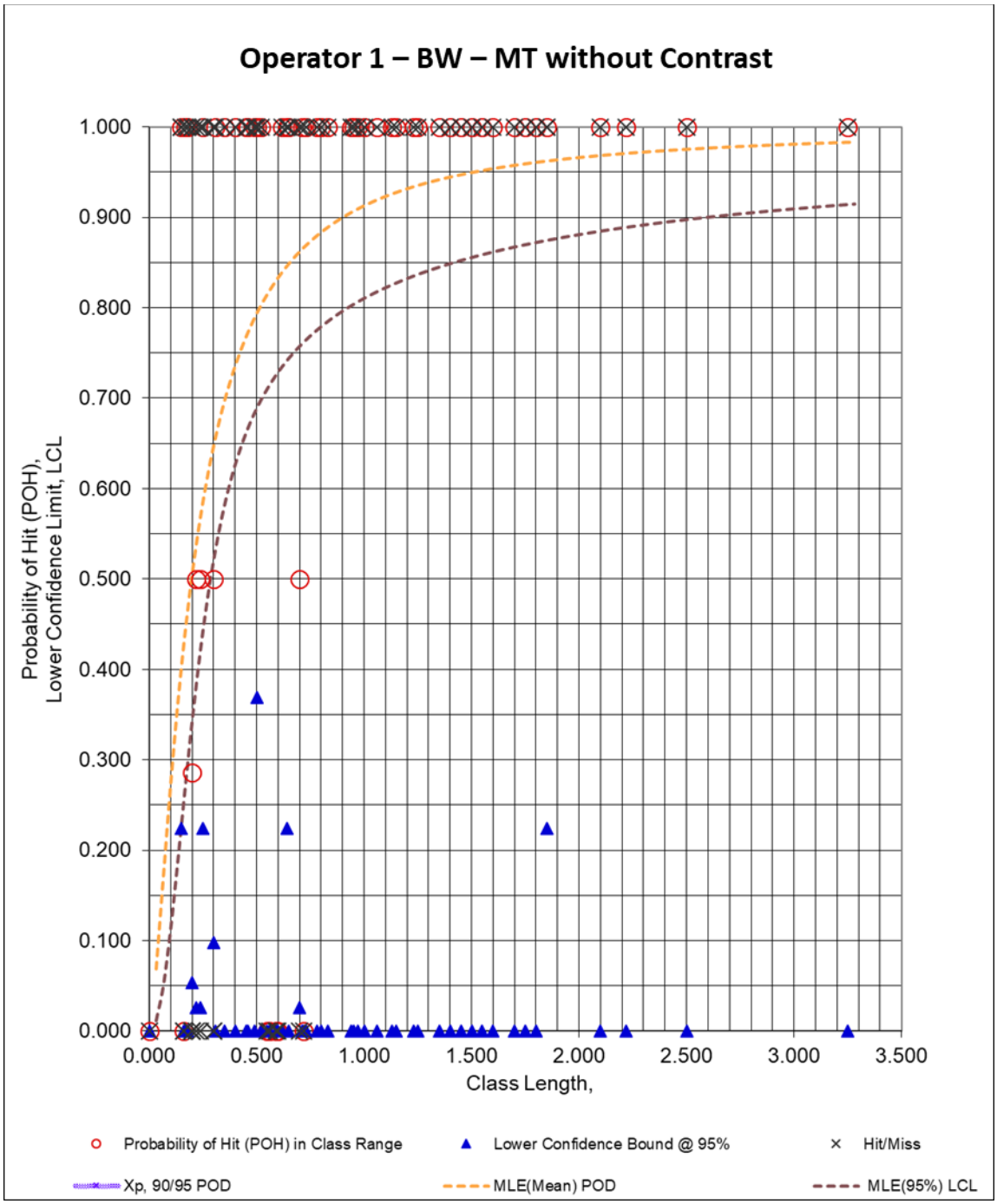

Figure 332. DOEPOD – BW – MT without Contrast – Operator 1

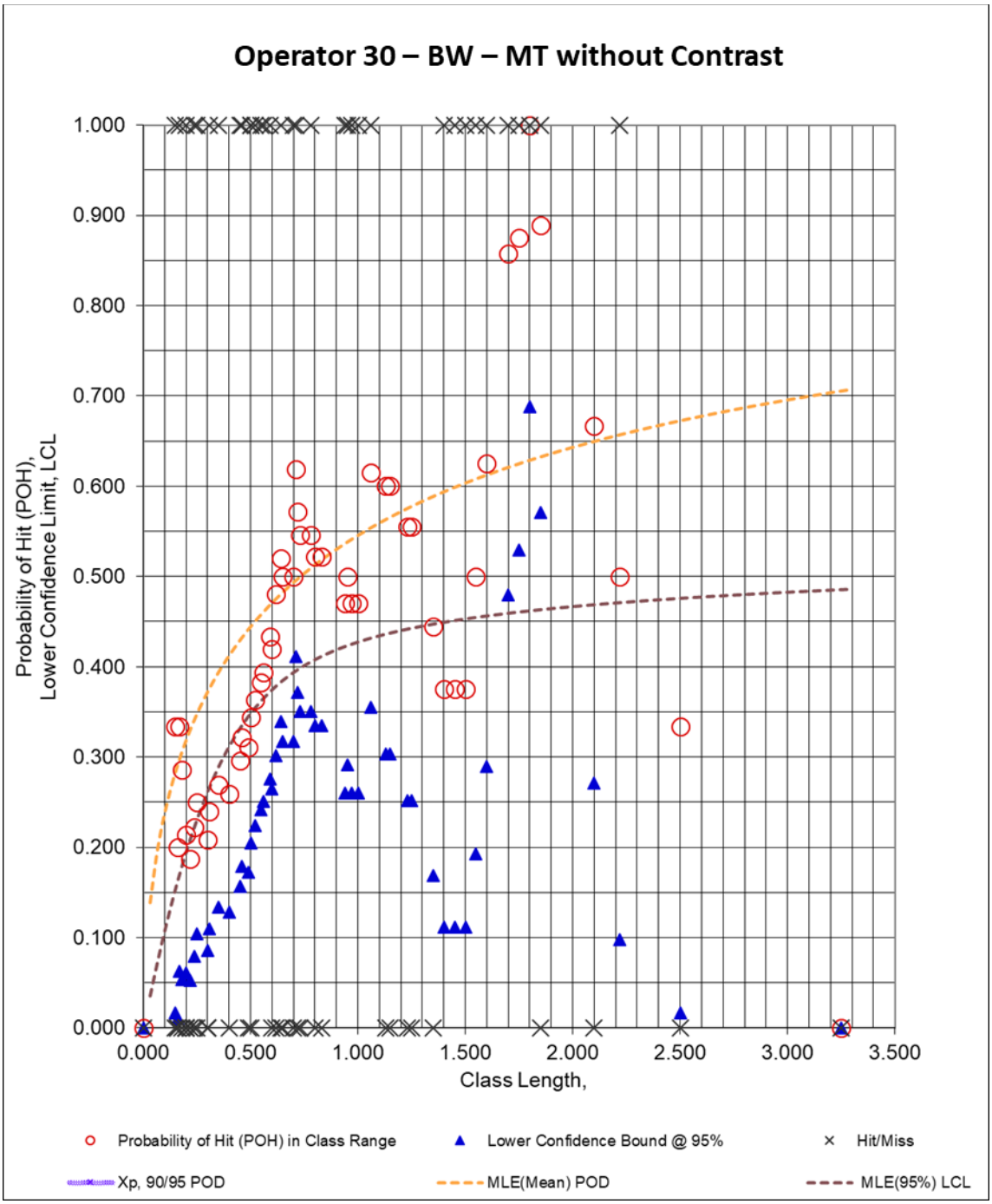

Figure 333. DOEPOD – BW – MT without Contrast – Operator 30

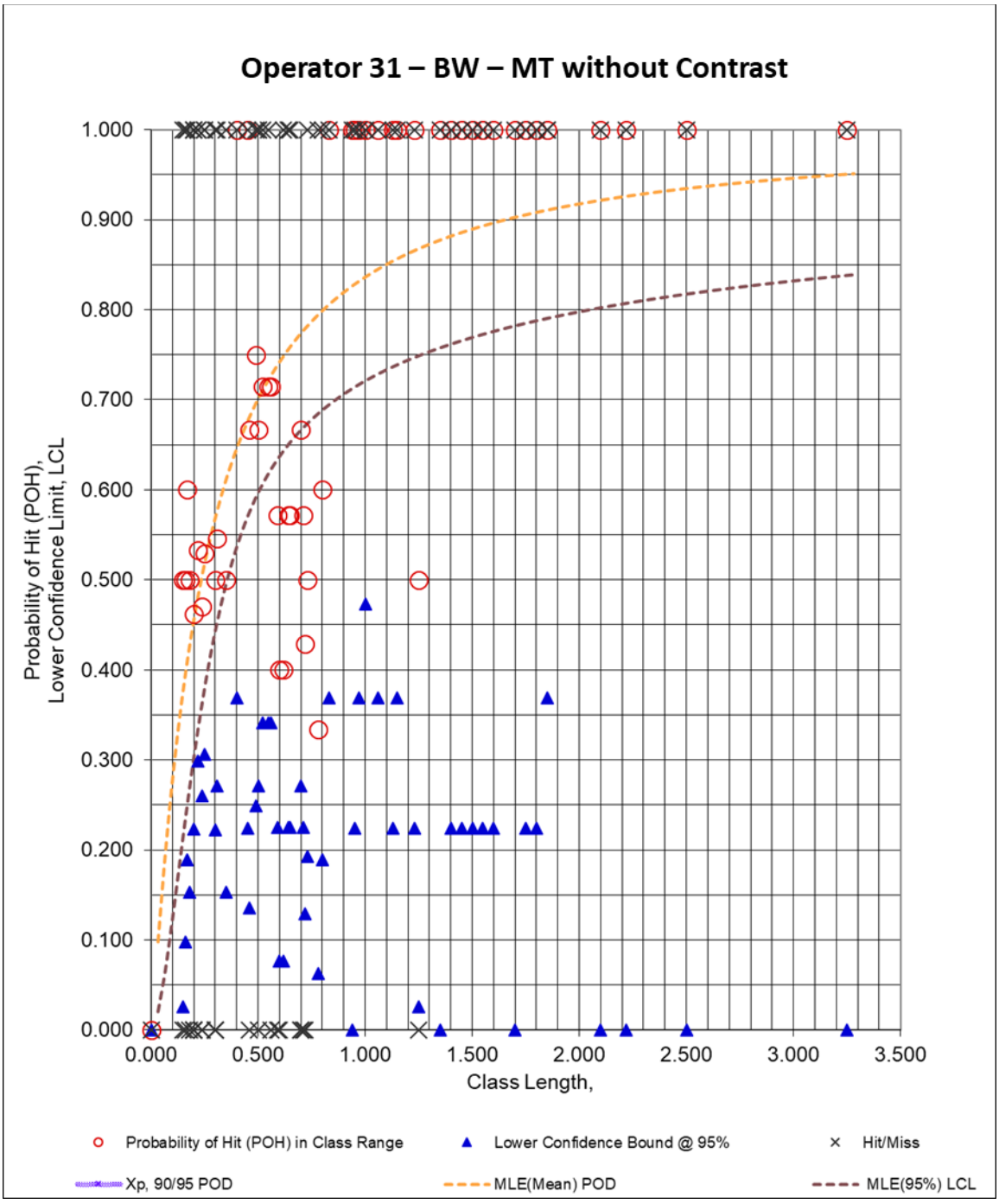

Figure 334. DOEPOD – BW – MT without Contrast – Operator 31

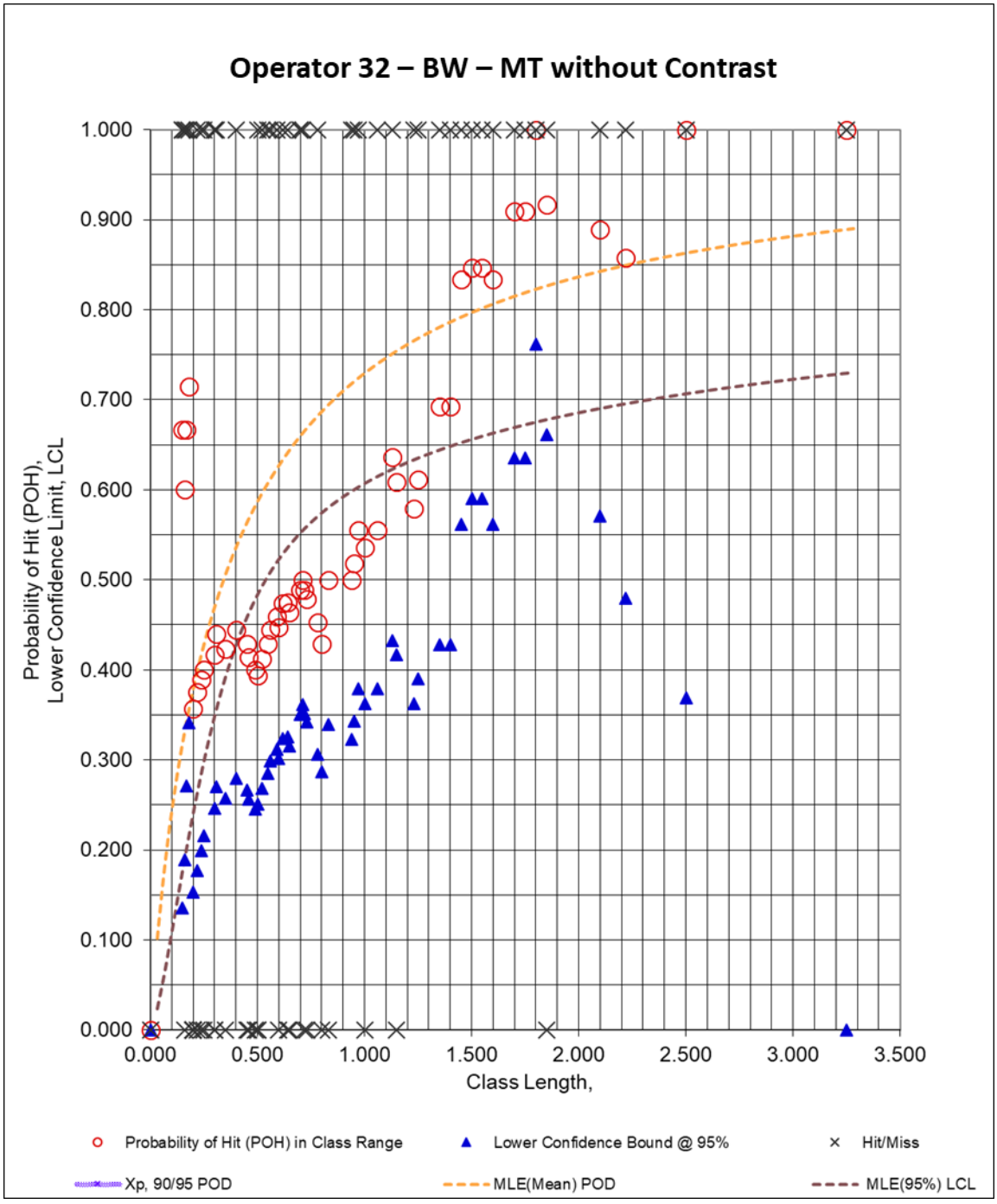

Figure 335. DOEPOD – BW – MT without Contrast – Operator 32

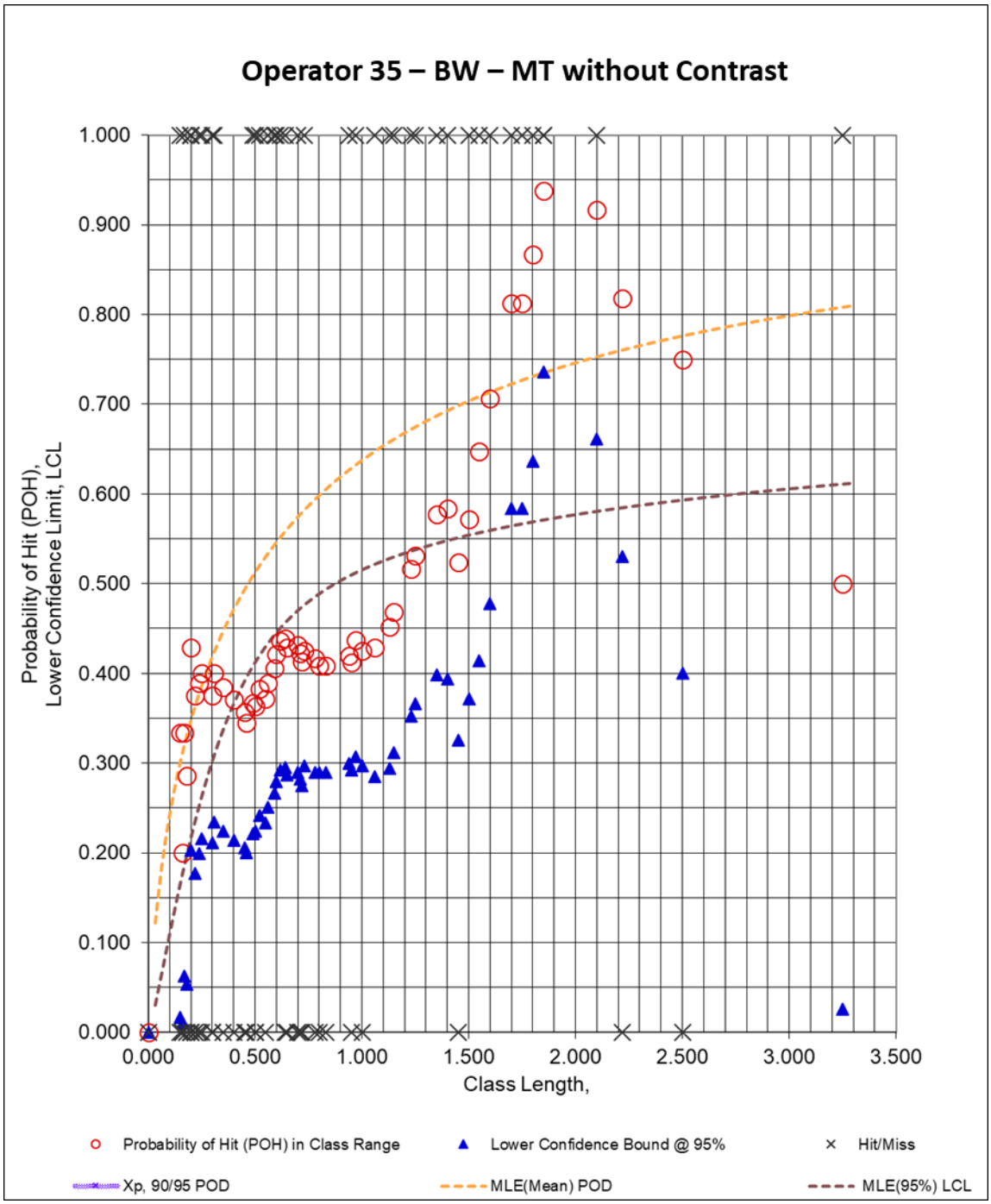

Figure 336. DOEPOD – BW – MT without Contrast – Operator 35

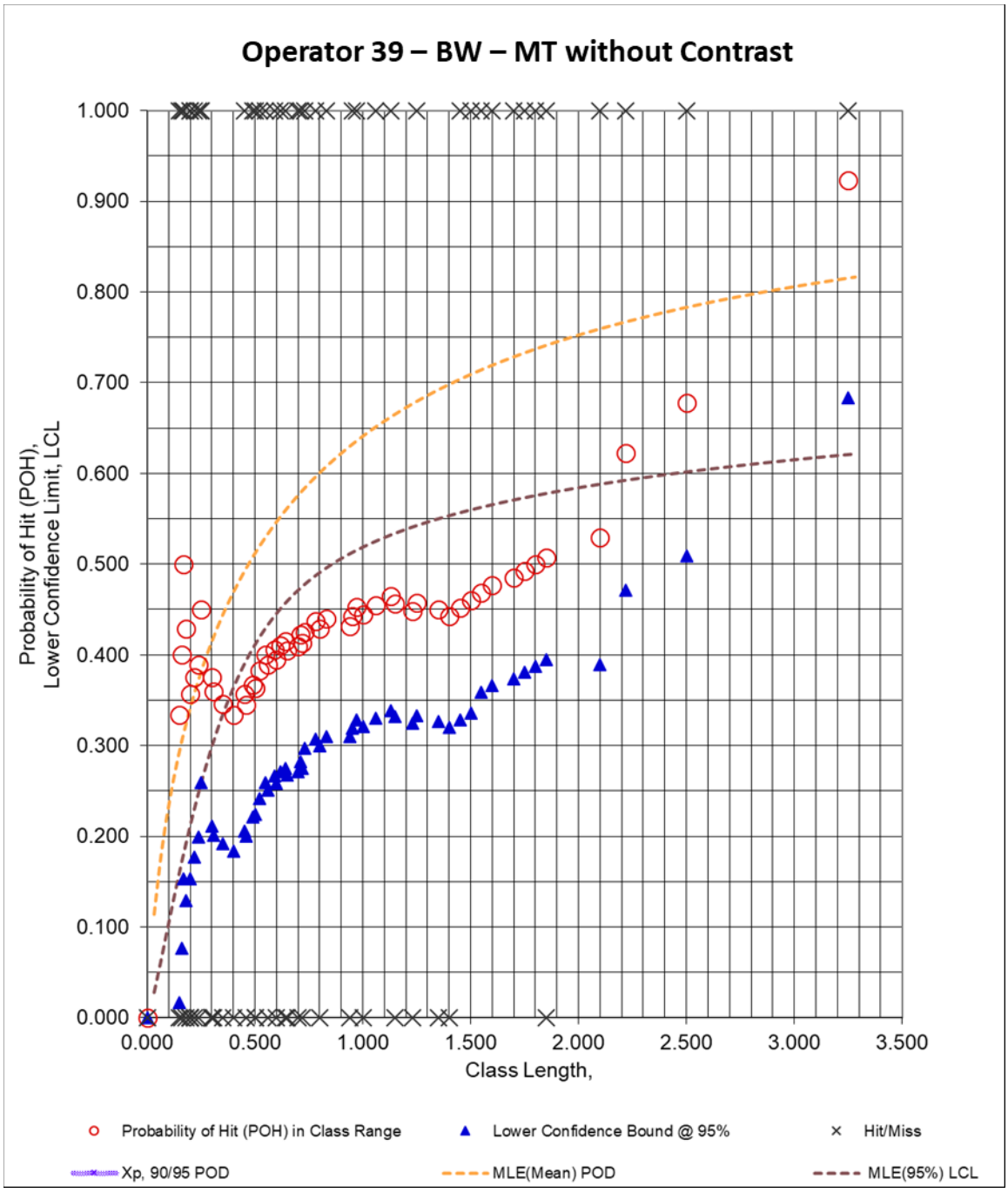

Figure 337. DOEPOD – BW – MT without Contrast – Operator 39

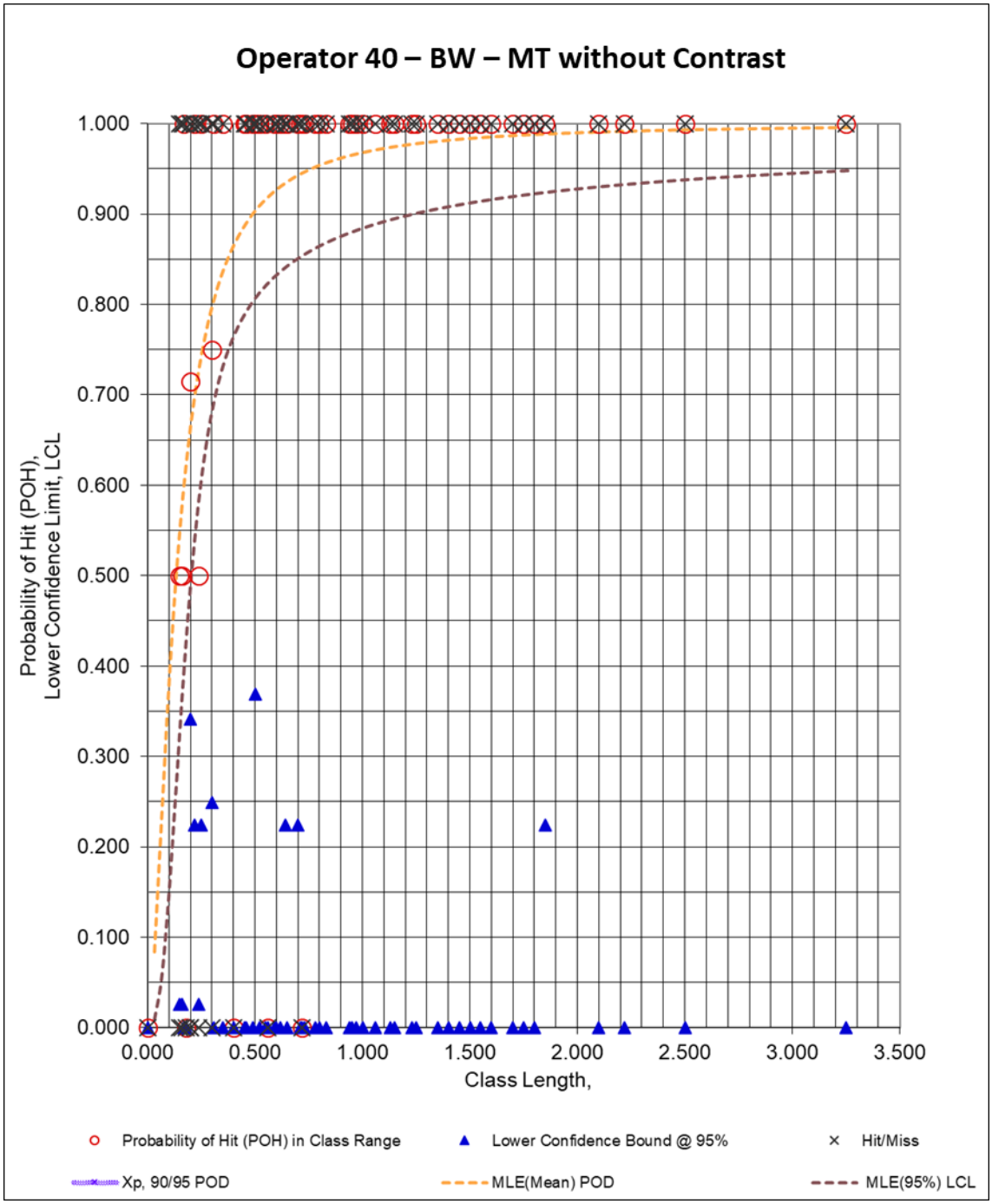

Figure 338. DOEPOD – BW – MT without Contrast – Operator 40

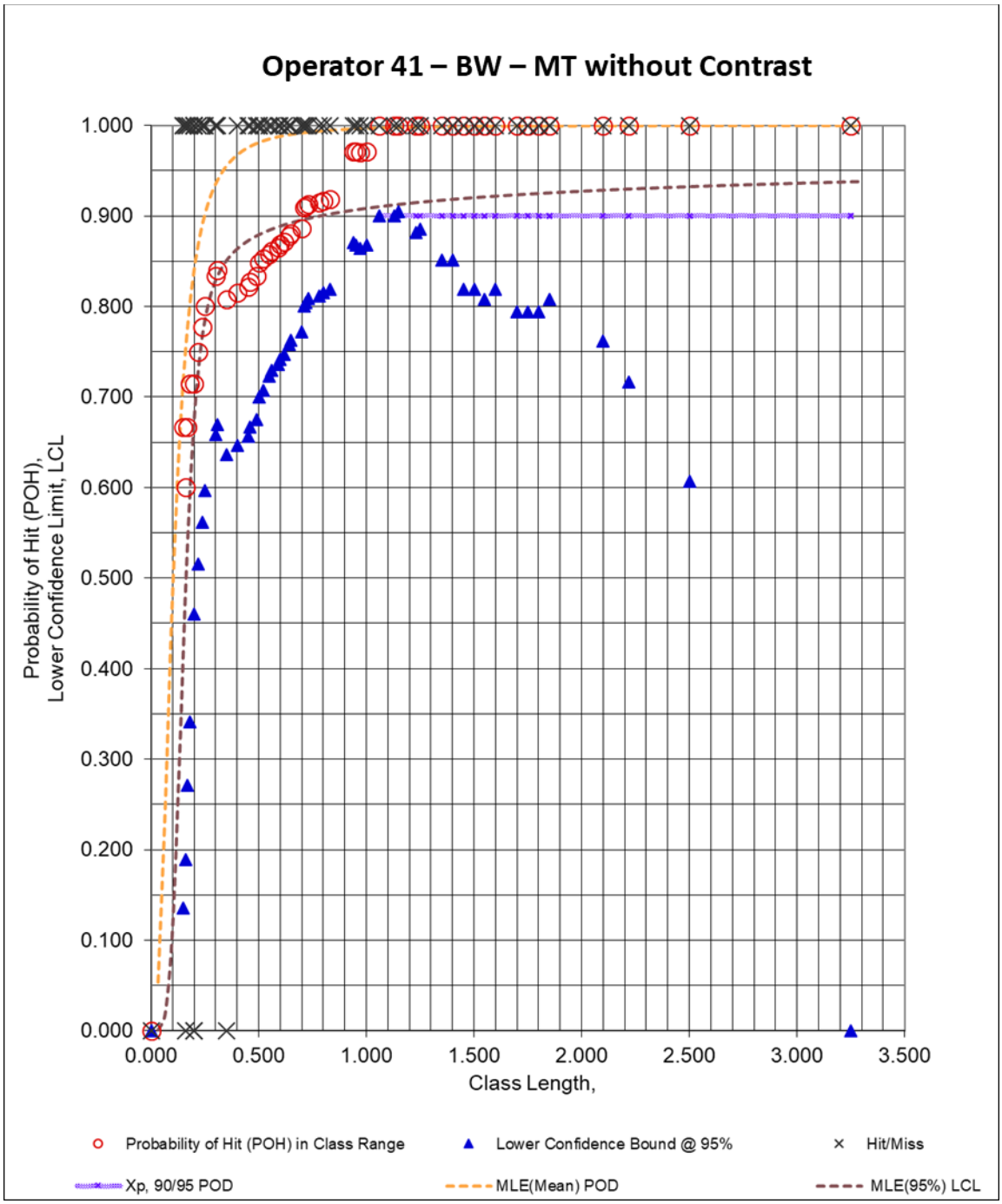

Figure 339. DOEPOD – BW – MT without Contrast – Operator 41

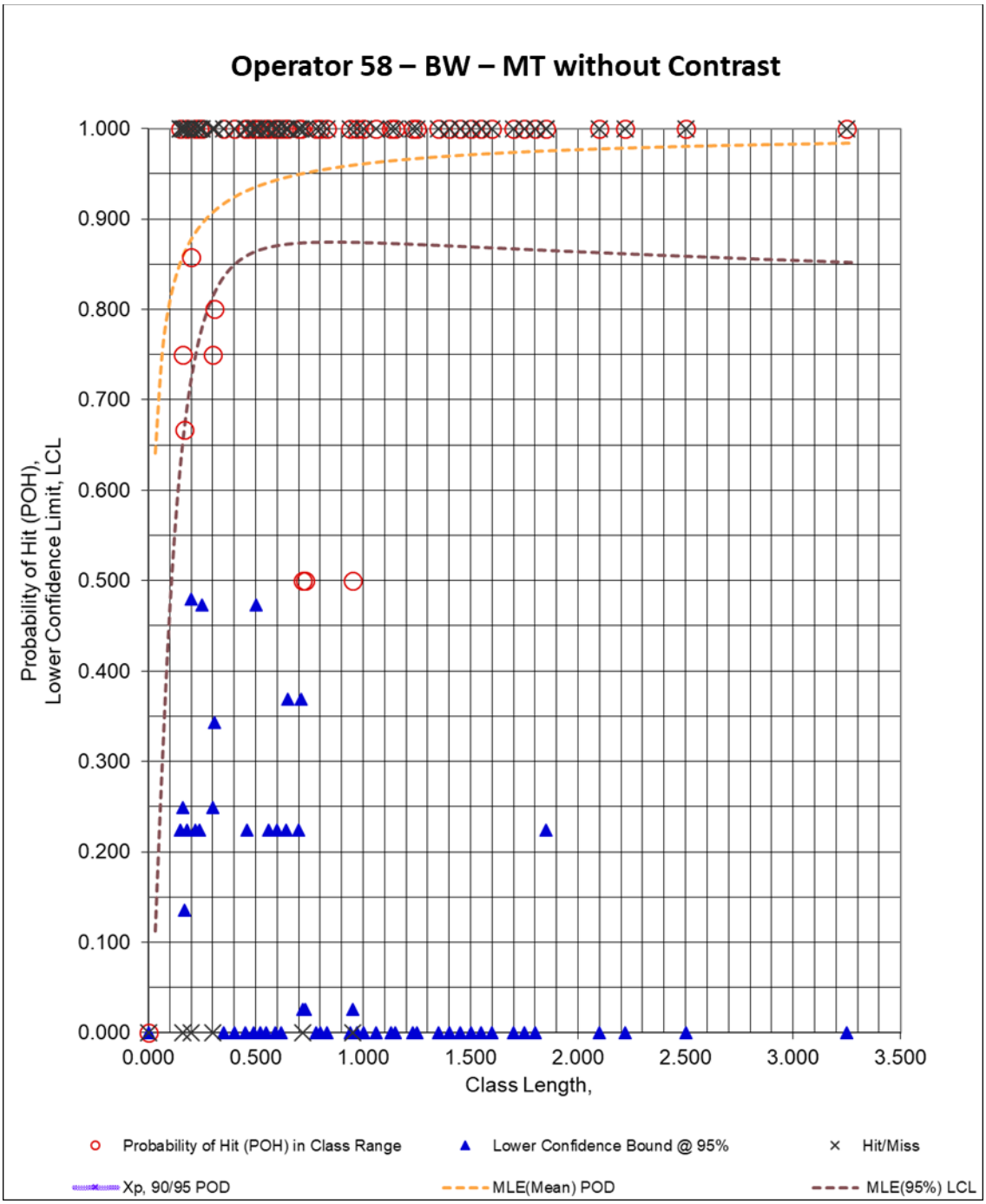

Figure 340. DOEPOD – BW – MT without Contrast – Operator 58

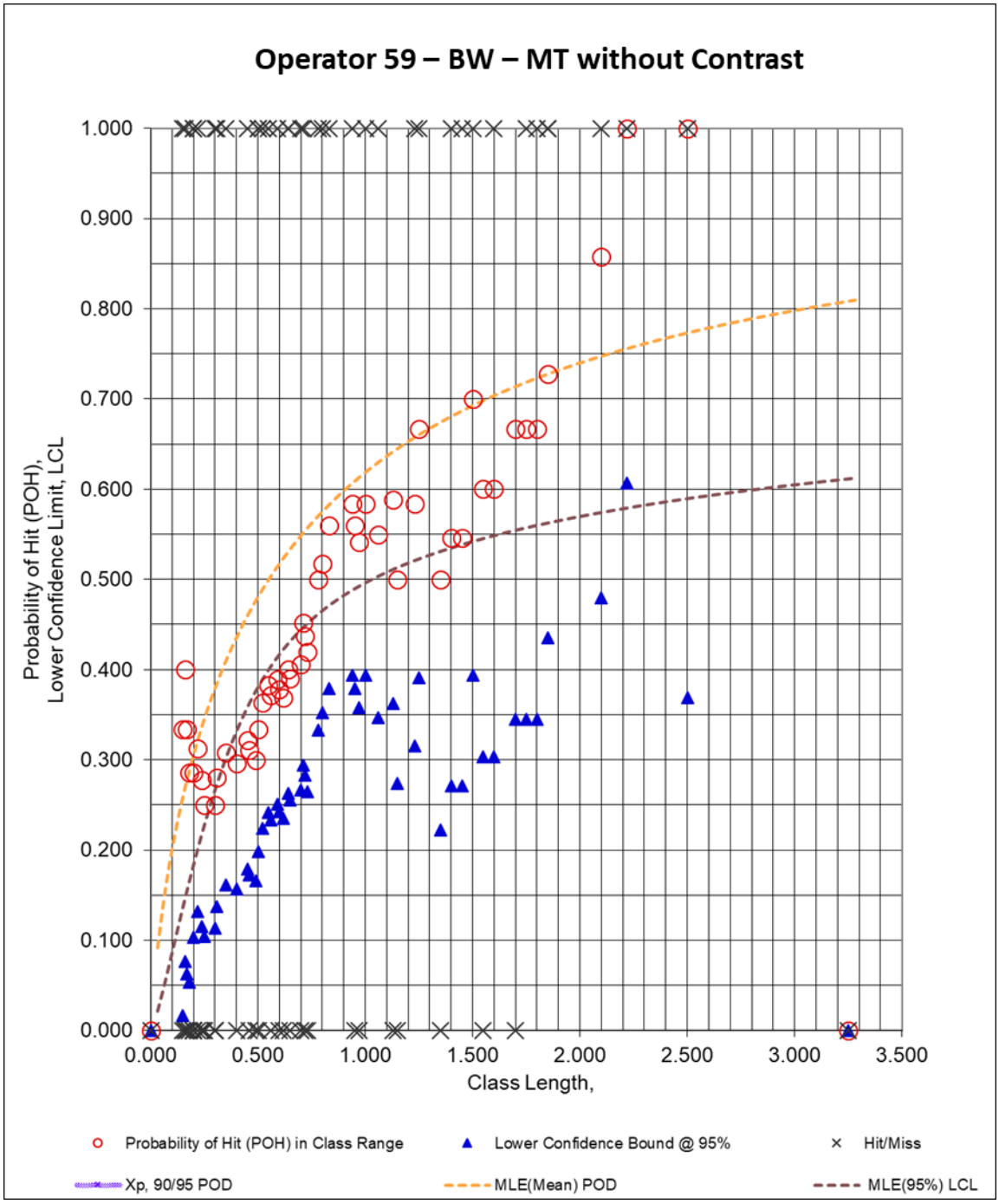

Figure 341. DOEPOD – BW – MT without Contrast – Operator 59

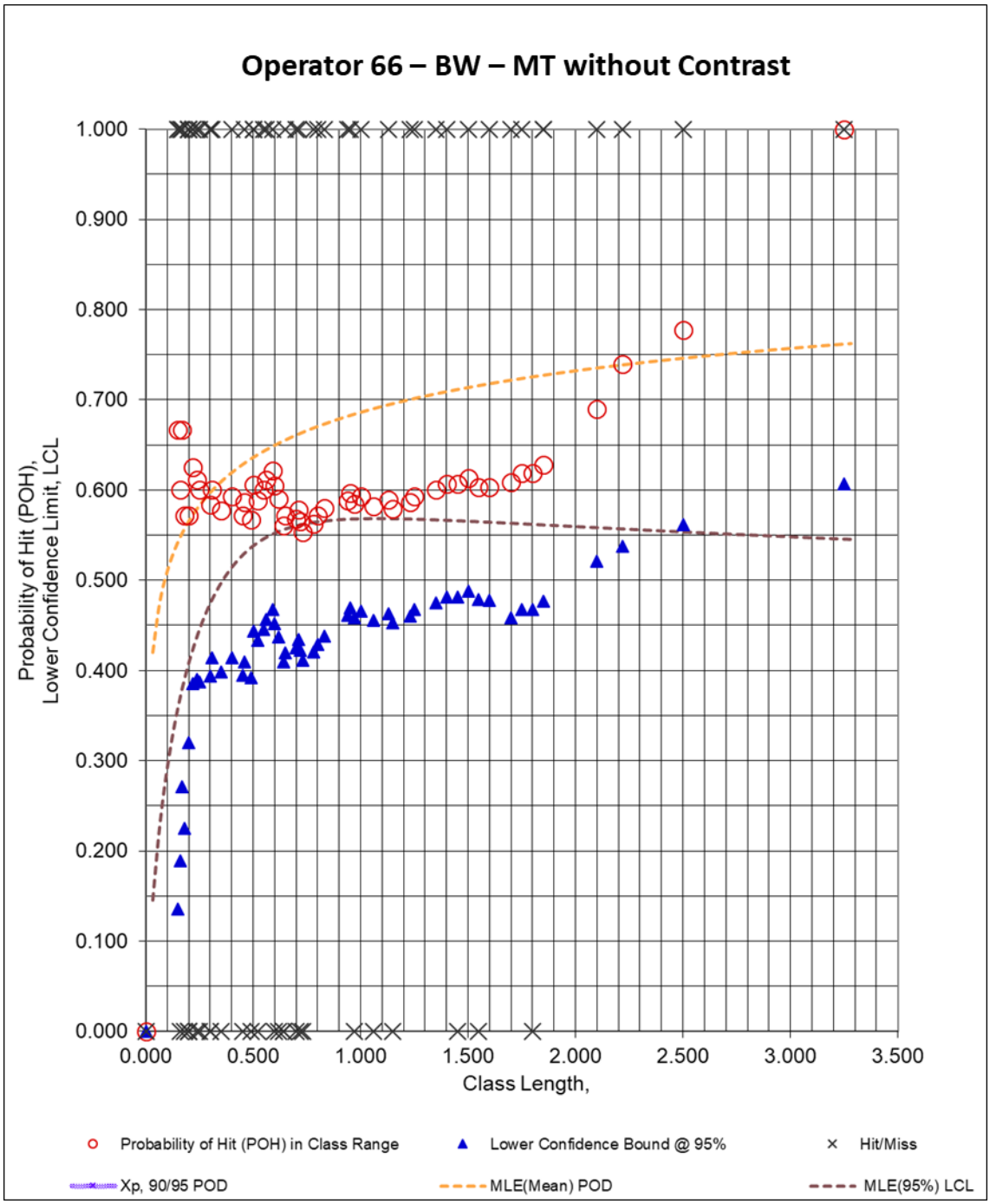

Figure 342. DOEPOD – BW – MT without Contrast – Operator 66

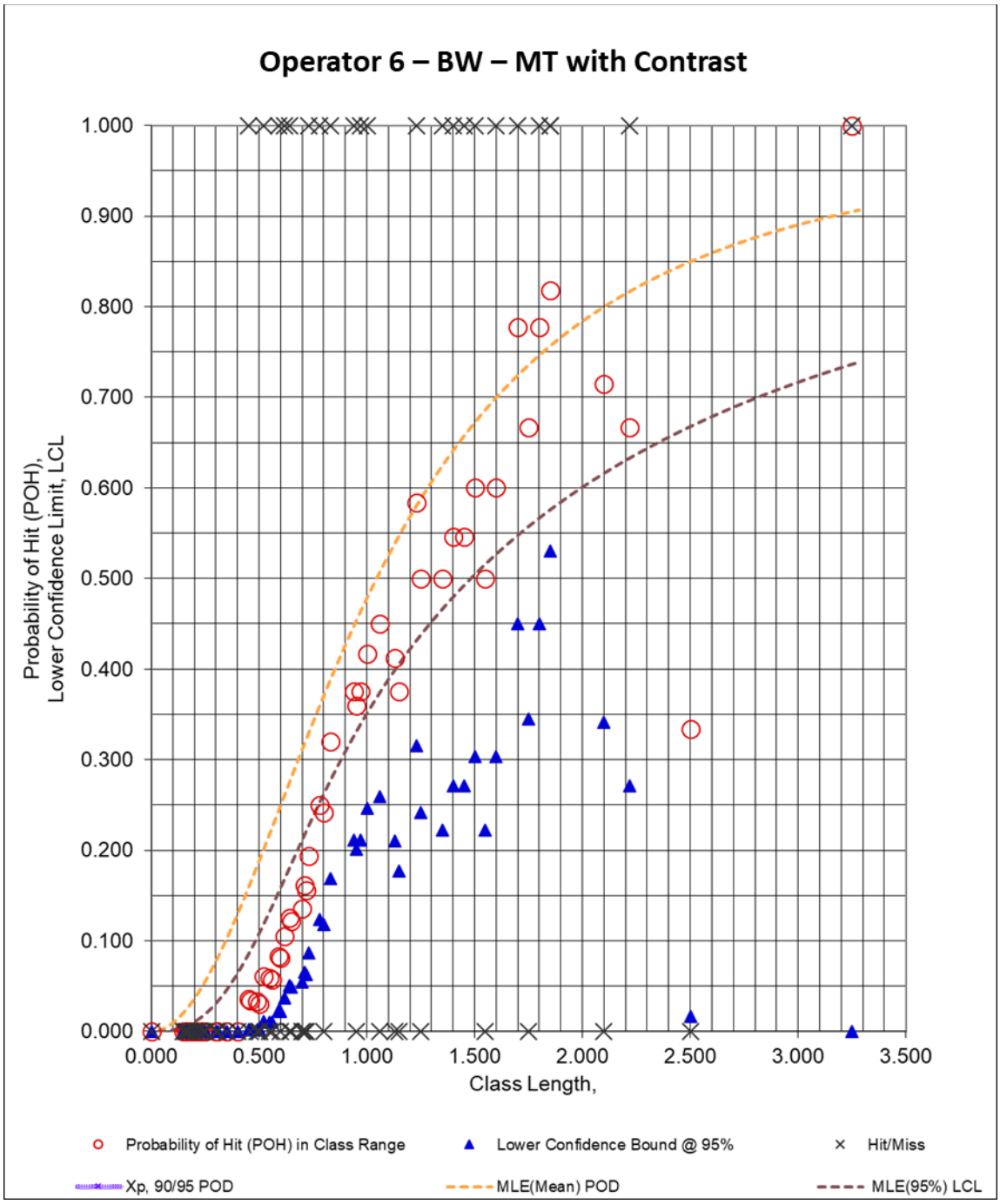

Figure 343. DOEPOD – BW – MT with Contrast – Operator 6

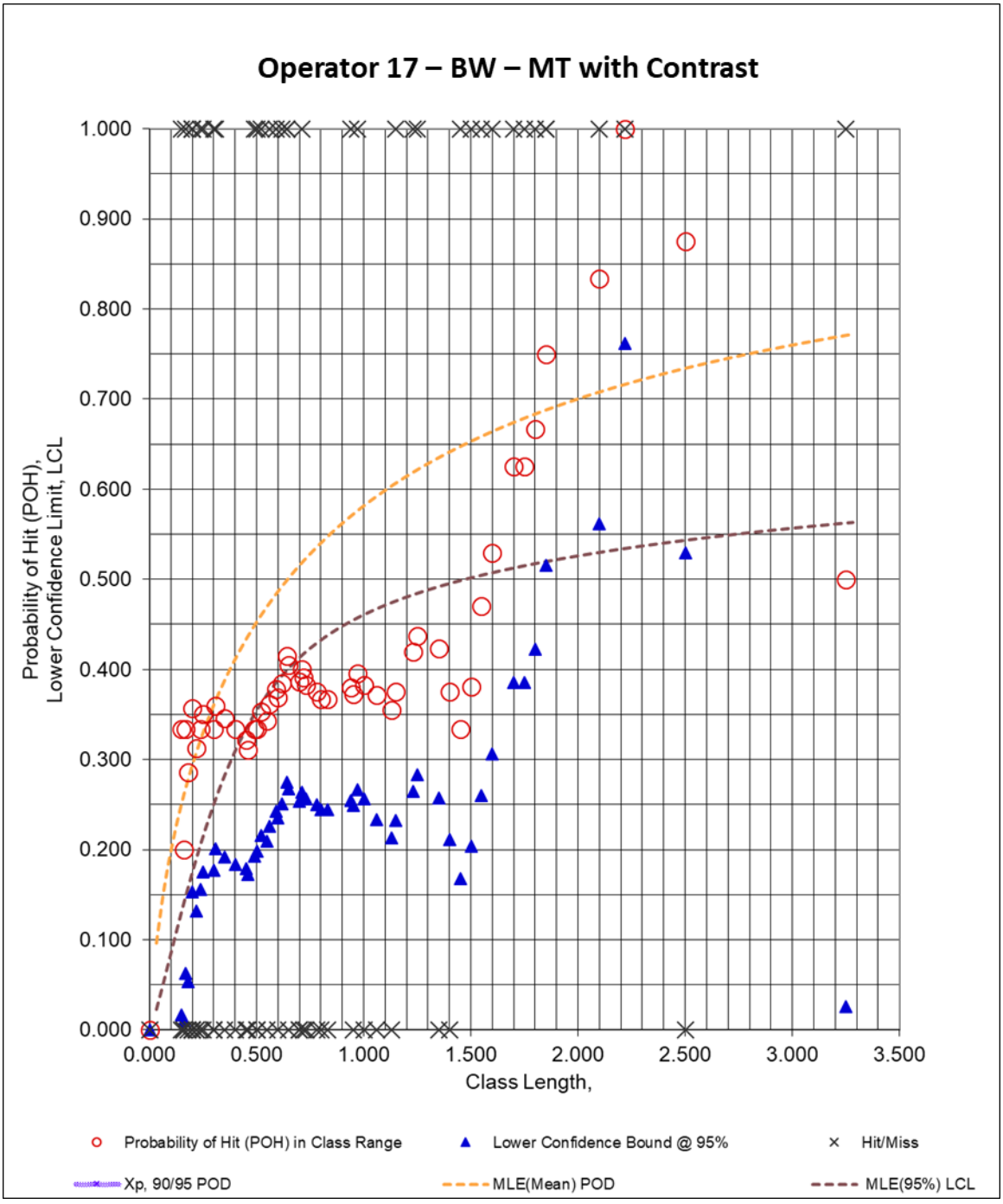

Figure 344. DOEPOD – BW – MT with Contrast – Operator 17

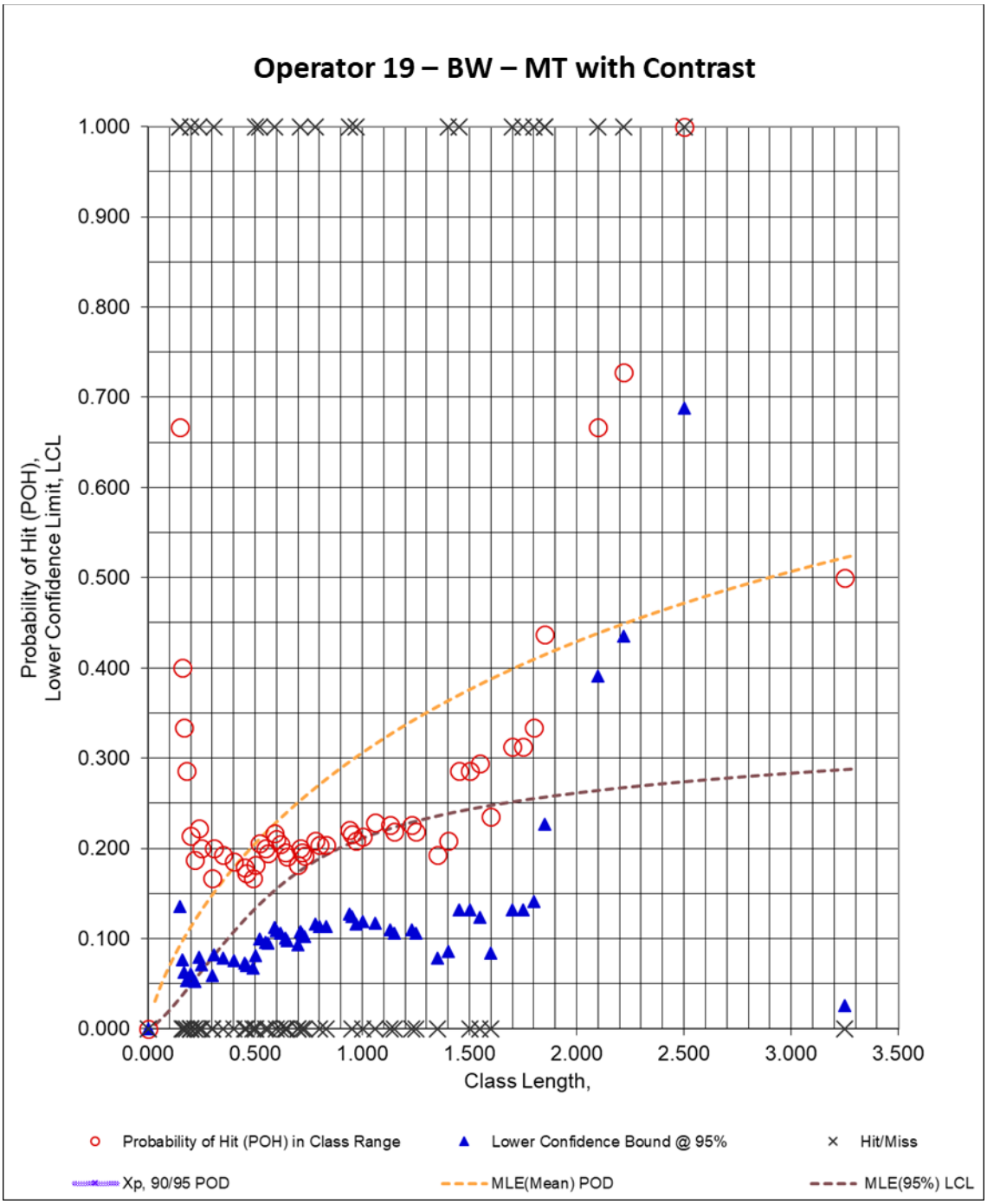

Figure 345. DOEPOD – BW – MT with Contrast – Operator 19

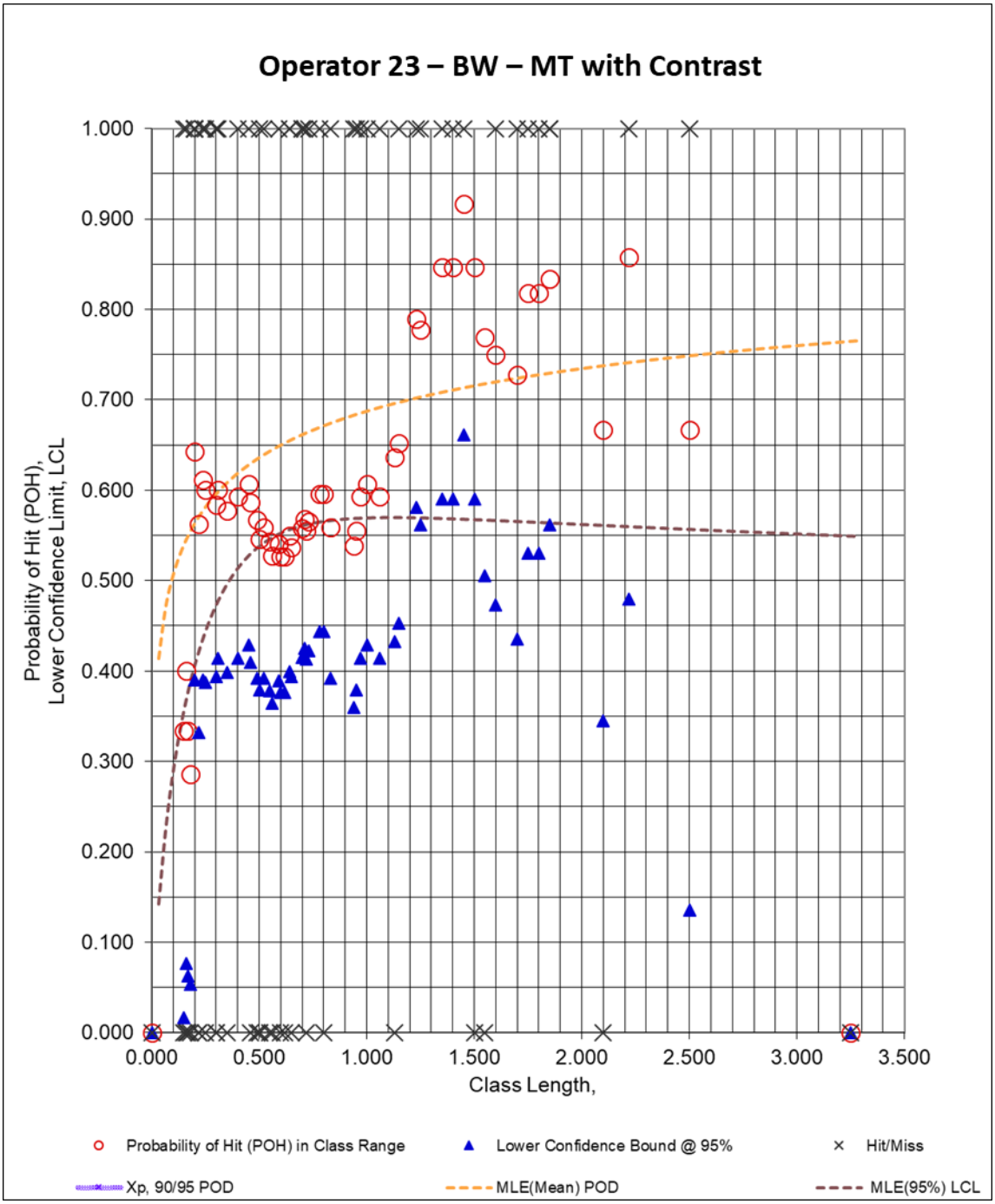

Figure 346. DOEPOD – BW – MT with Contrast – Operator 23

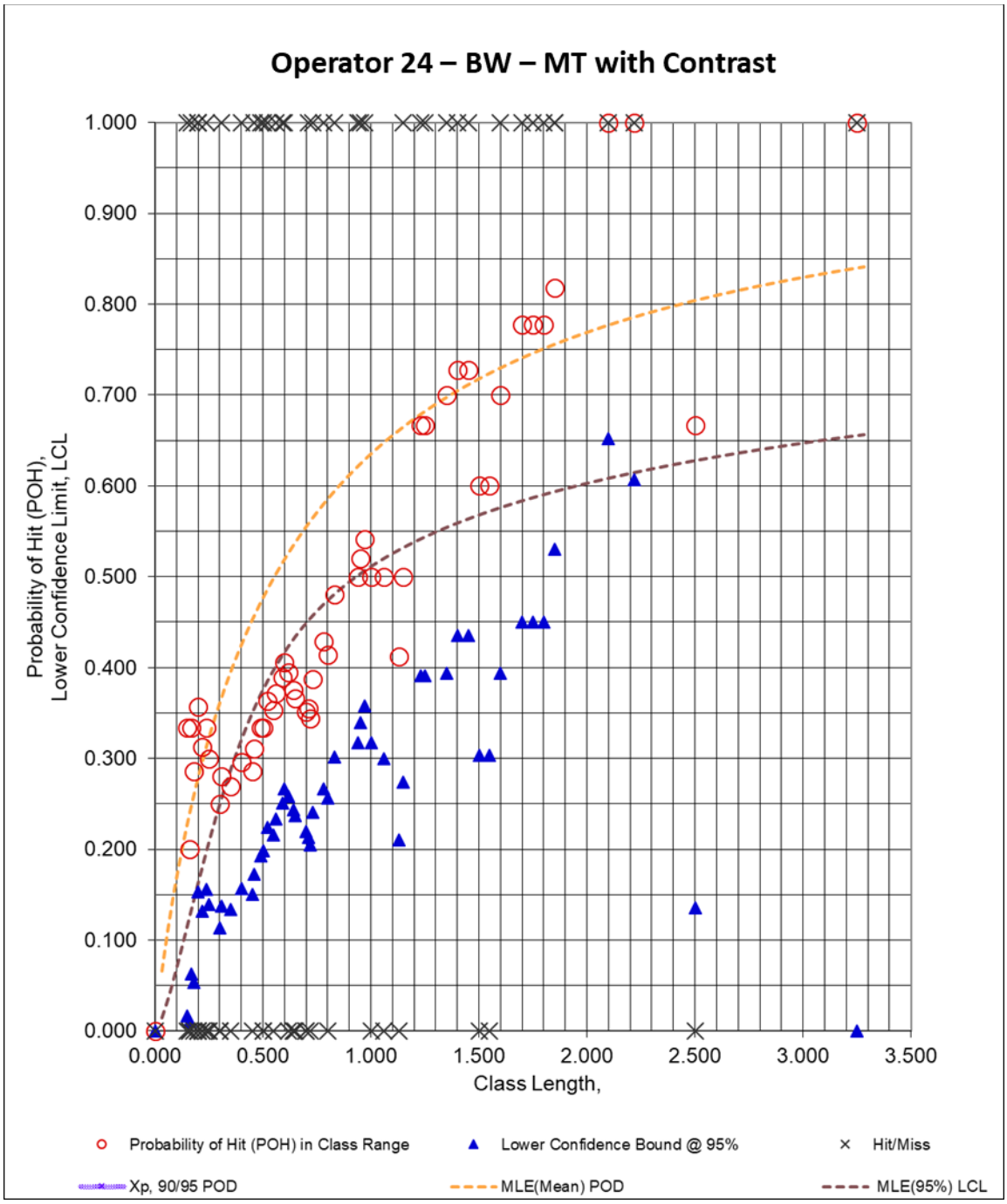

Figure 347. DOEPOD – BW – MT with Contrast – Operator 24

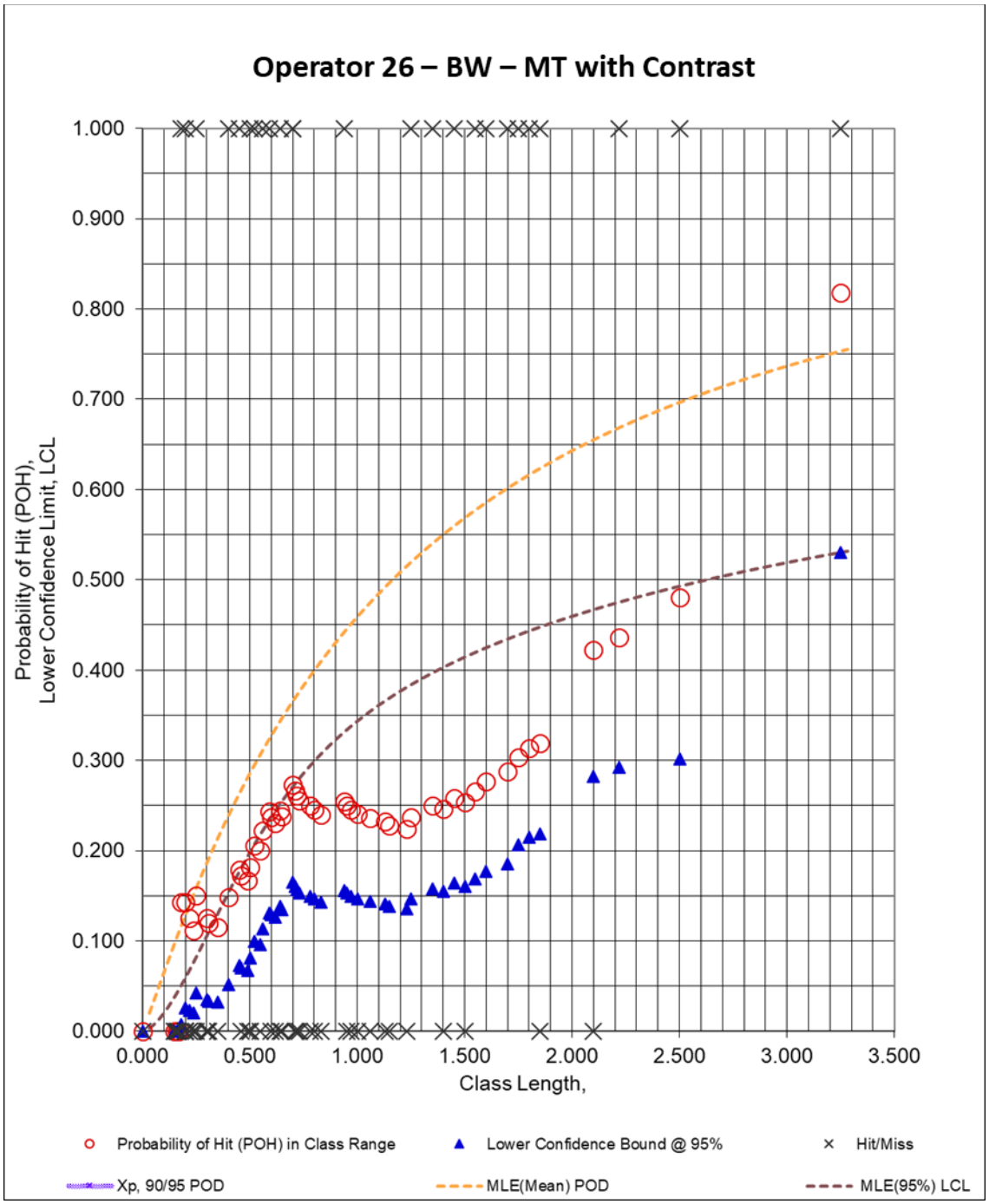

Figure 348. DOEPOD – BW – MT with Contrast – Operator 26

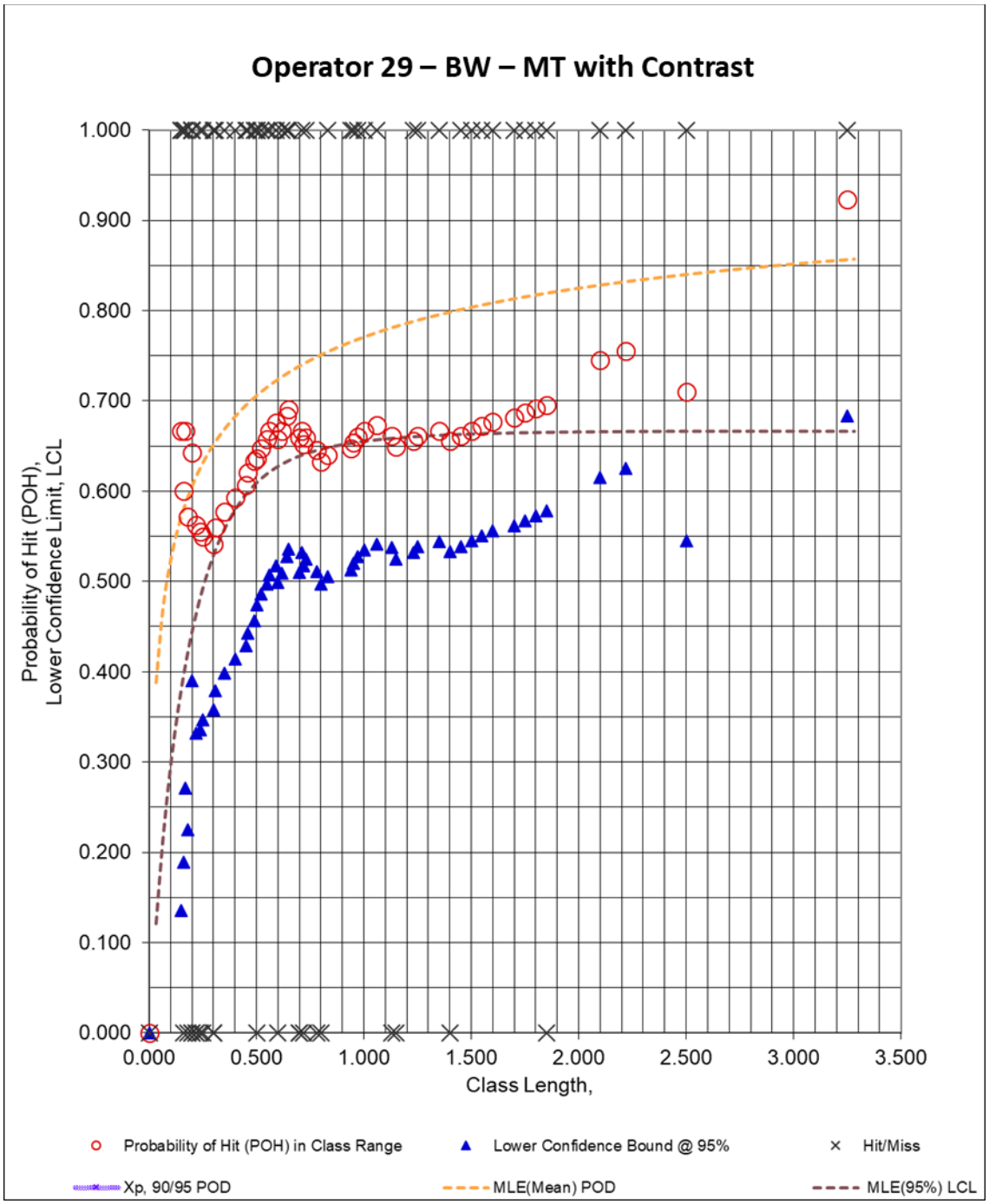

Figure 349. DOEPOD – BW – MT with Contrast – Operator 297

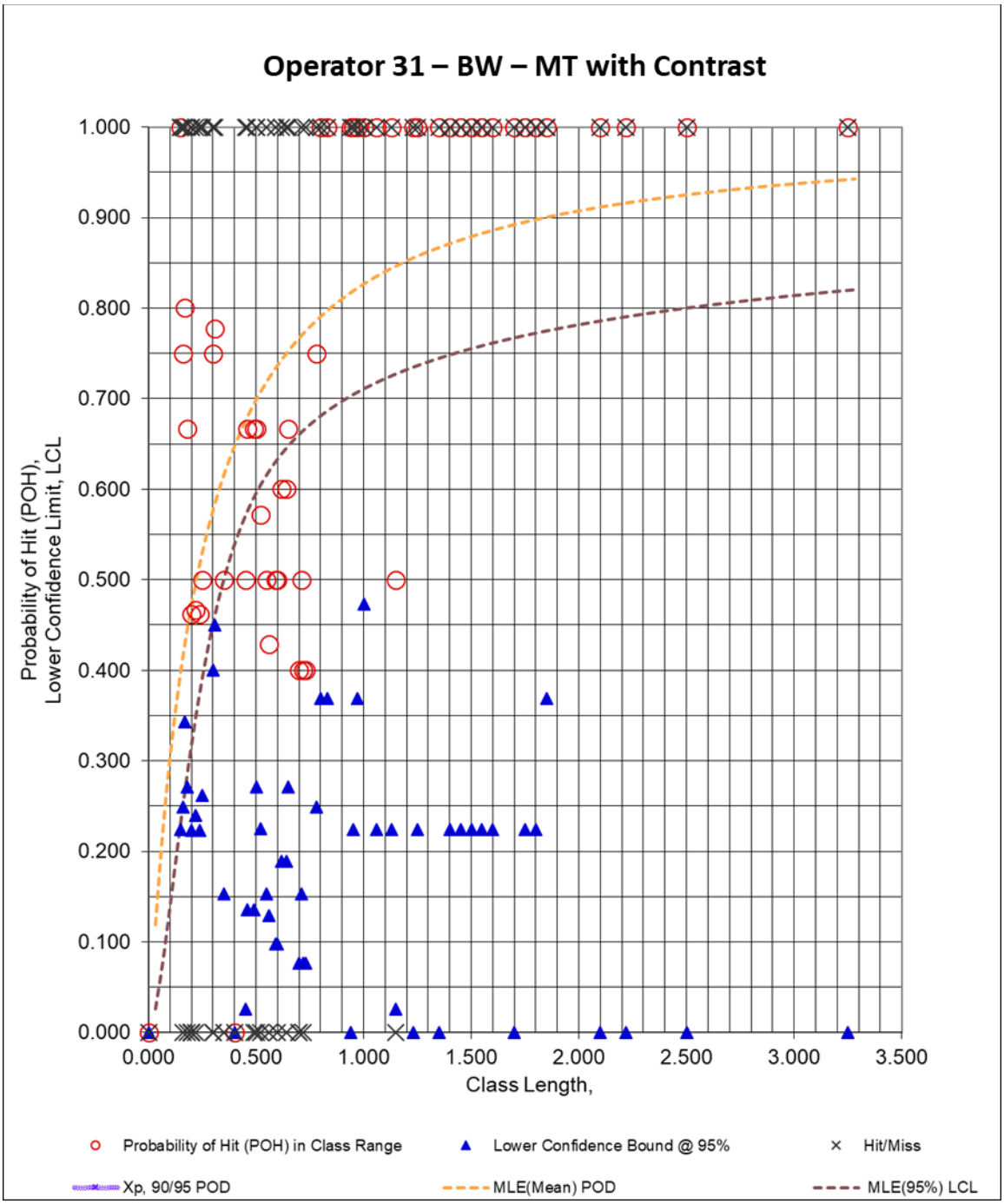

Figure 350. DOEPOD – BW – MT with Contrast – Operator 31

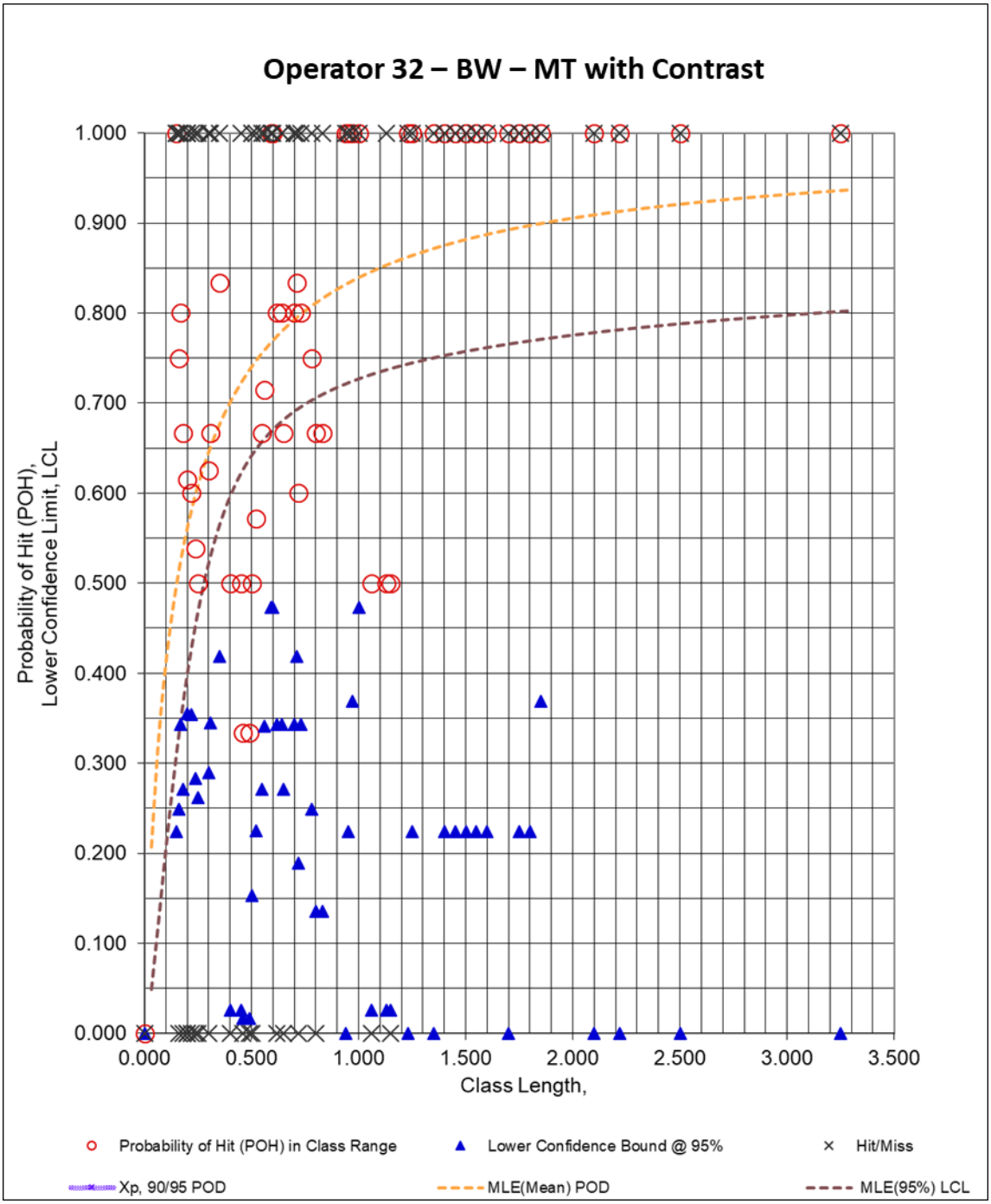

Figure 351. DOEPOD – BW – MT with Contrast – Operator 32

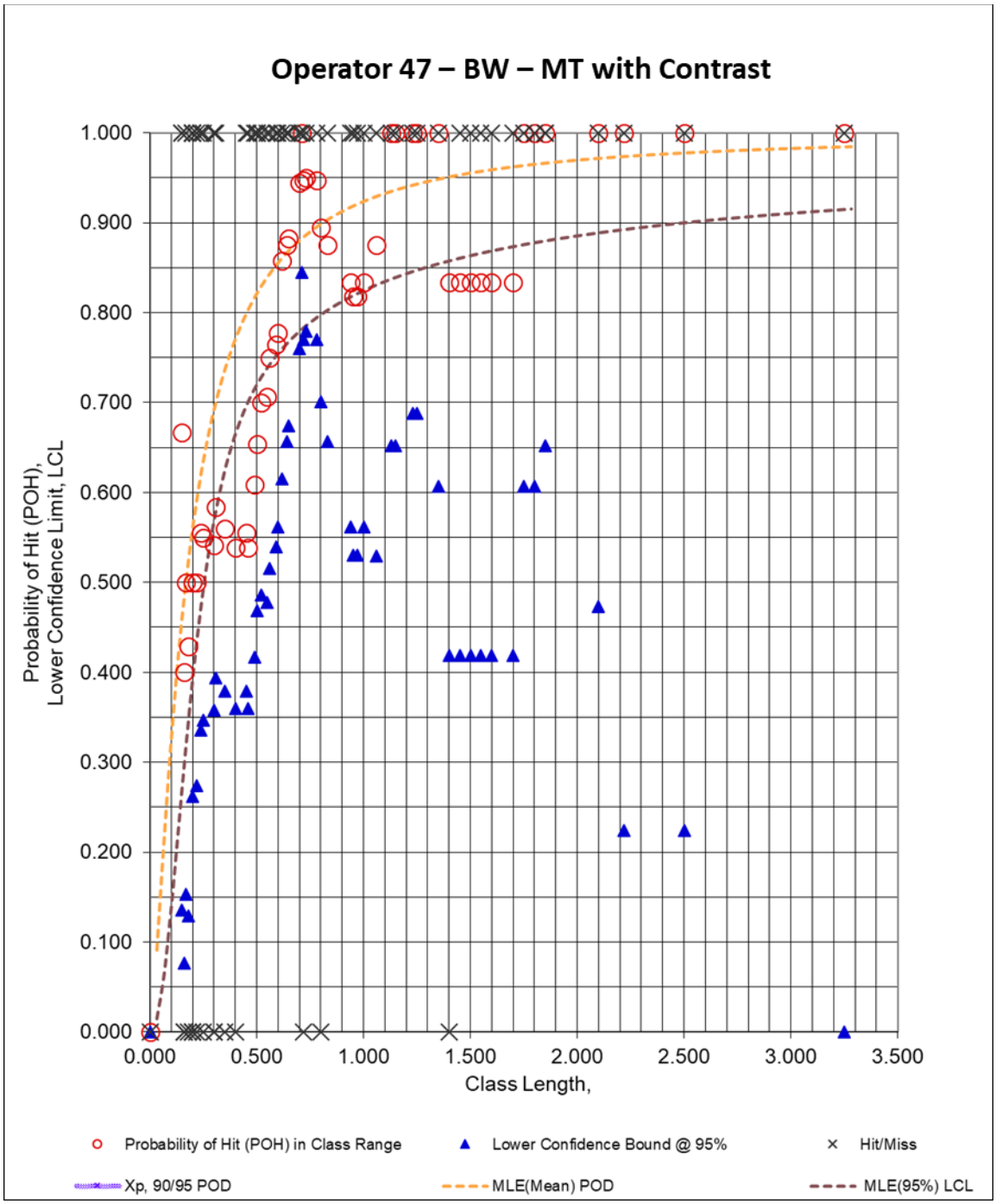

Figure 352. DOEPOD – BW – MT with Contrast – Operator 47

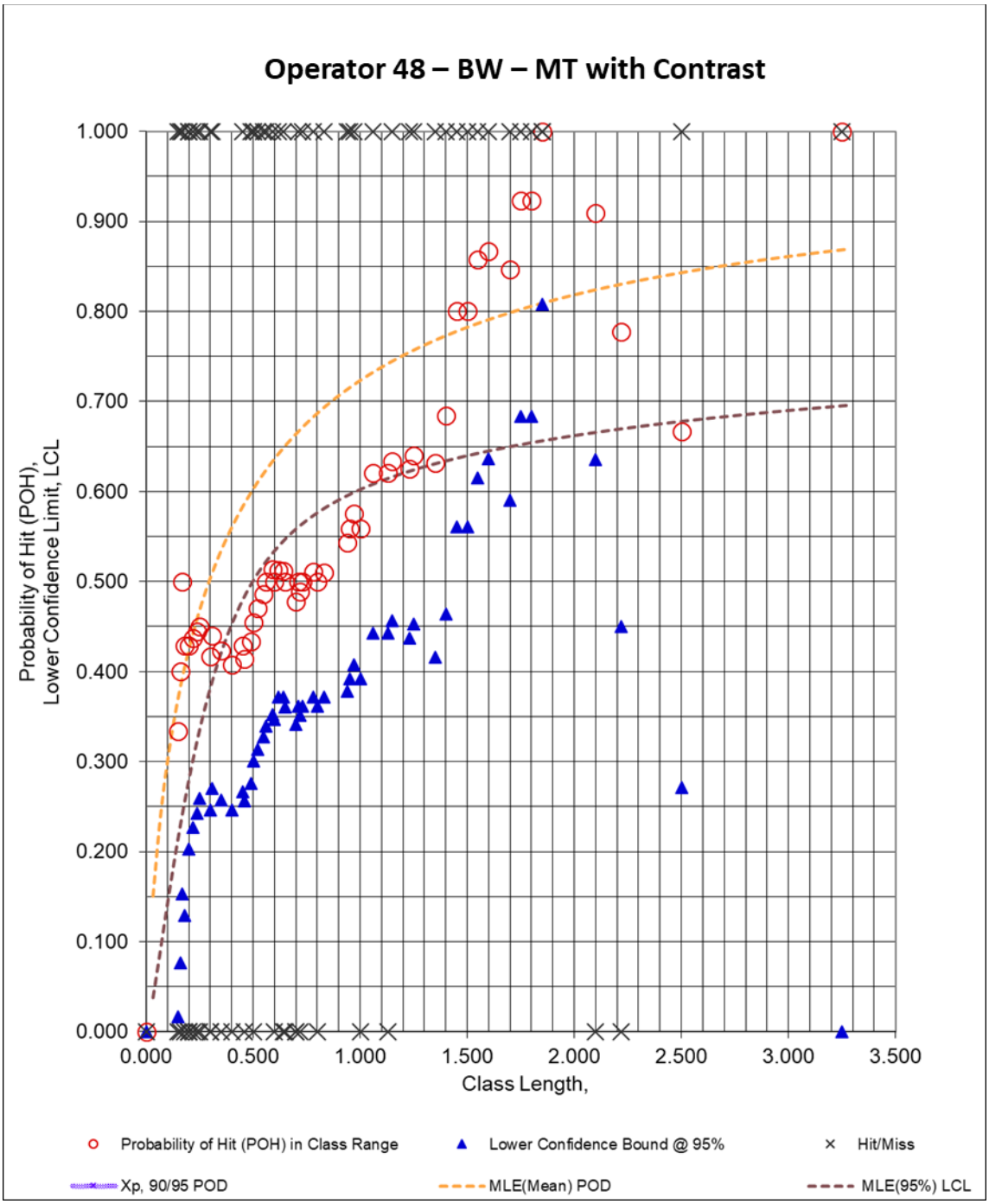

Figure 353. DOEPOD – BW – MT with Contrast – Operator 48

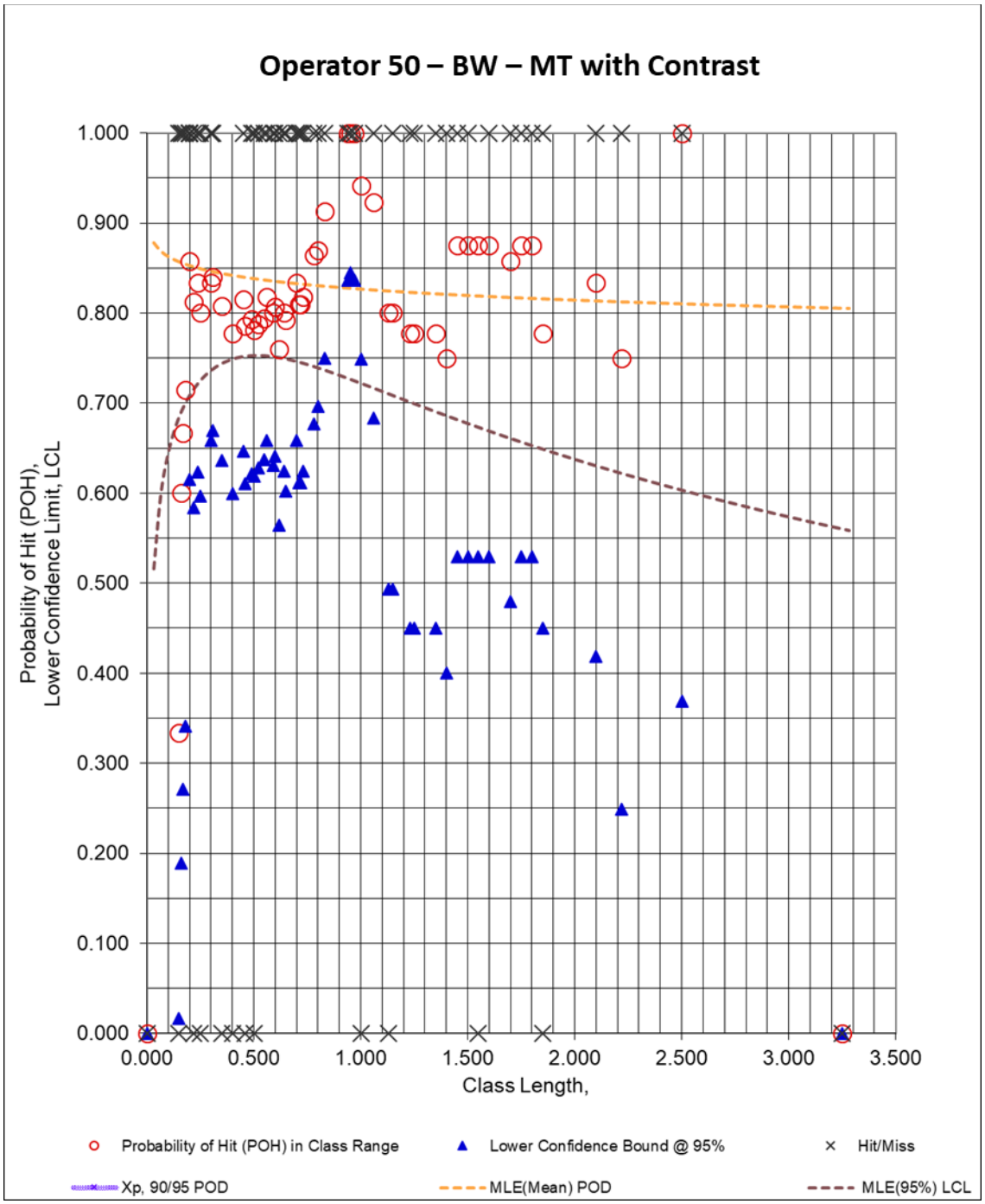

Figure 354. DOEPOD – BW – MT with Contrast – Operator 50

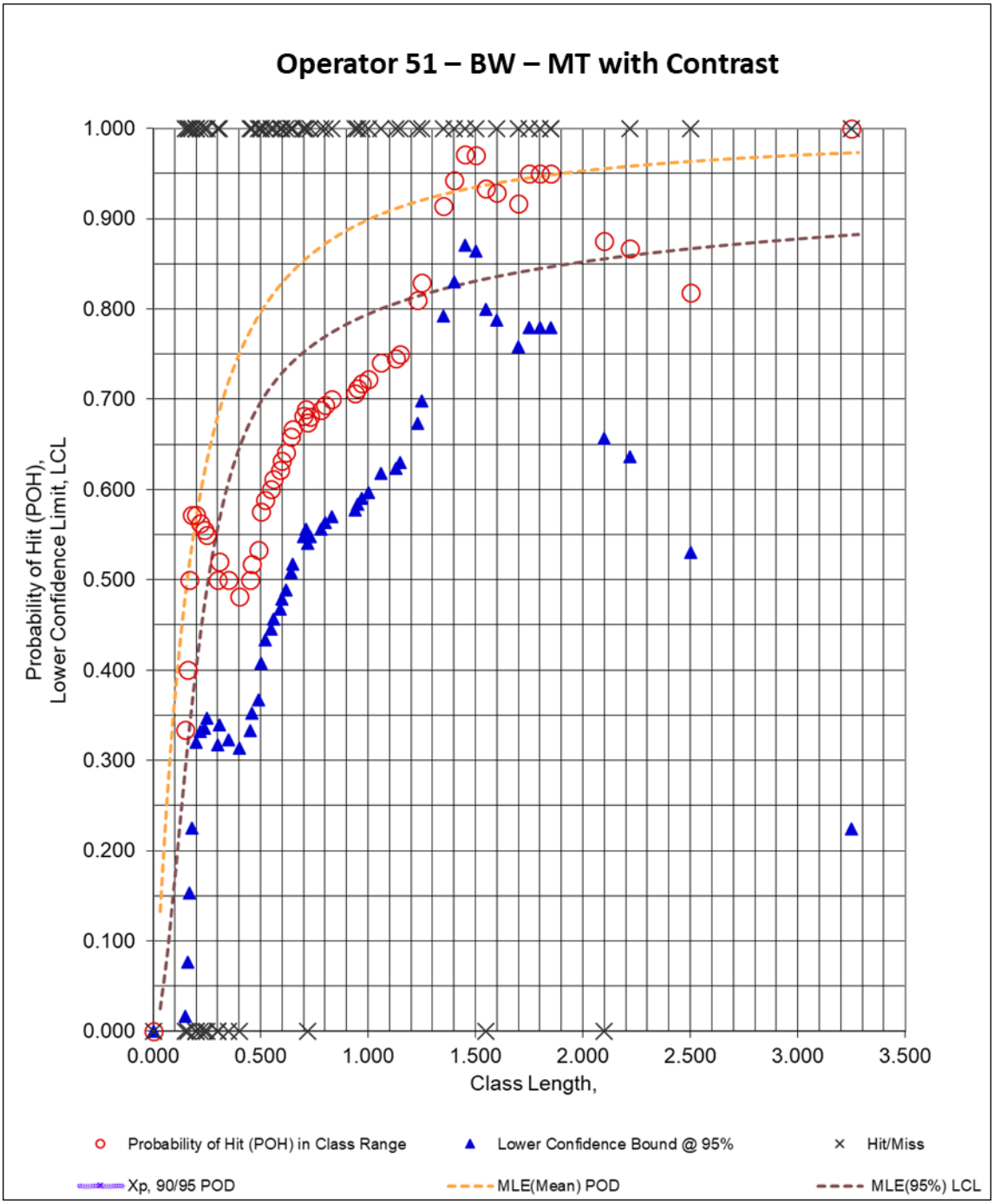

Figure 355. DOEPOD – BW – MT with Contrast – Operator 51

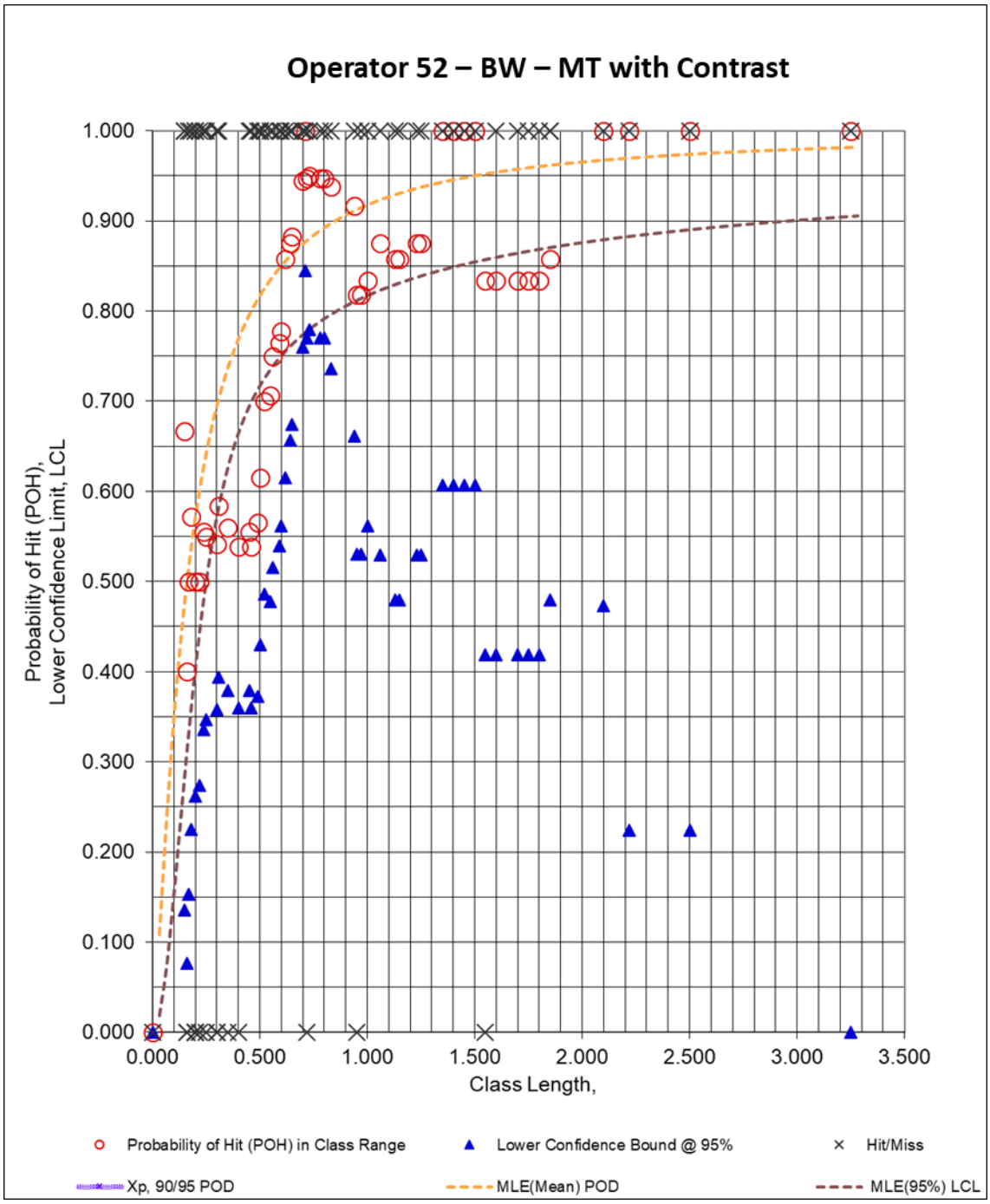

Figure 356. DOEPOD – BW – MT with Contrast – Operator 52

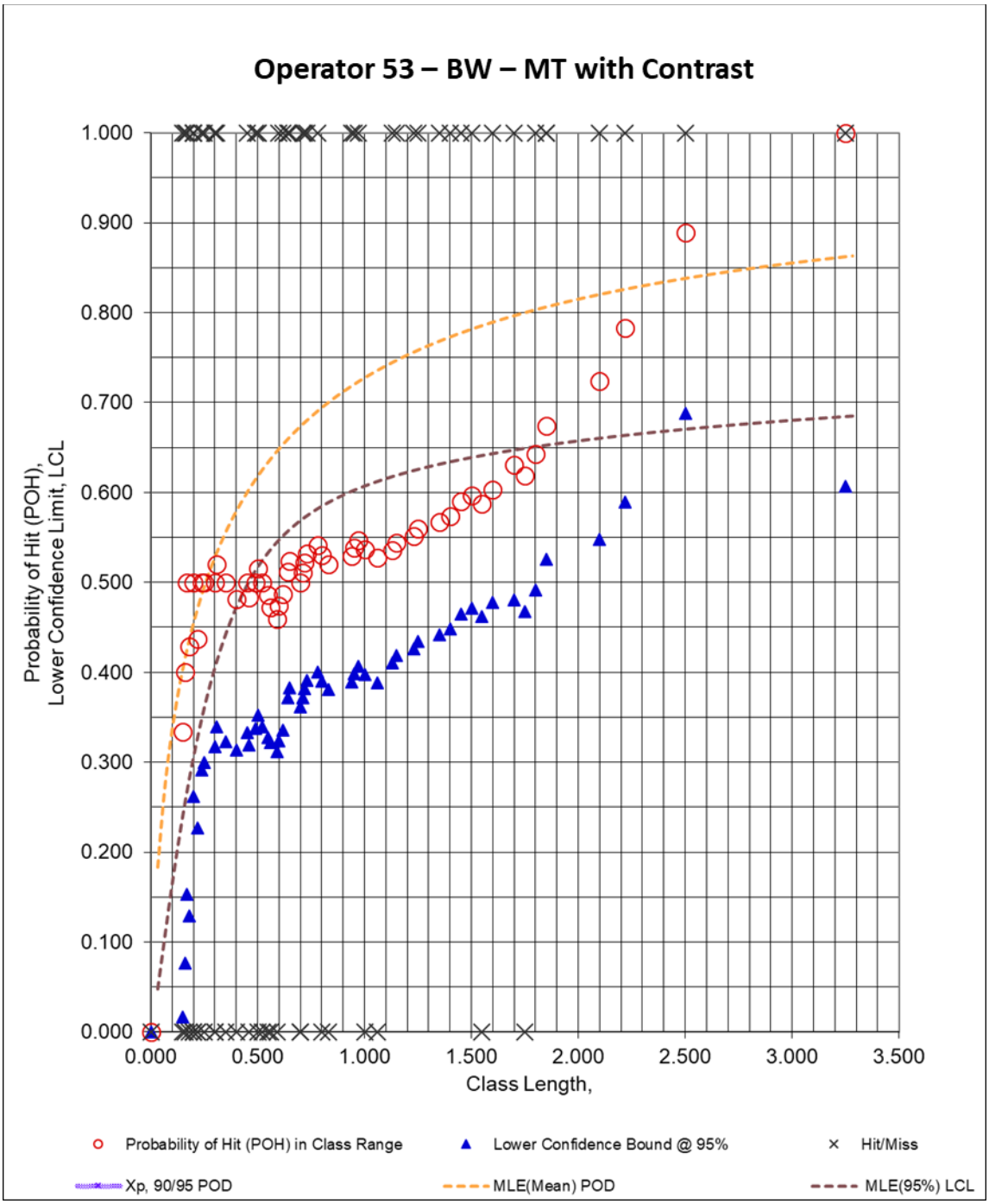

Figure 357. DOEPOD – BW – MT with Contrast – Operator 53

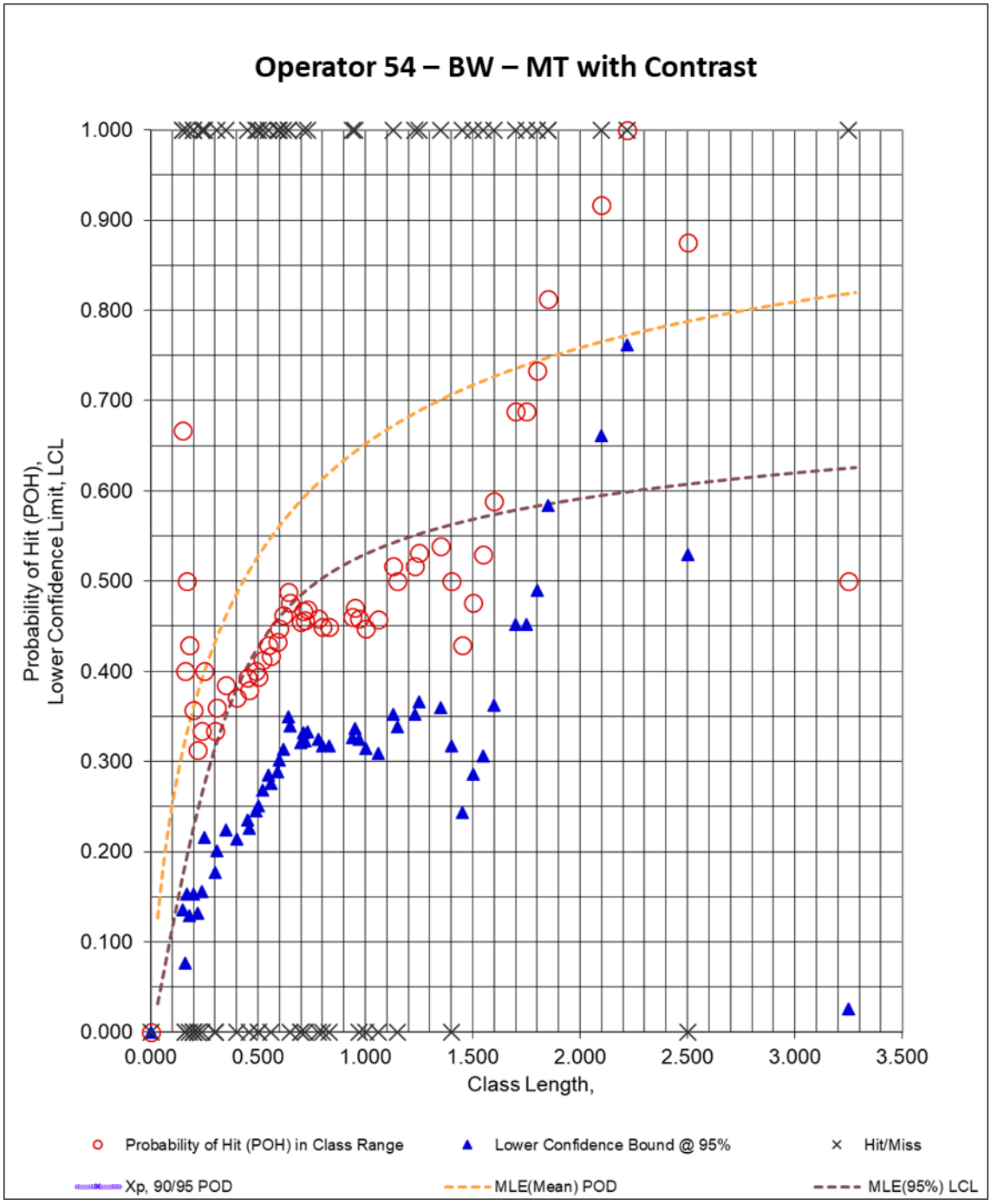

Figure 358. DOEPOD – BW – MT with Contrast – Operator 54

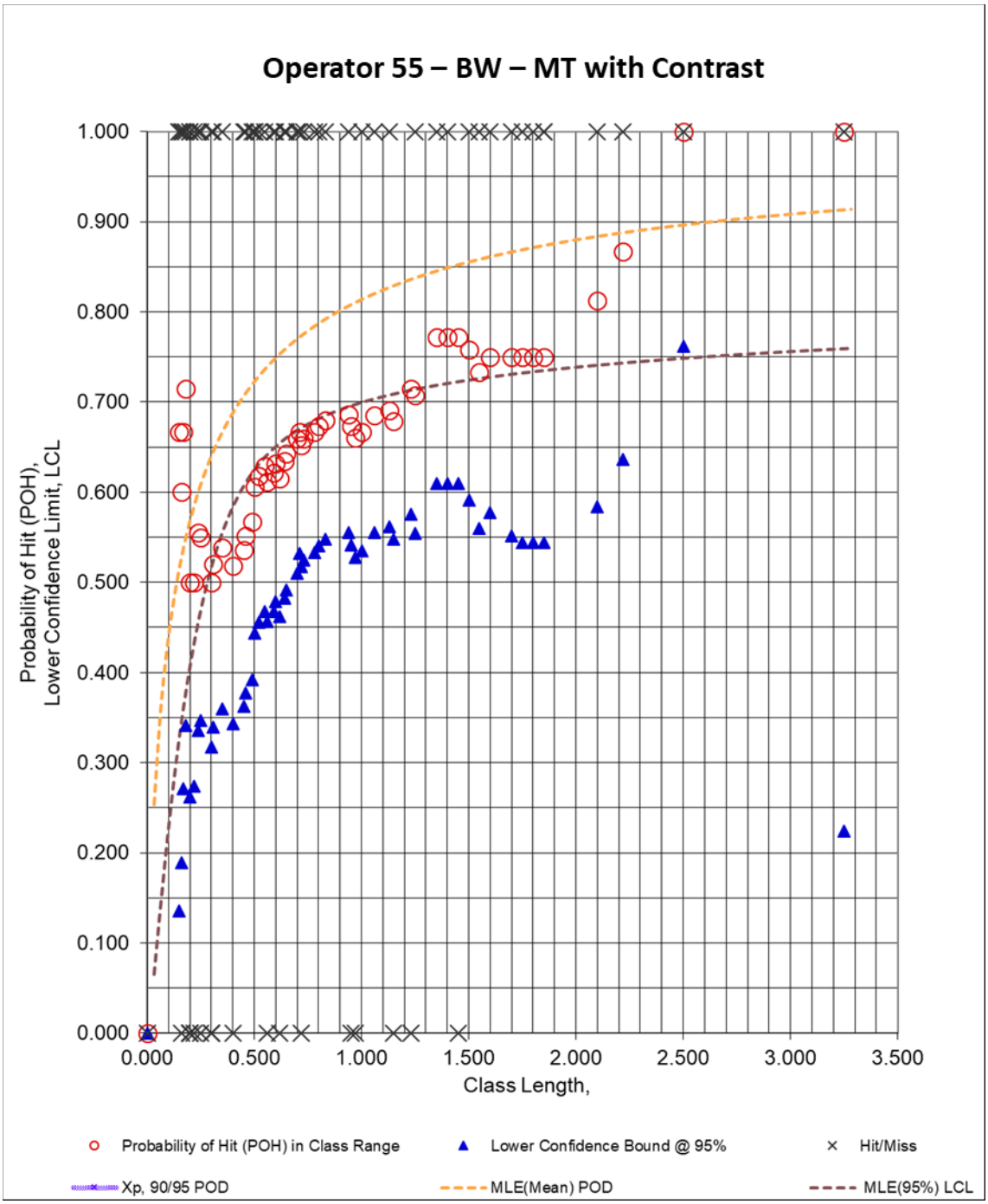

Figure 359. DOEPOD – BW – MT with Contrast – Operator 55

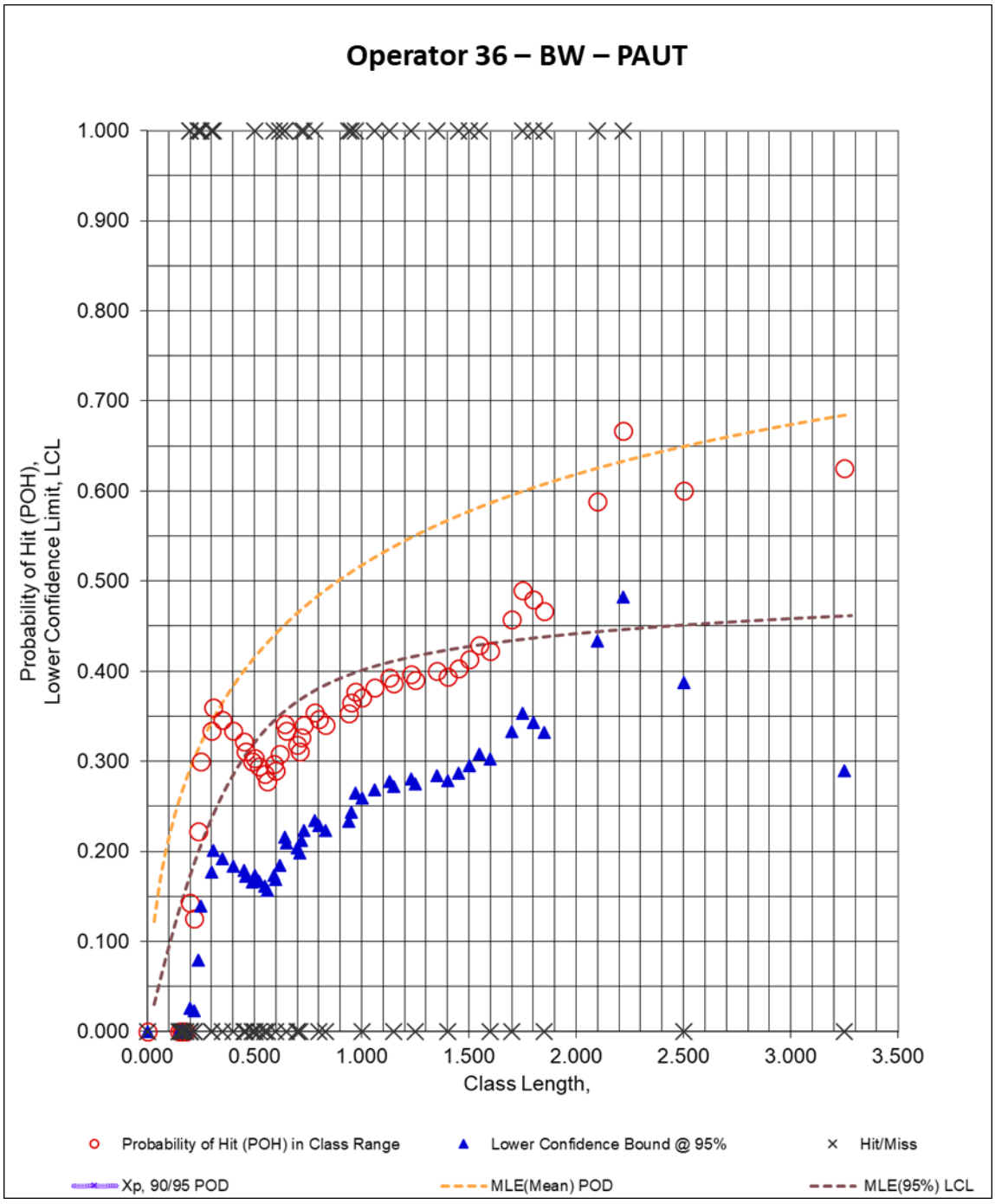

Figure 360. DOEPOD – BW – PAUT – Operator 36

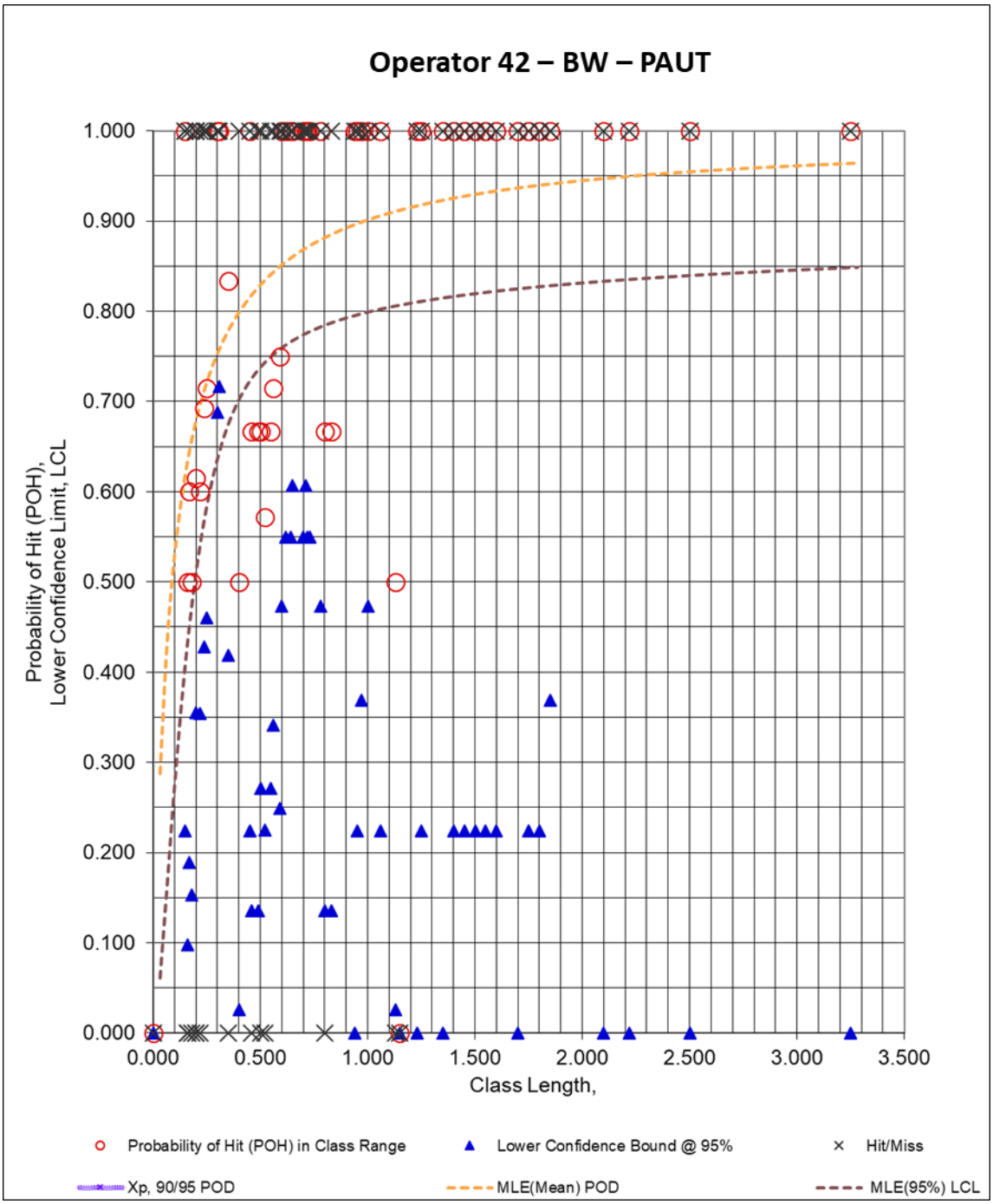

Figure 361. DOEPOD – BW – PAUT – Operator 42

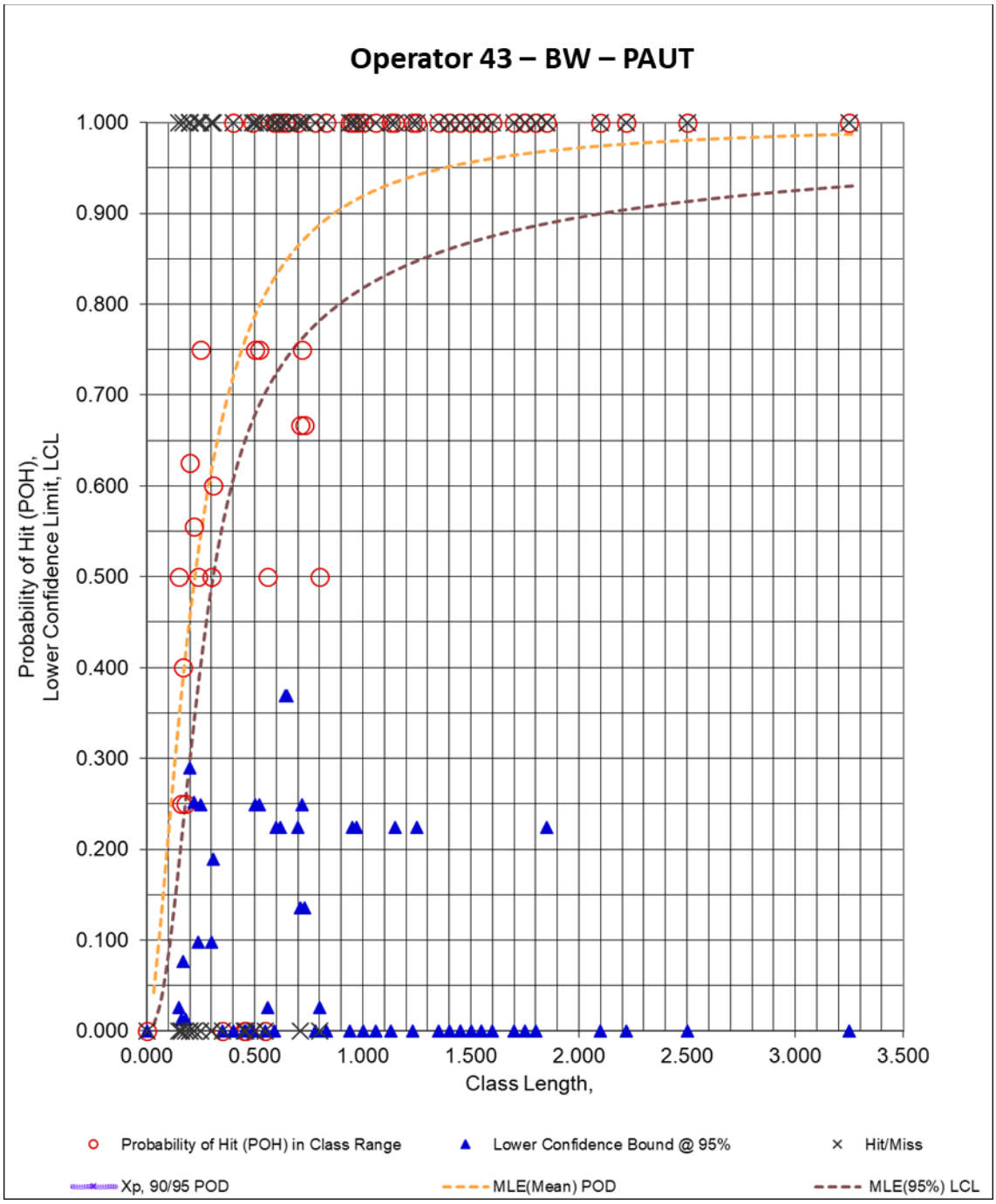

Figure 362. DOEPOD – BW – PAUT – Operator 43

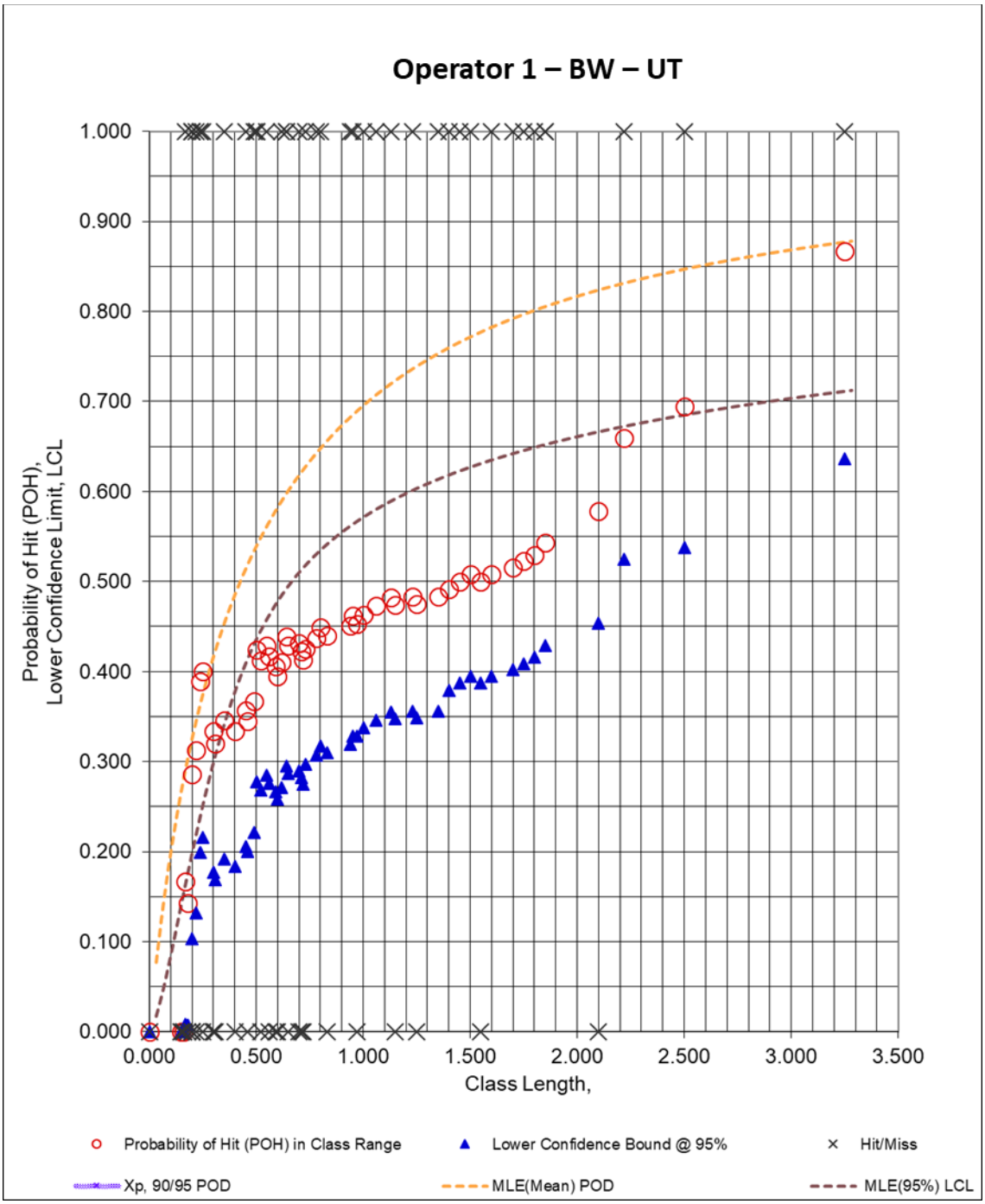

Figure 363. DOEPOD – BW – UT – Operator 1

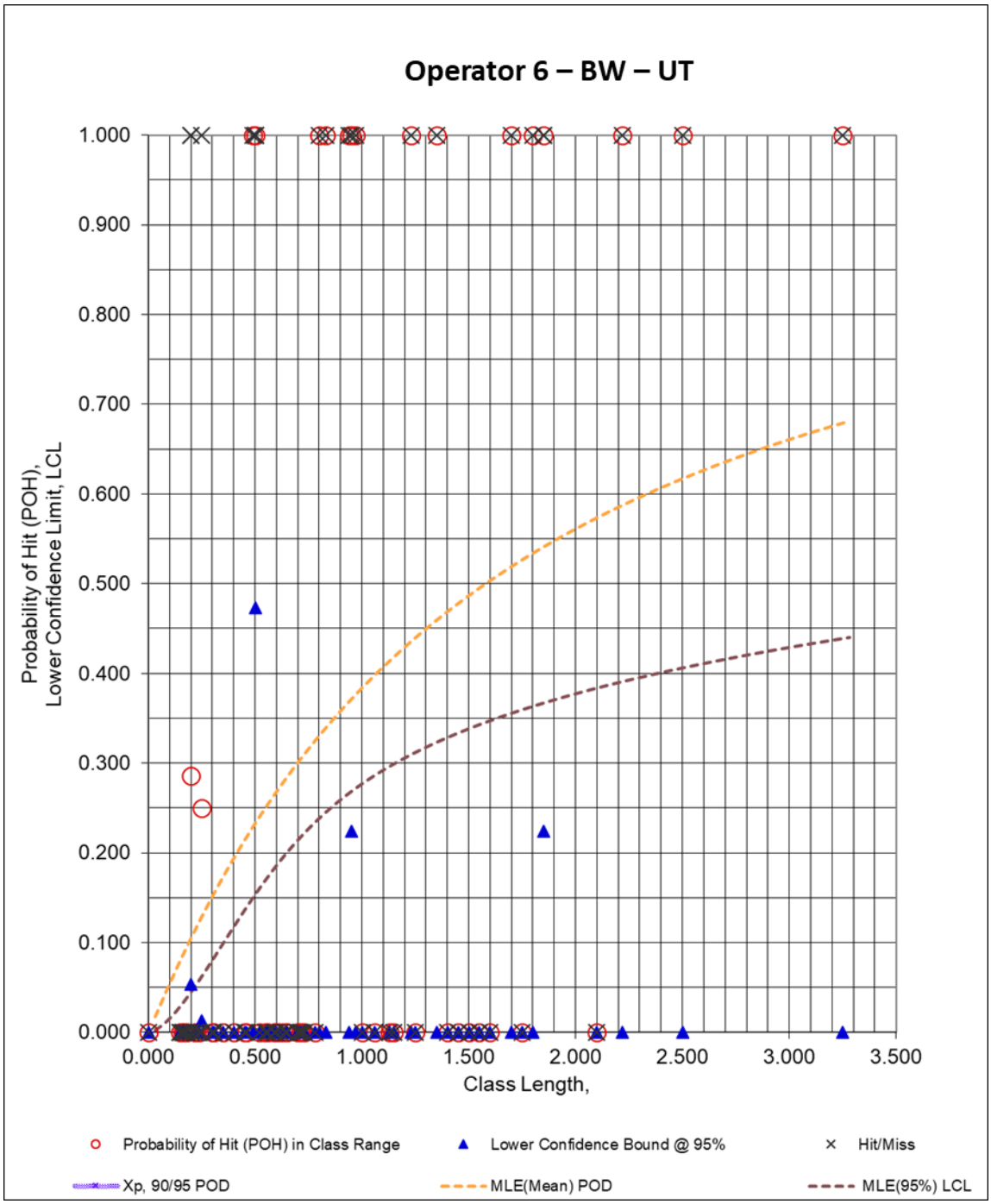

Figure 364. DOEPOD – BW – UT – Operator 6

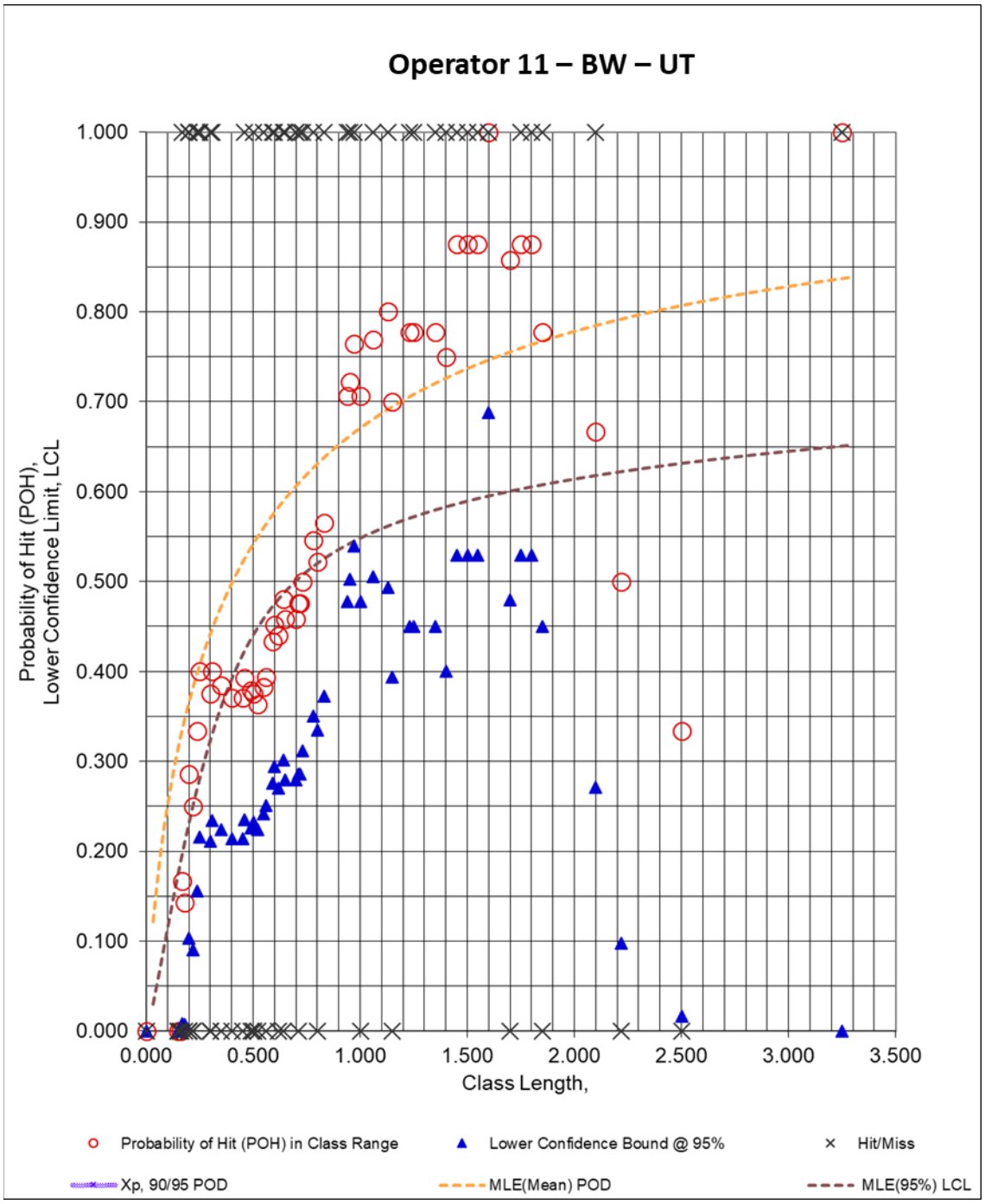

Figure 365. DOEPOD – BW – UT – Operator 11

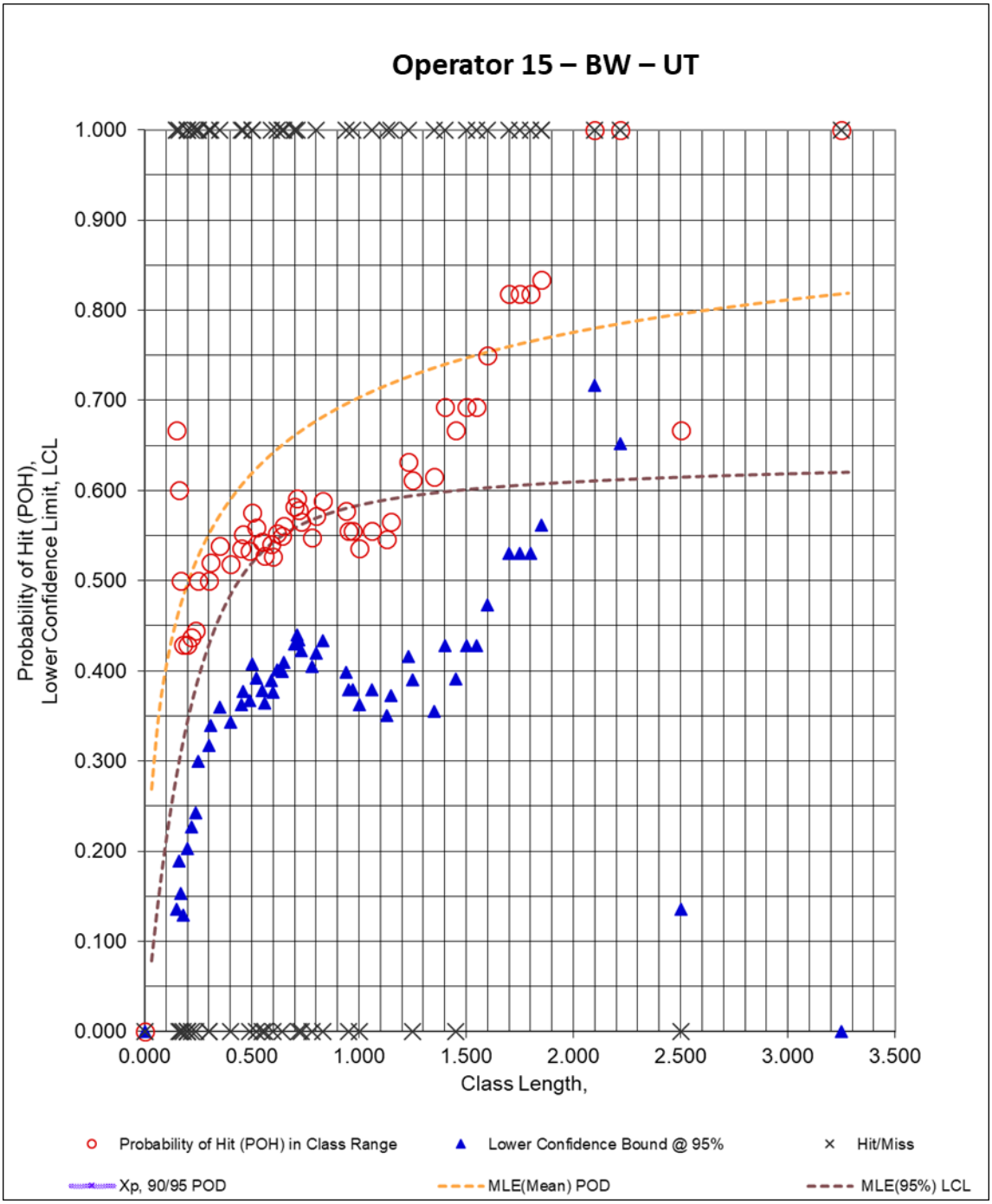

Figure 366. DOEPOD – BW – UT – Operator 15

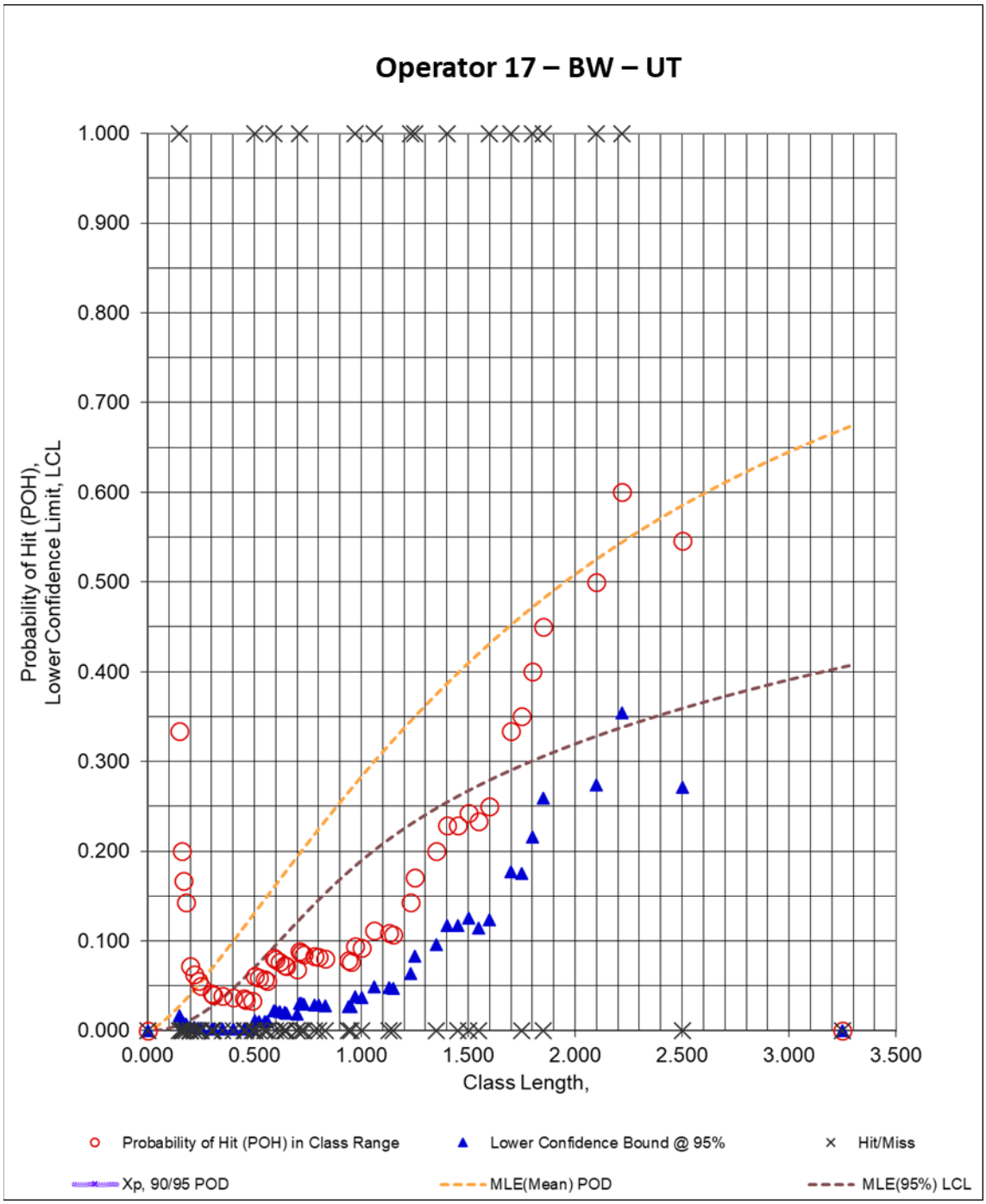

Figure 367. DOEPOD – BW – UT – Operator 17

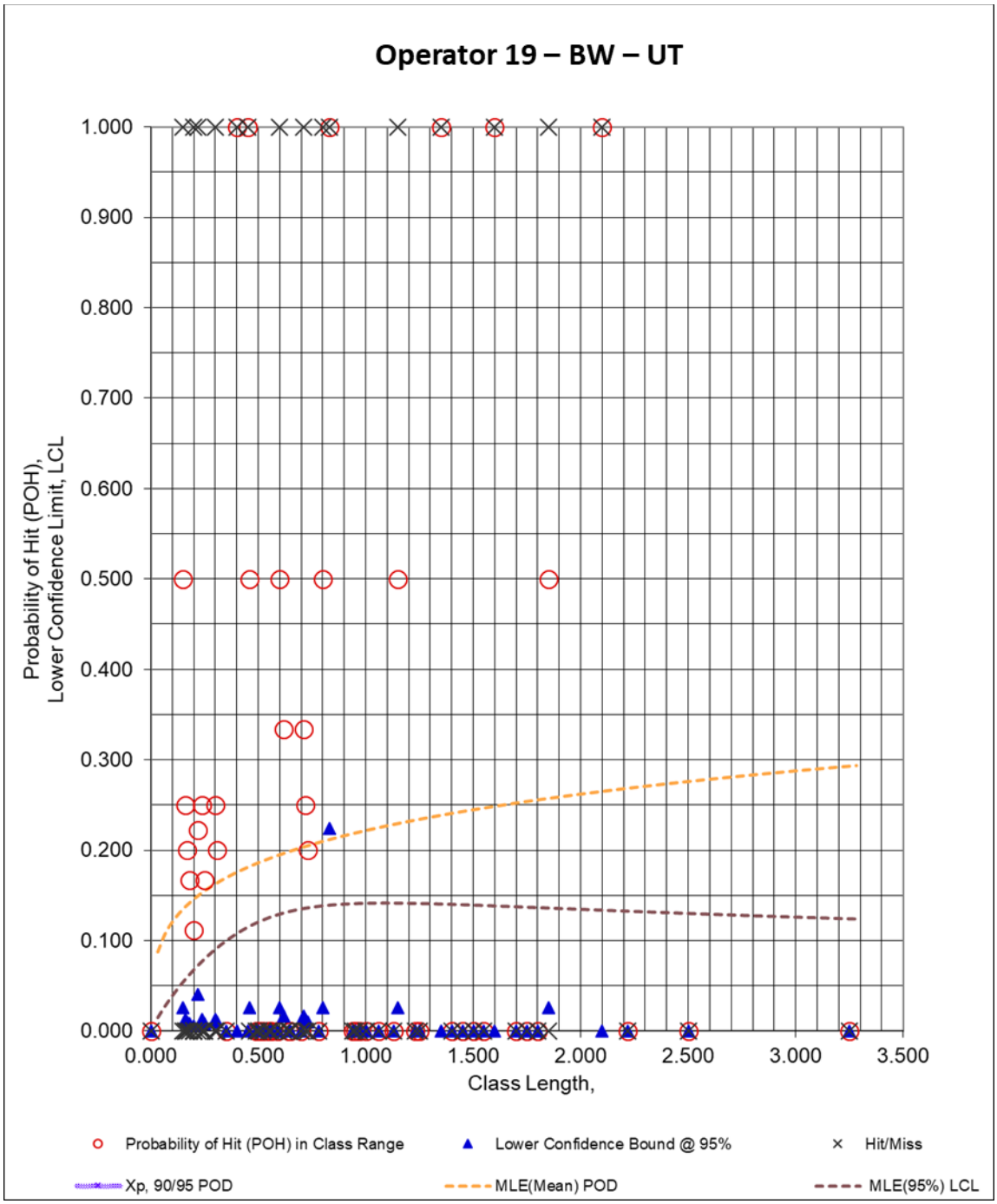

Figure 368. DOEPOD – BW – UT – Operator 19

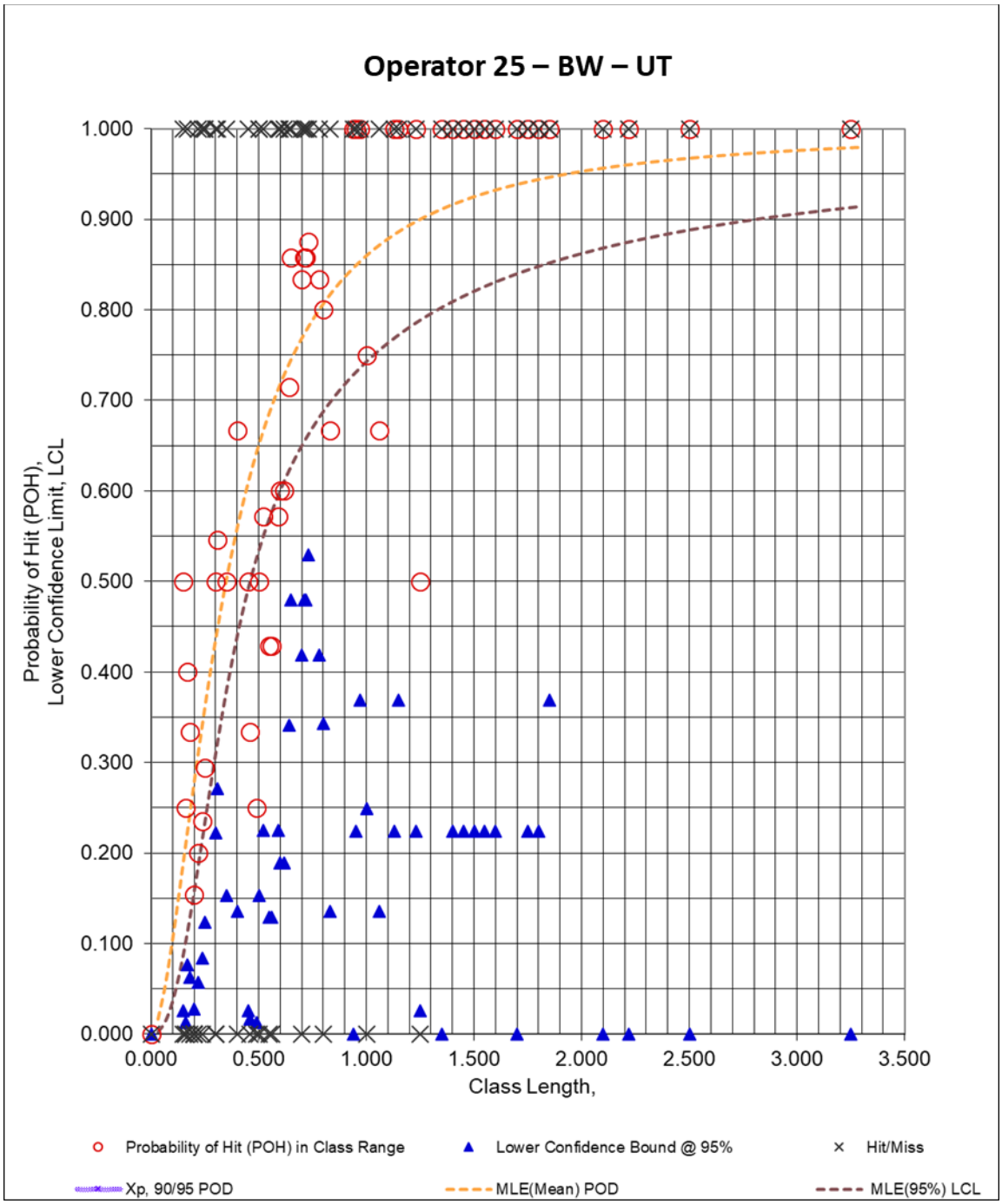

Figure 369. DOEPOD – BW – UT – Operator 25

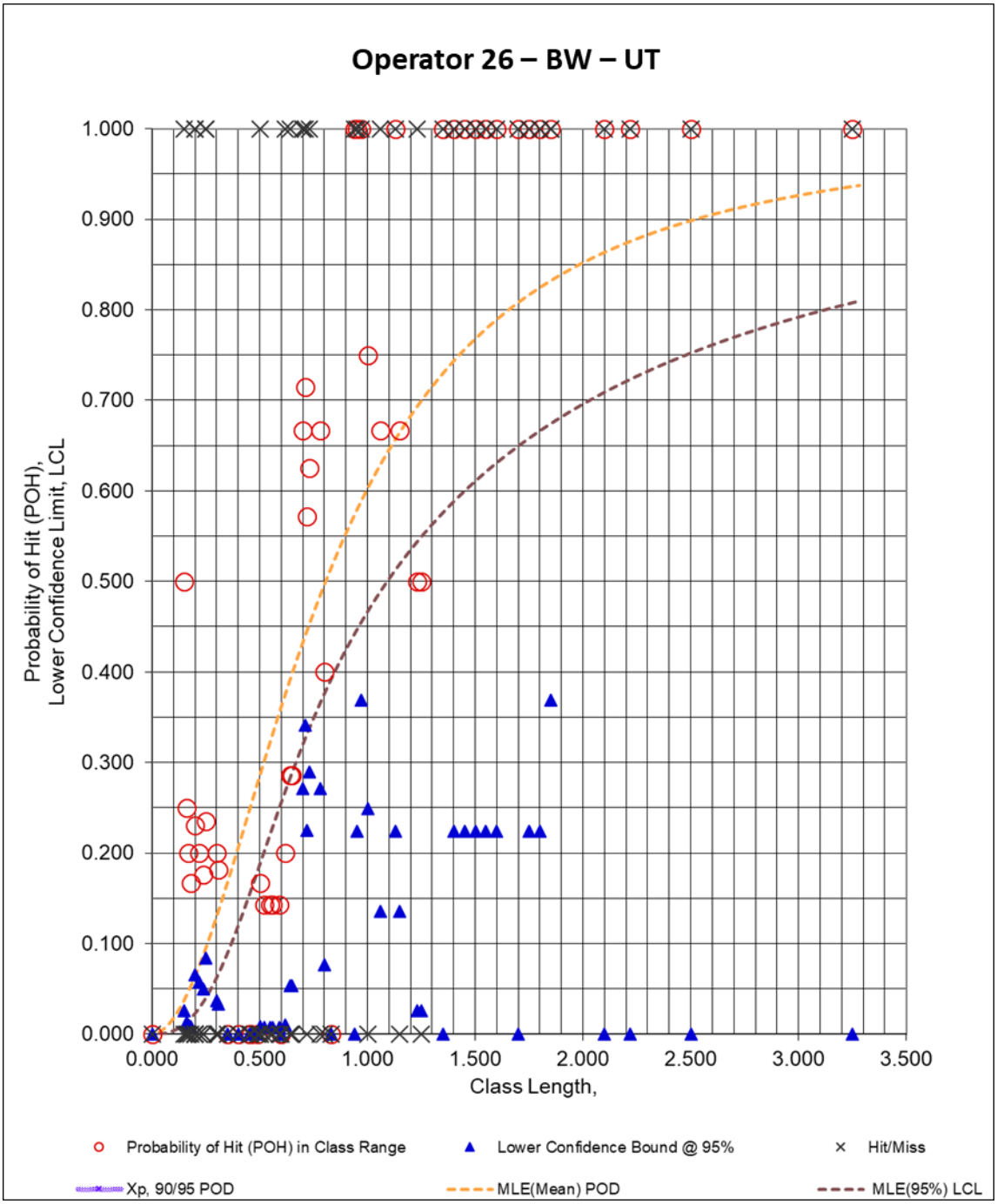

Figure 370. DOEPOD – BW – UT – Operator 26

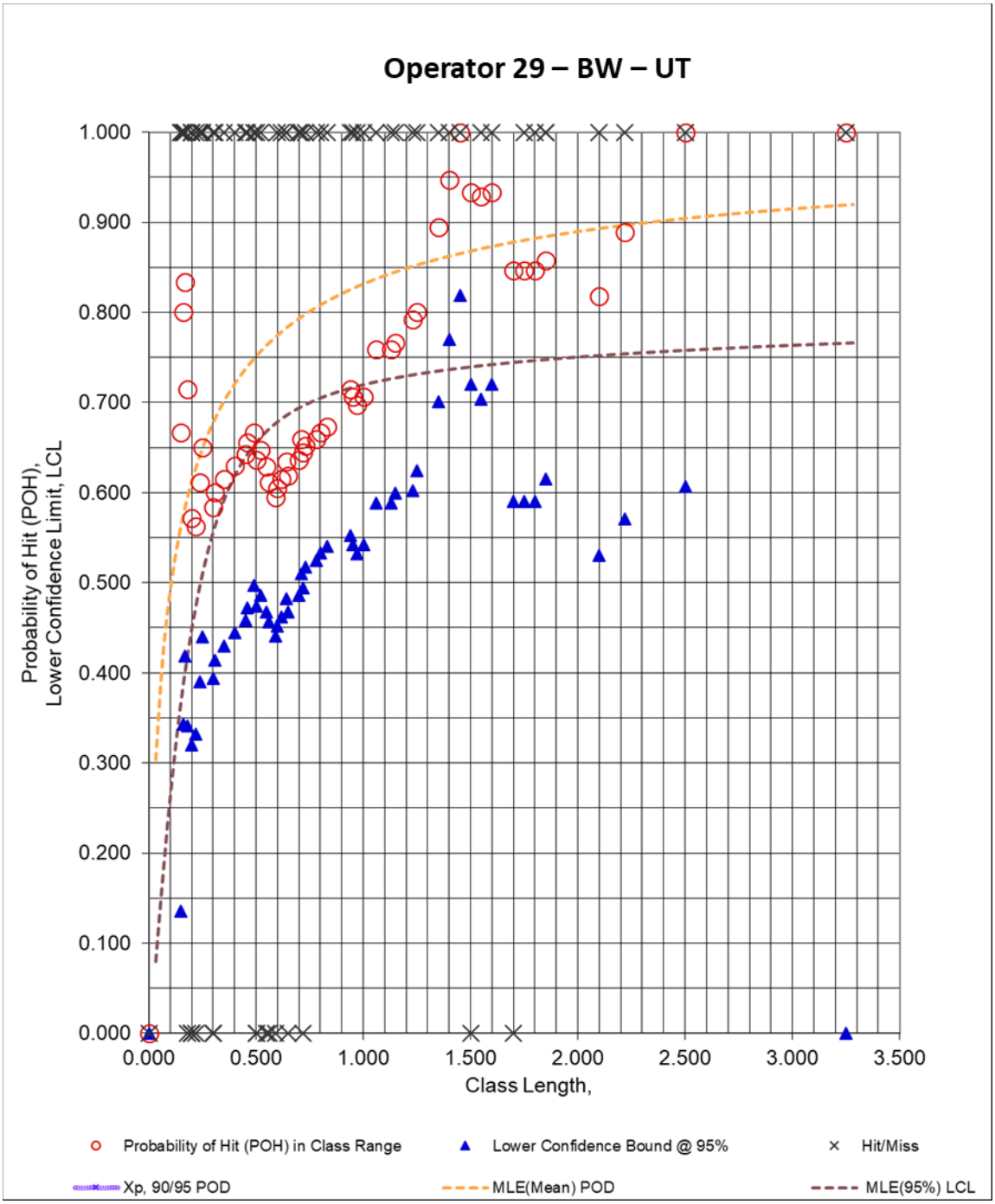

Figure 371. DOEPOD – BW – UT – Operator 29

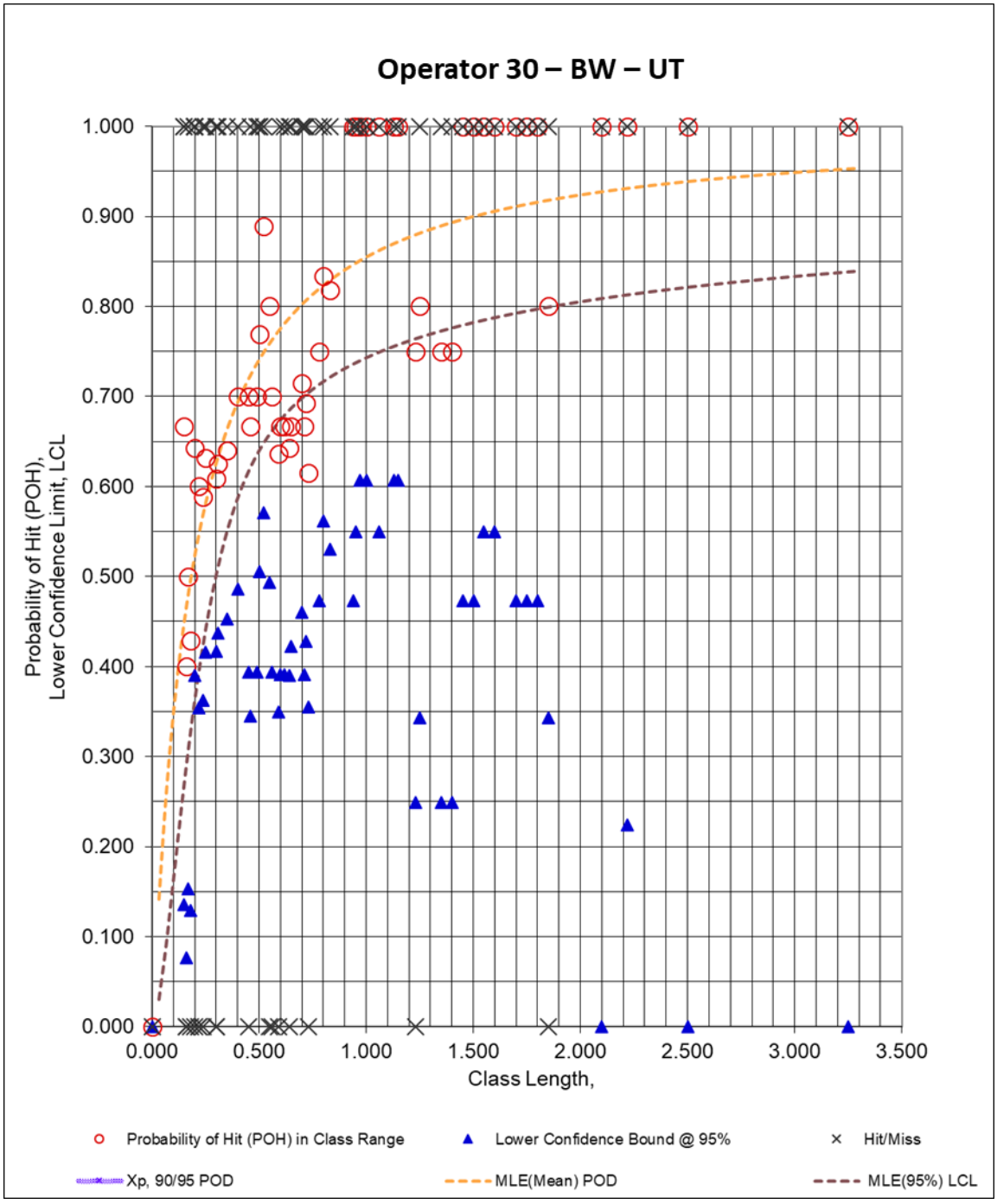

Figure 372. DOEPOD – BW – UT – Operator 30

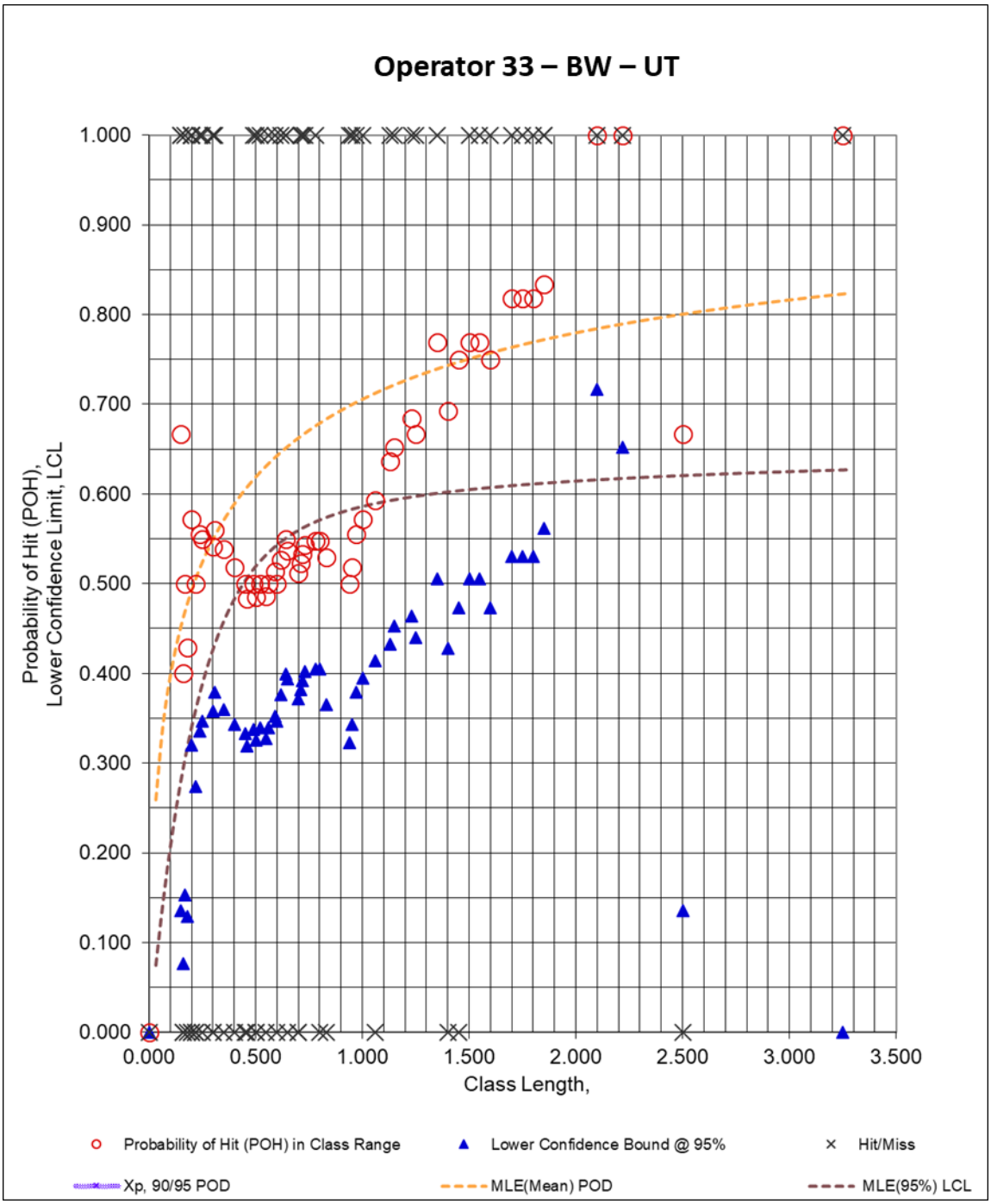

Figure 373. DOEPOD – BW – UT – Operator 33

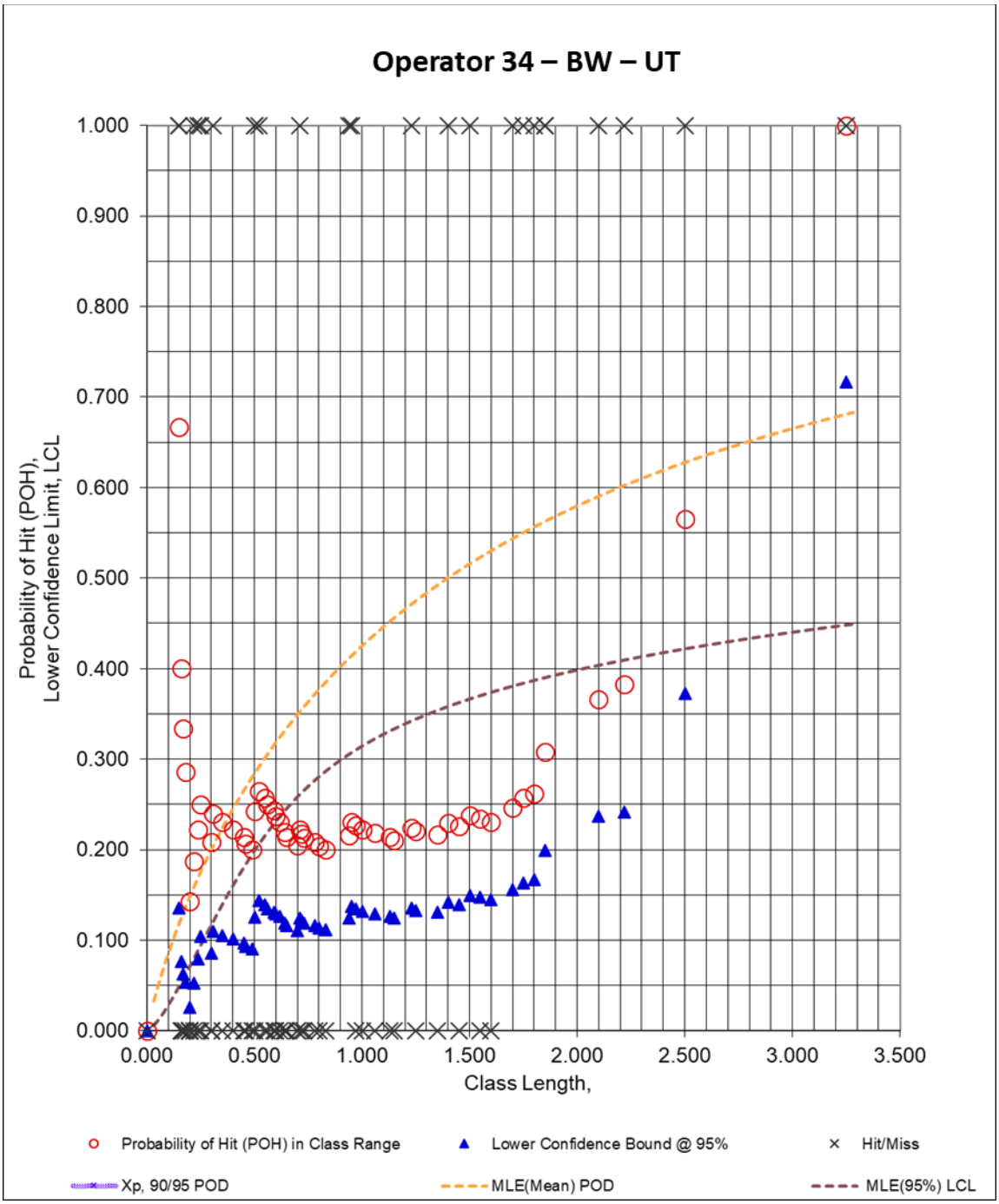

Figure 374. DOEPOD – BW – UT – Operator 34

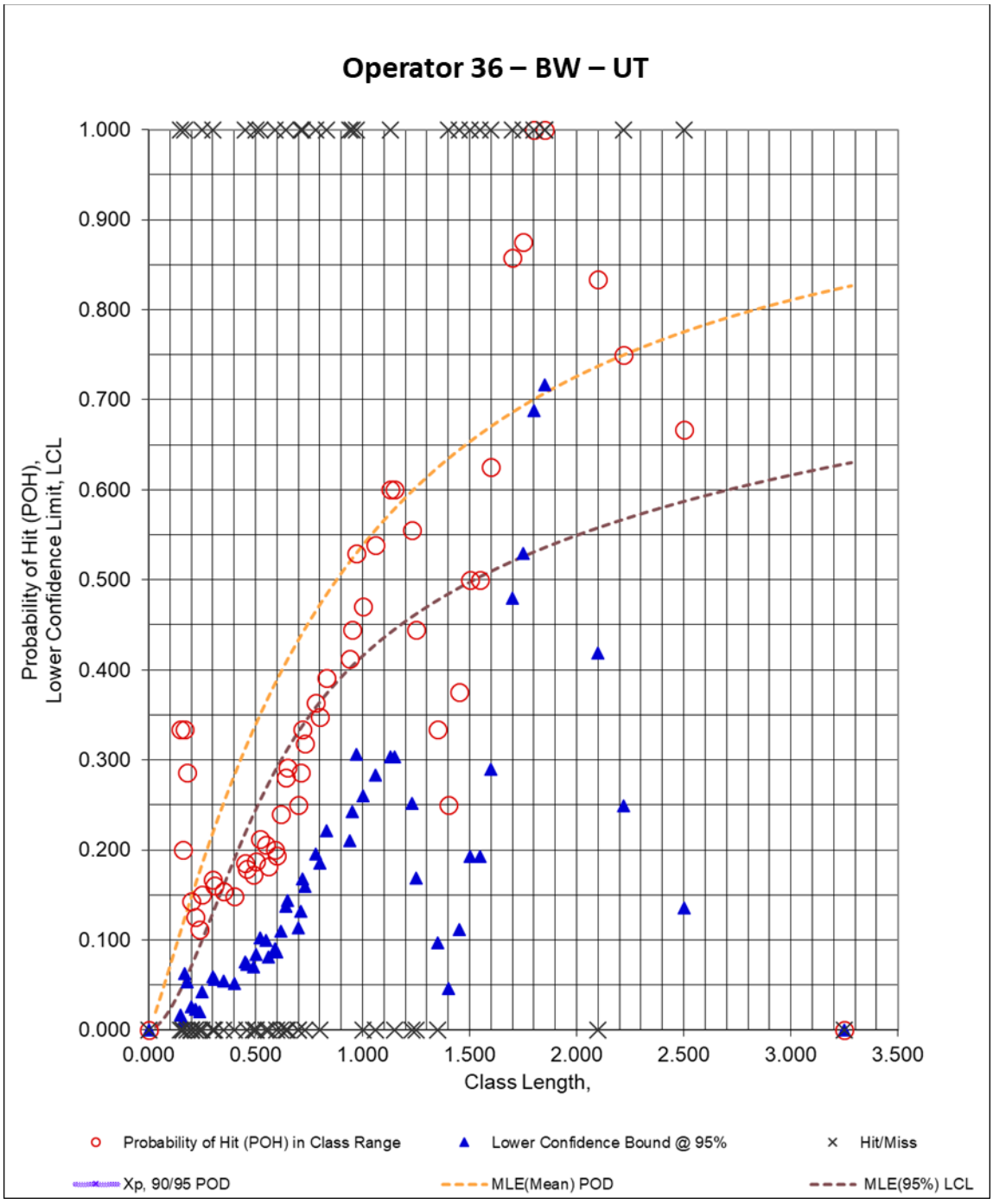

Figure 375. DOEPOD – BW – UT – Operator 36

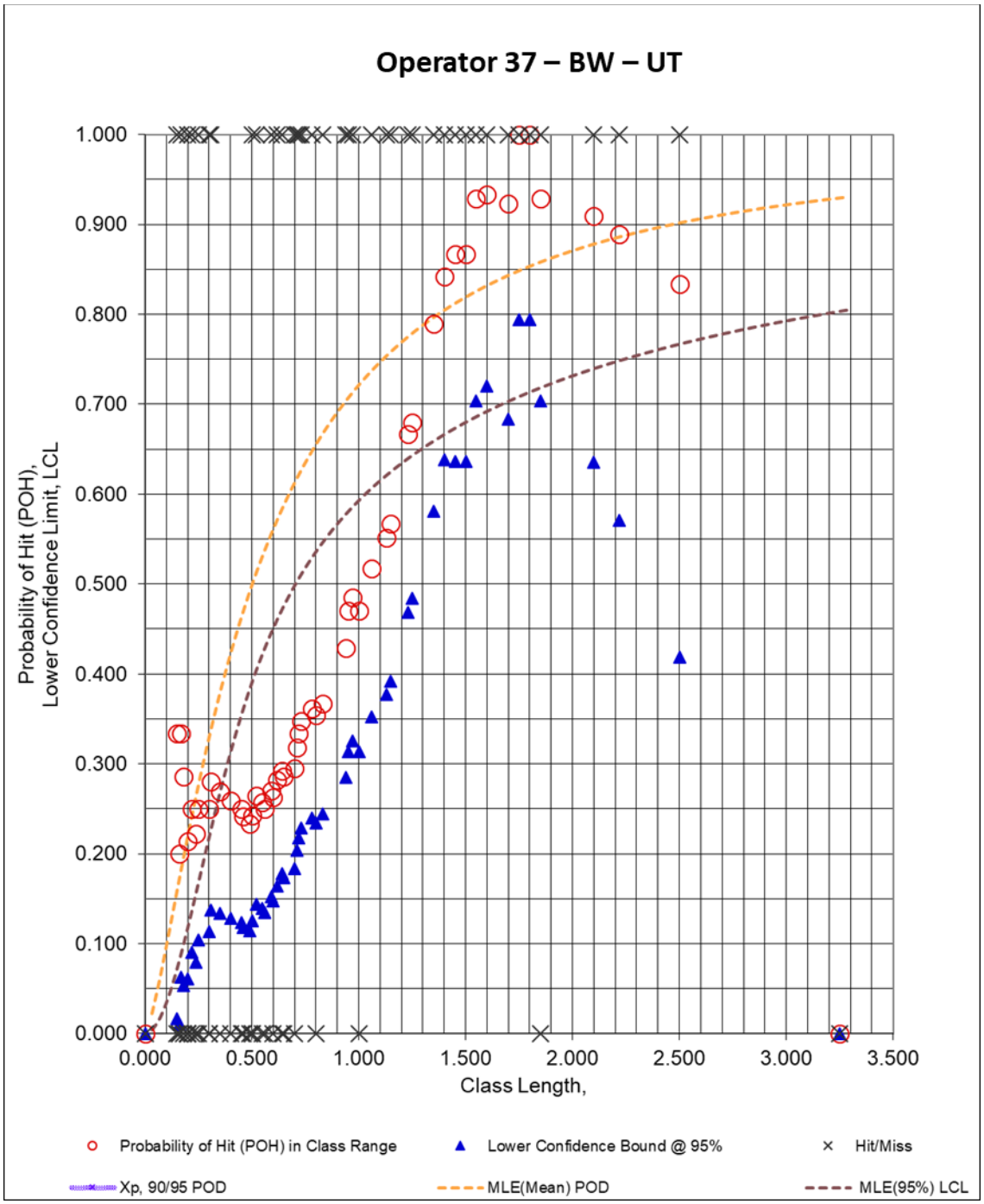

Figure 376. DOEPOD – BW – UT – Operator 37

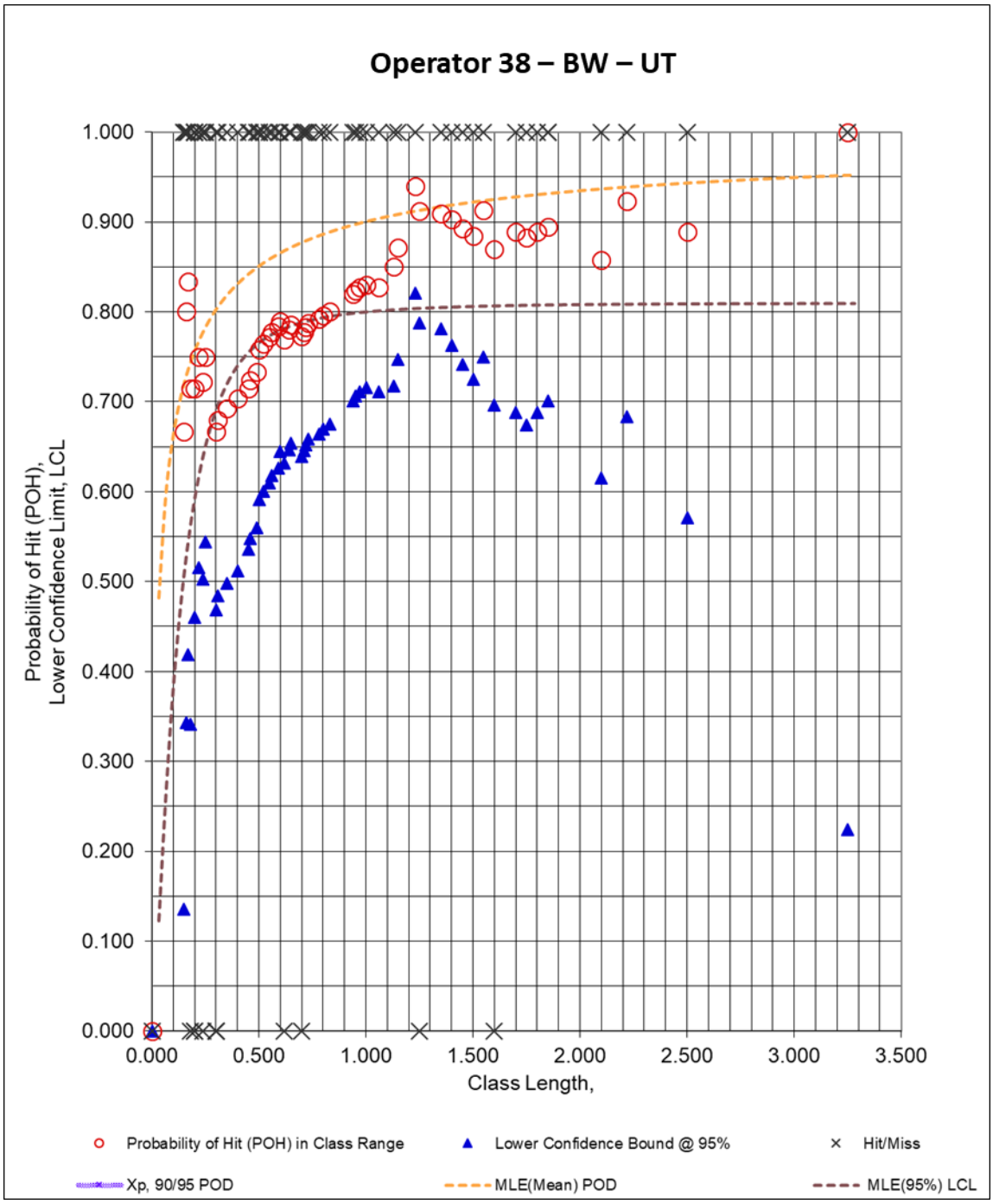

Figure 377. DOEPOD – BW – UT – Operator 38

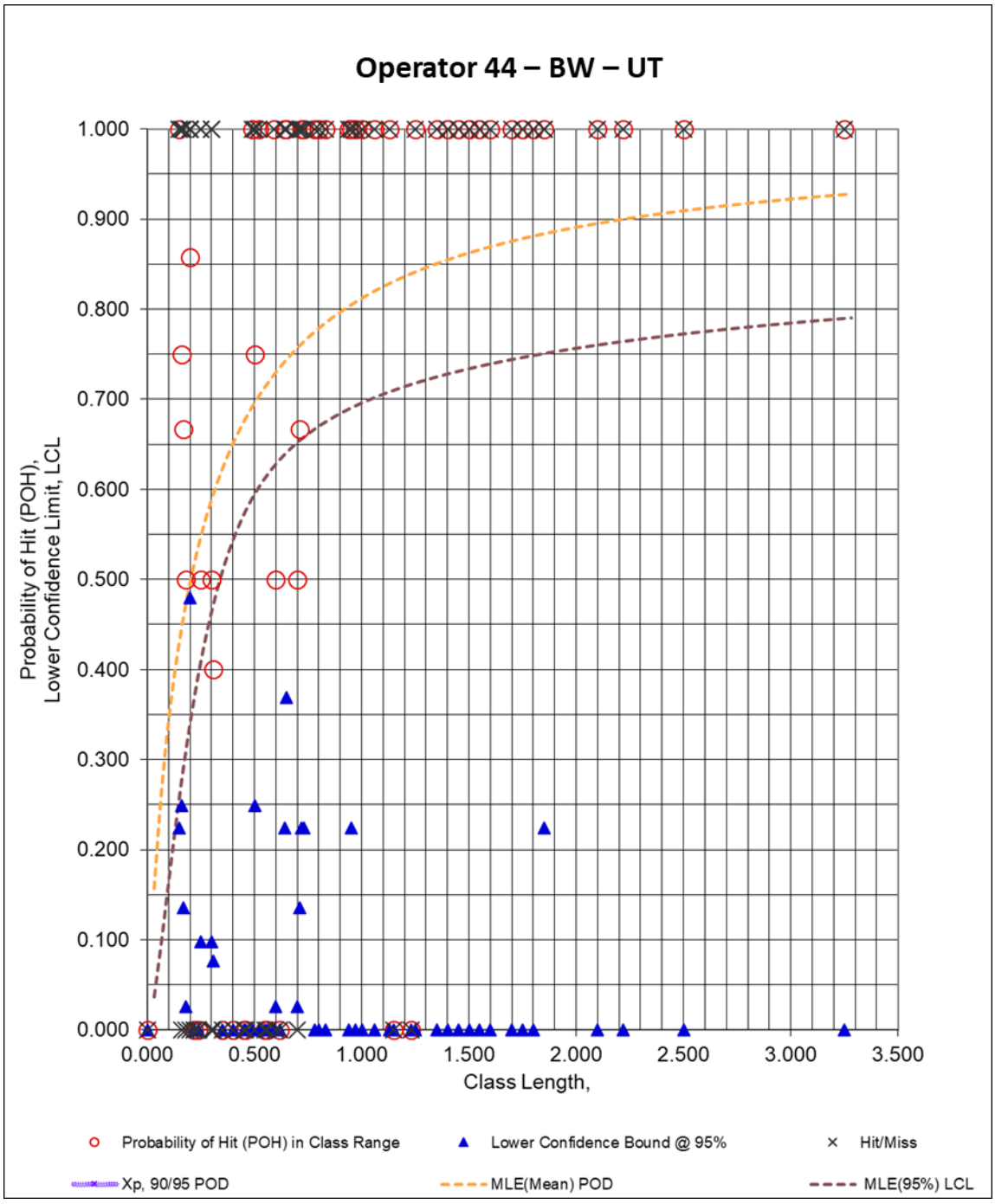

Figure 378. DOEPOD – BW – UT – Operator 44

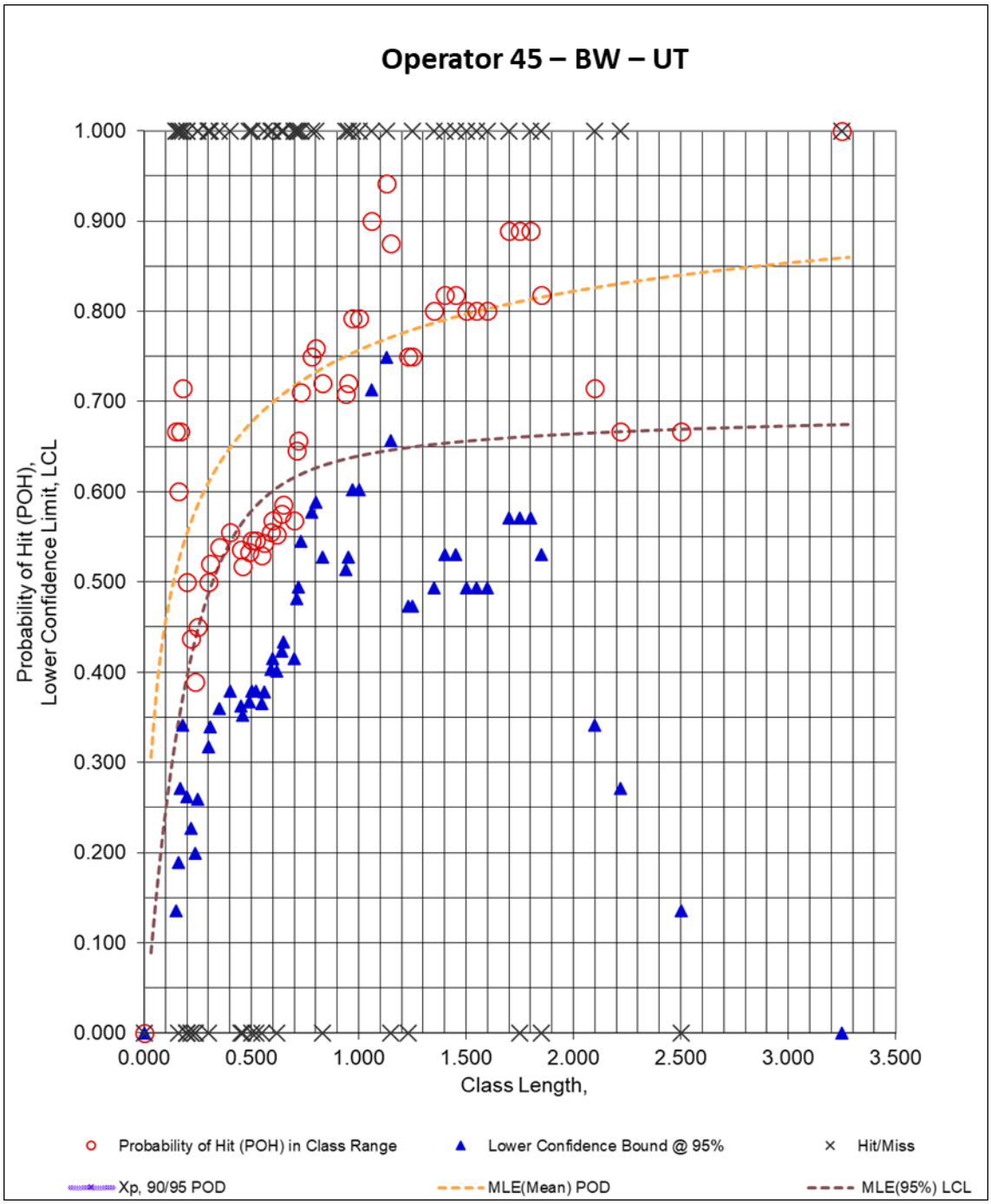

Figure 379. DOEPOD – BW – UT – Operator 45

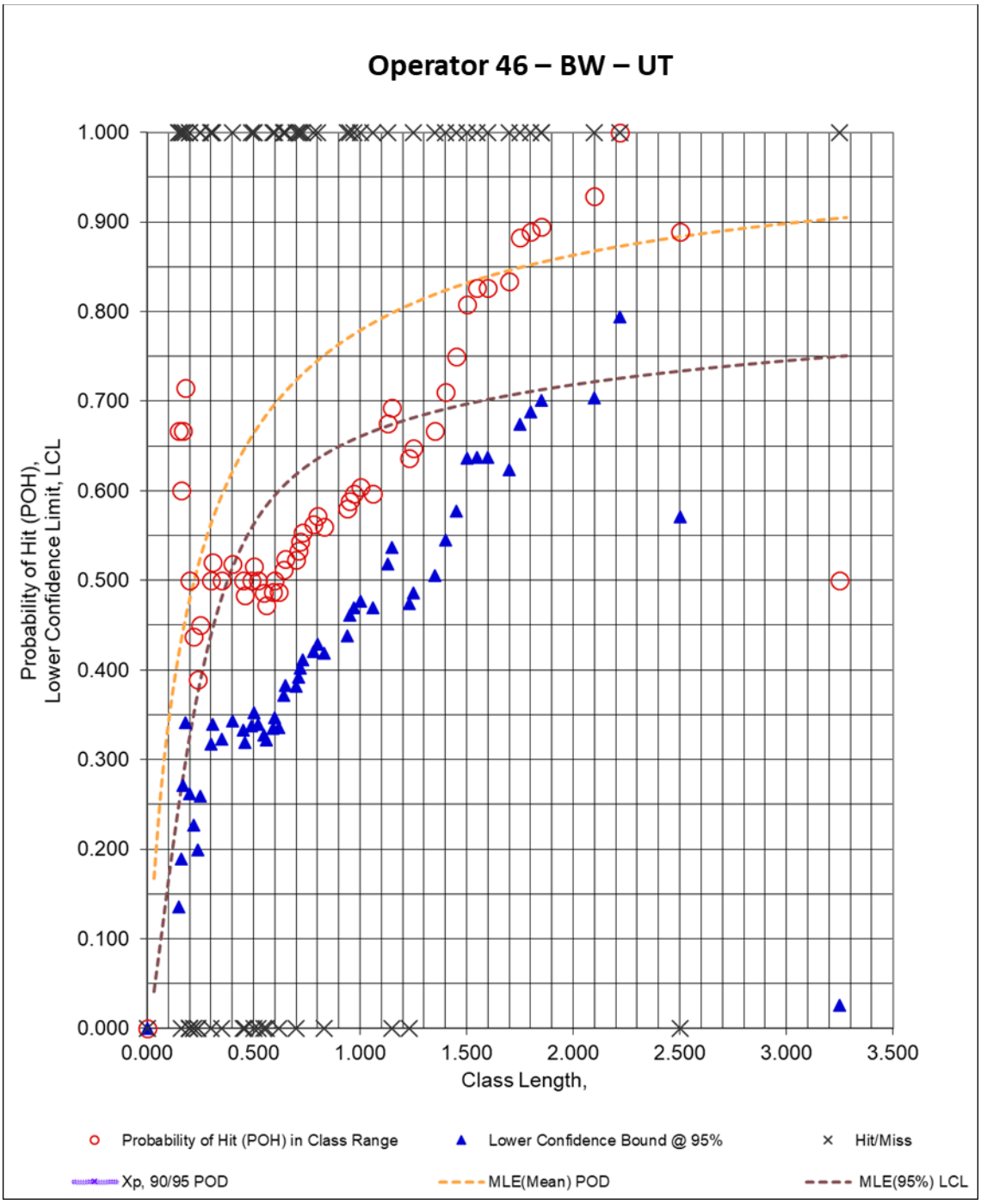

Figure 380. DOEPOD – BW – UT – Operator 46

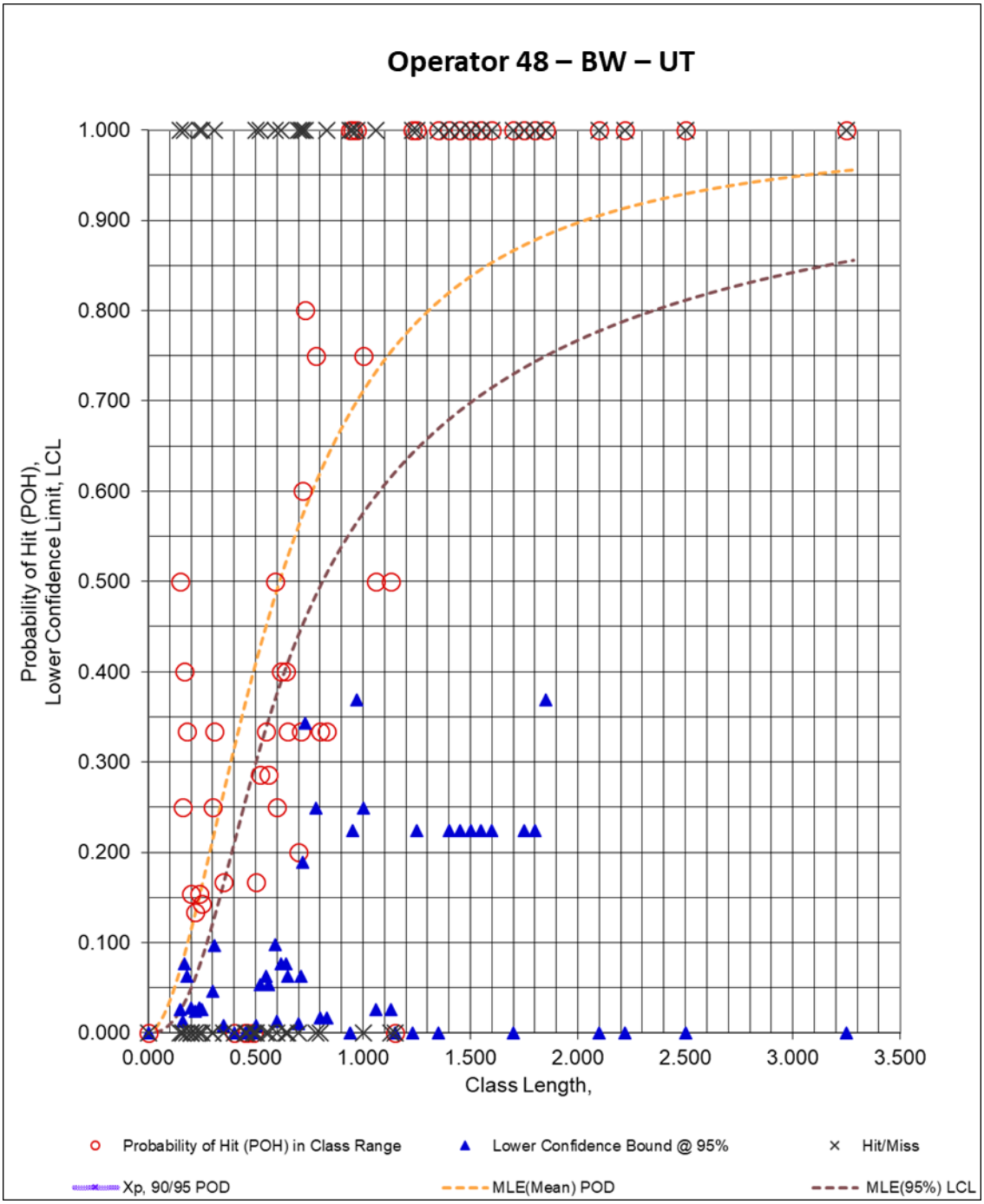

Figure 381. DOEPOD – BW – UT – Operator 48

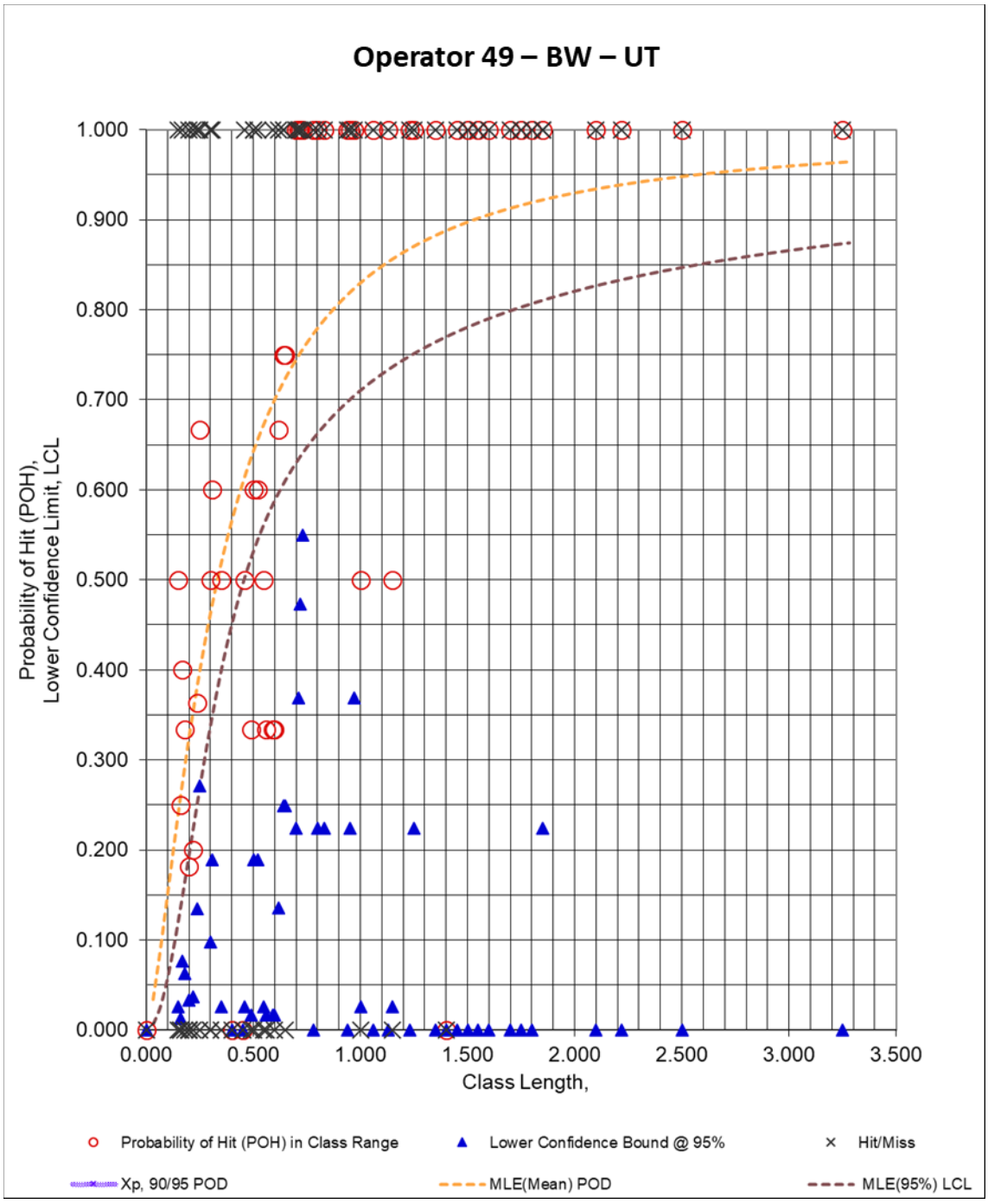

Figure 382. DOEPOD – BW – UT – Operator 49

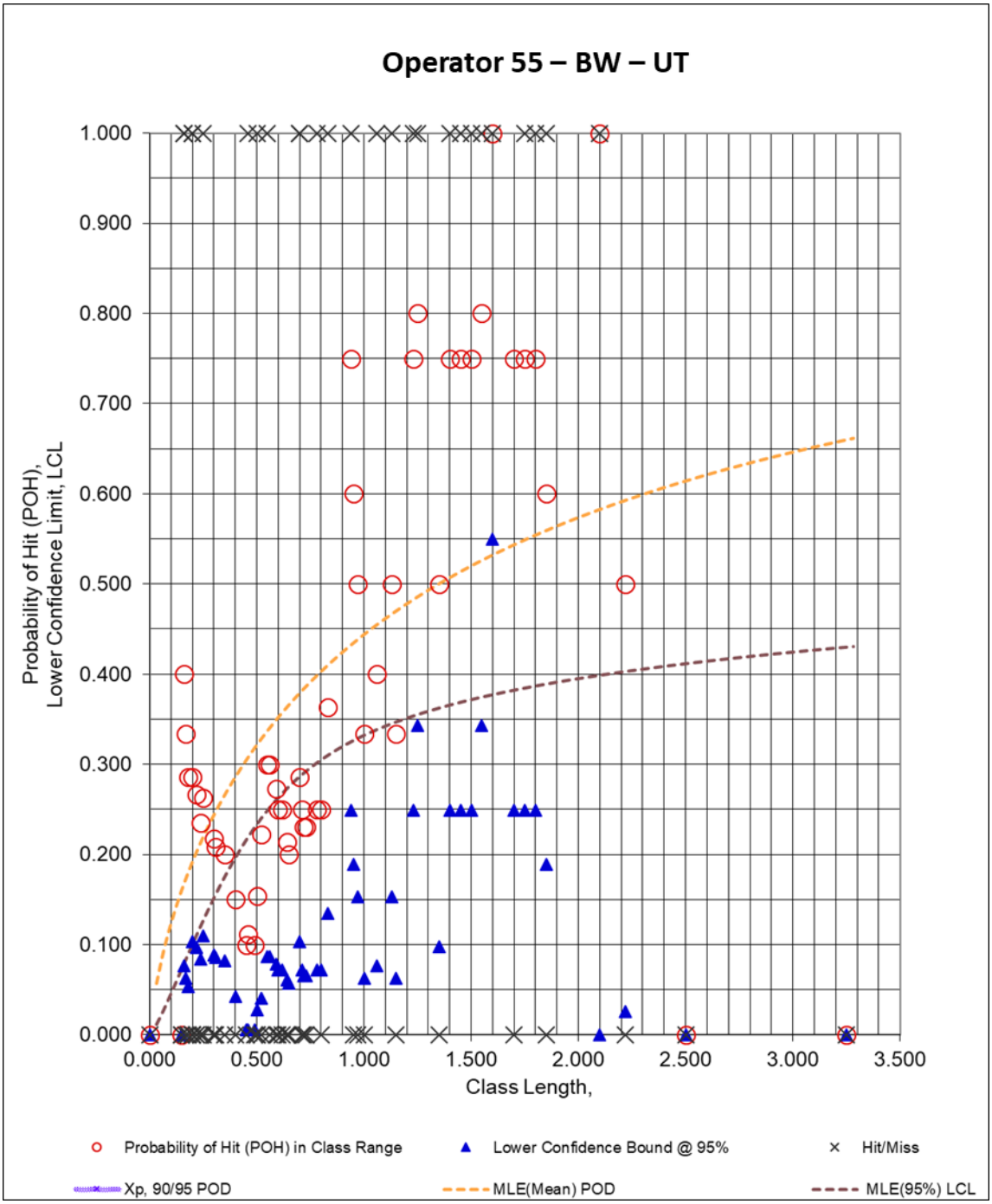

Figure 383. DOEPOD – BW – UT – Operator 55

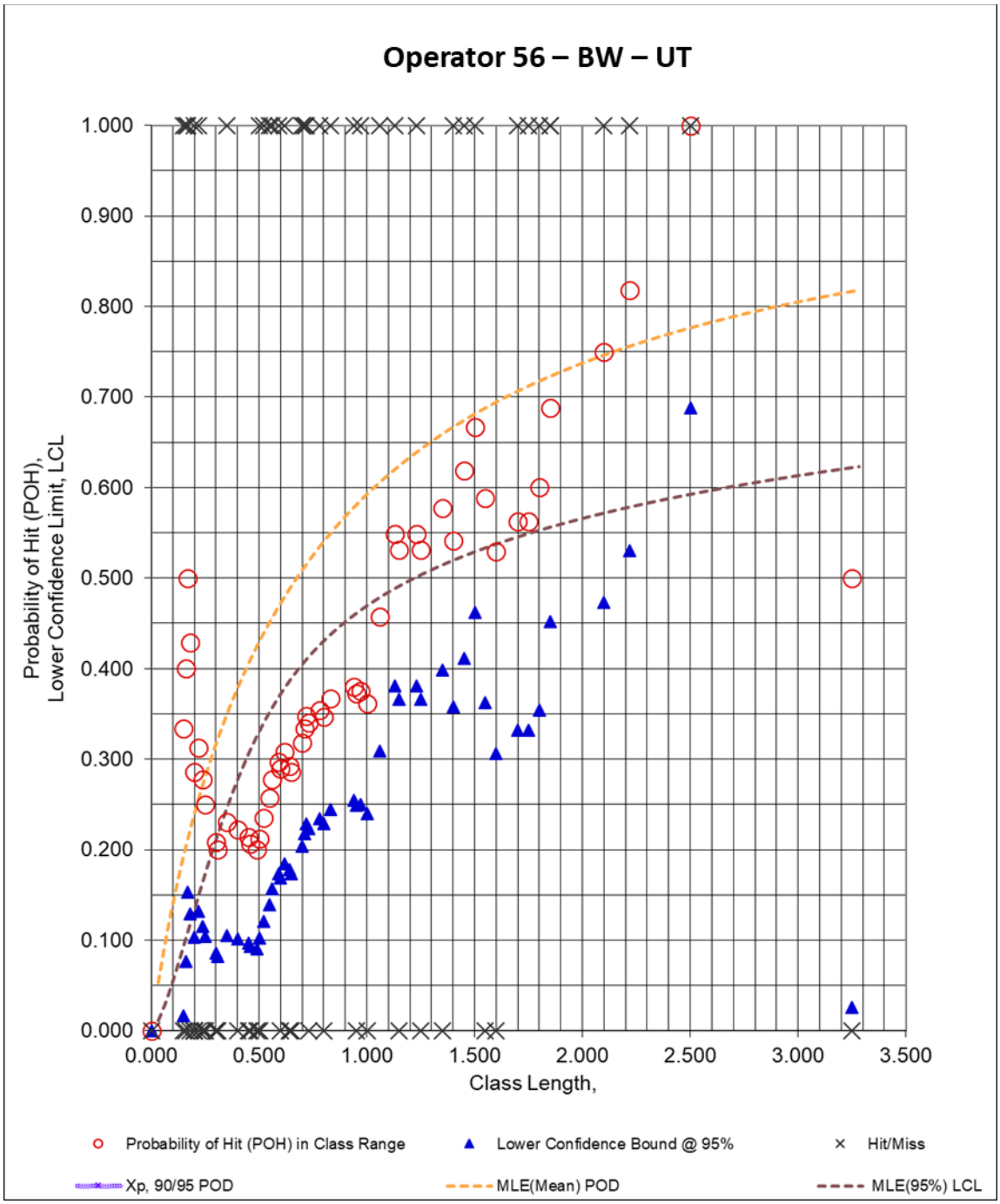

Figure 384. DOEPOD – BW – UT – Operator 56

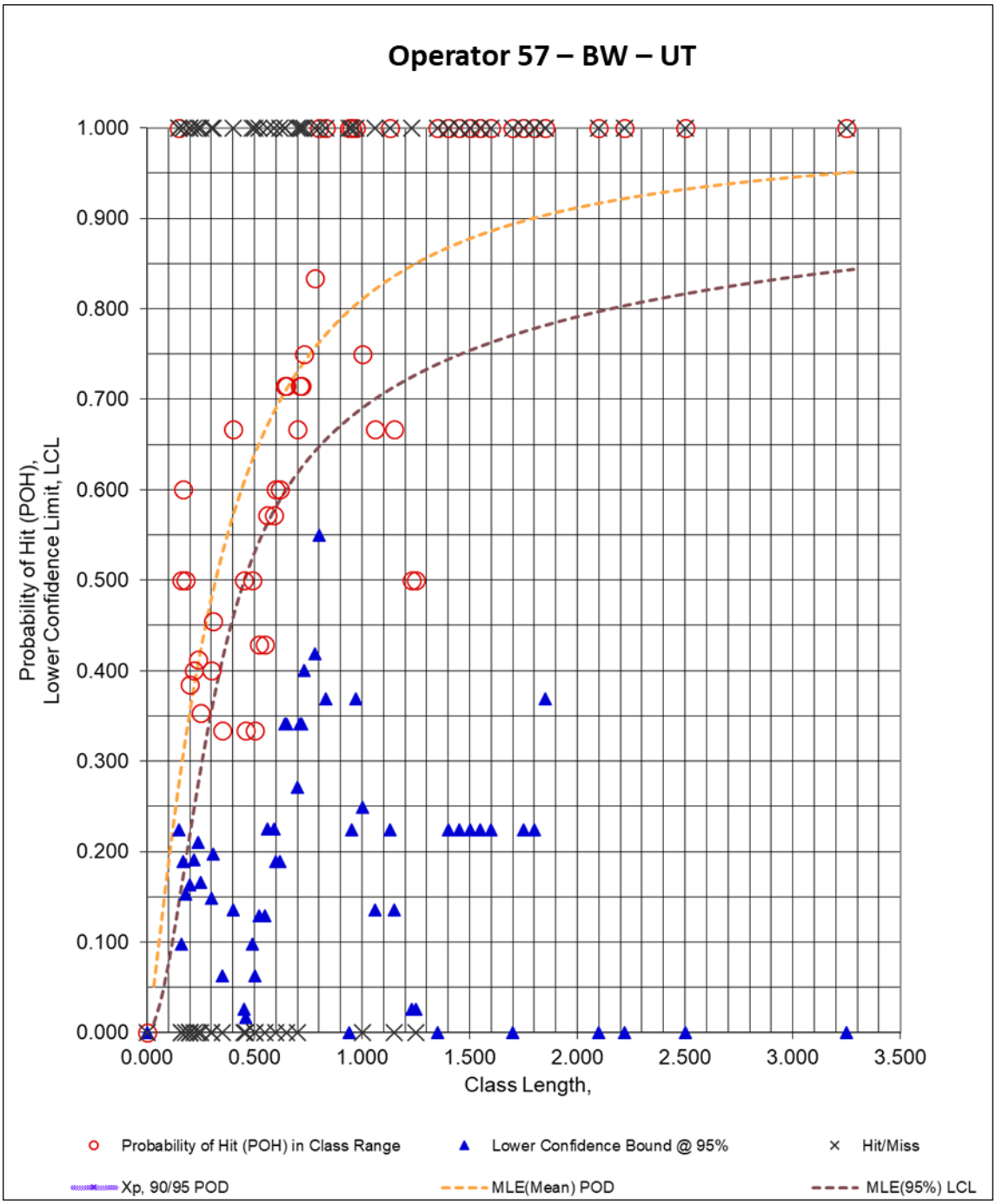

Figure 385. DOEPOD – BW – UT – Operator 57

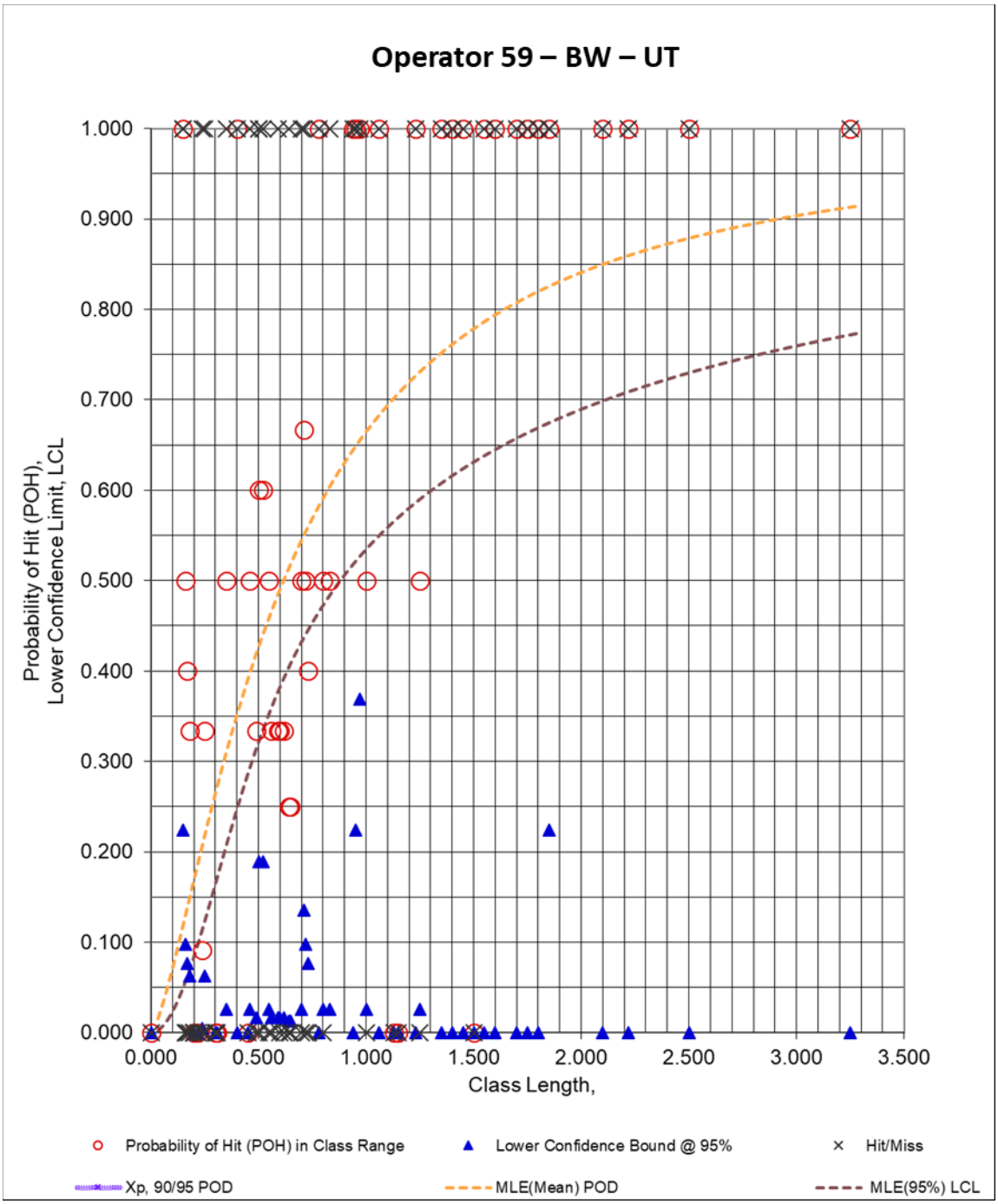

Figure 386. DOEPOD – BW – UT – Operator 59

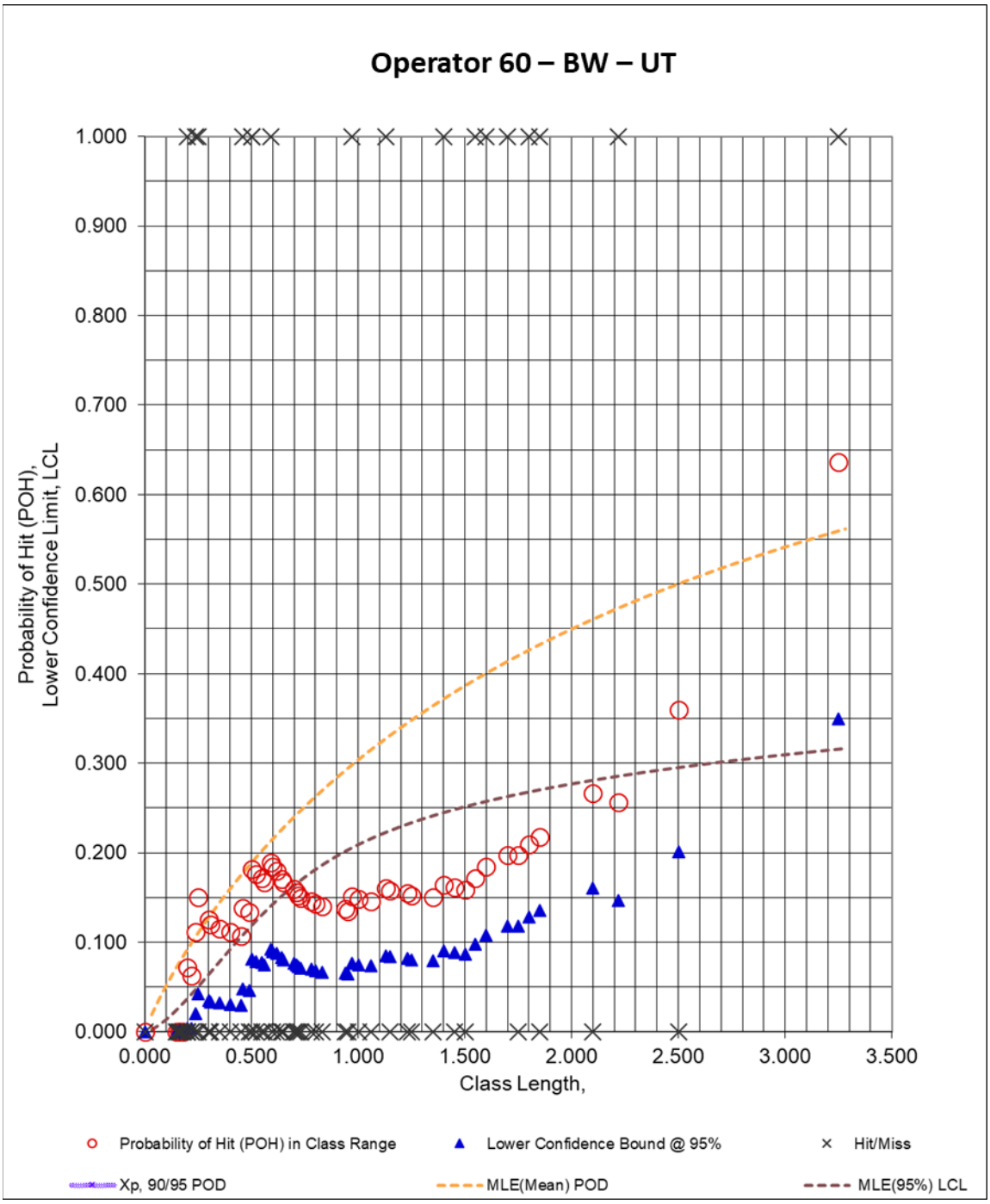

Figure 387. DOEPOD – BW – UT – Operator 60

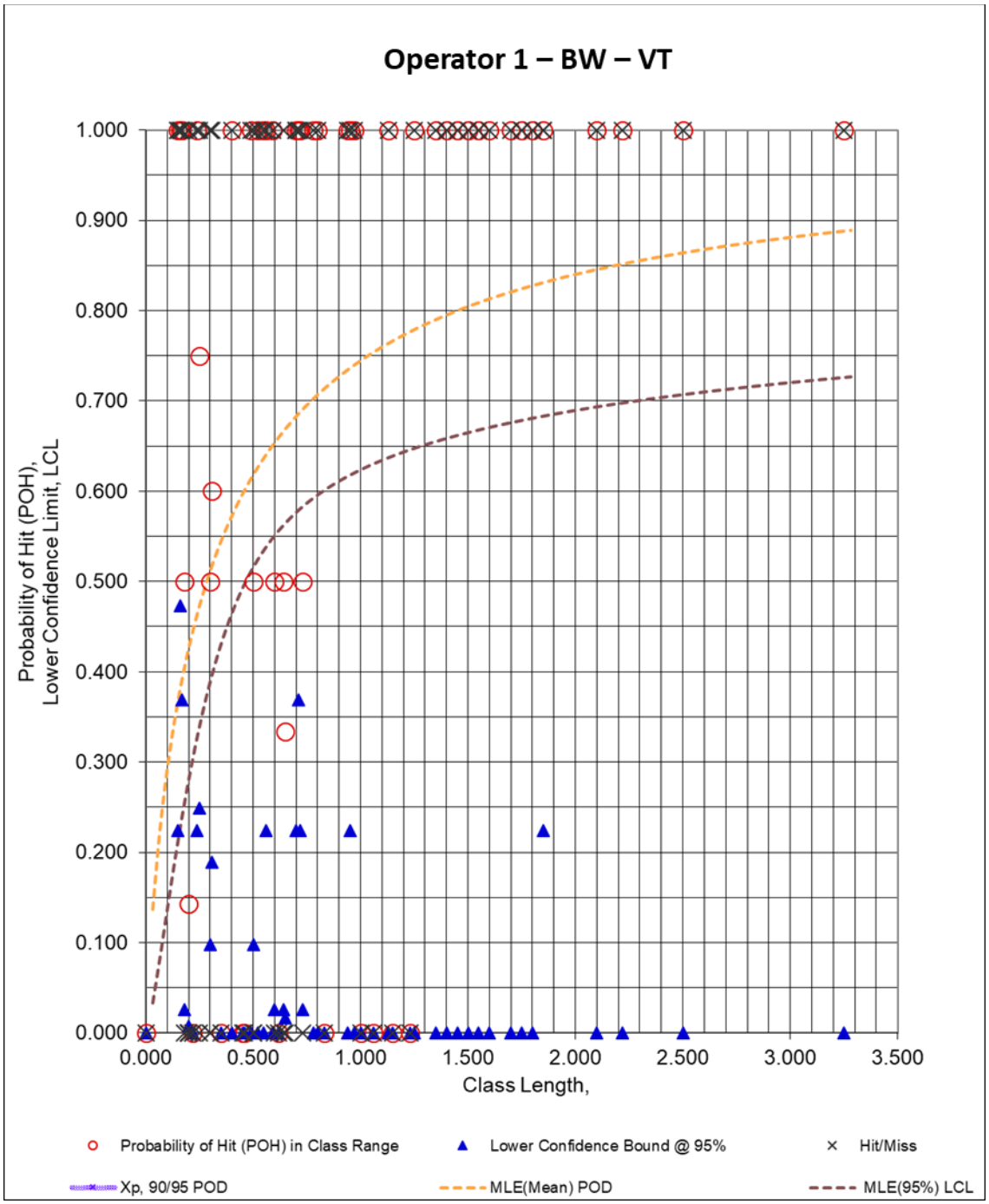

Figure 388. DOEPOD – BW – VT – Operator 1

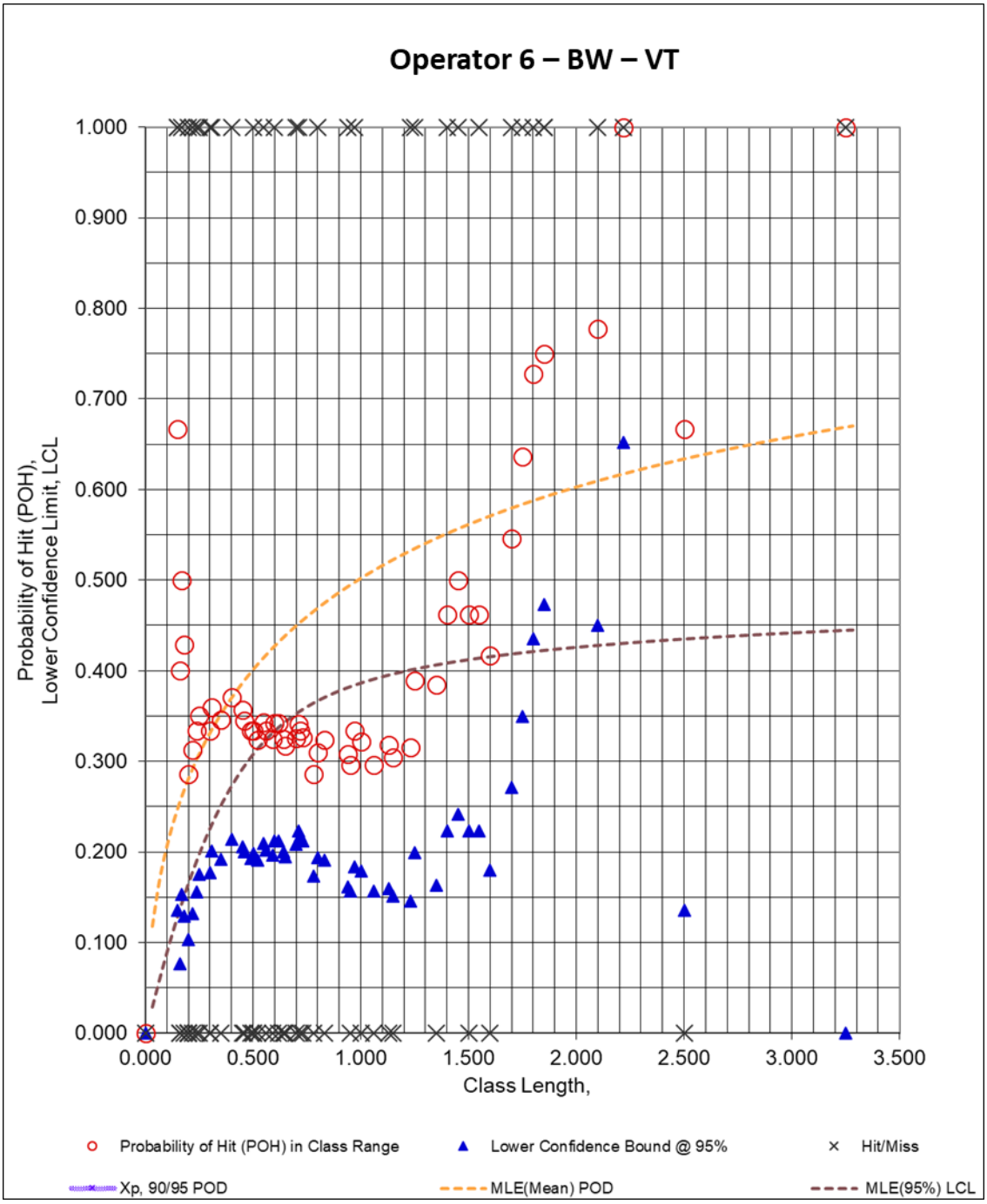

Figure 389. DOEPOD – BW – VT – Operator 6

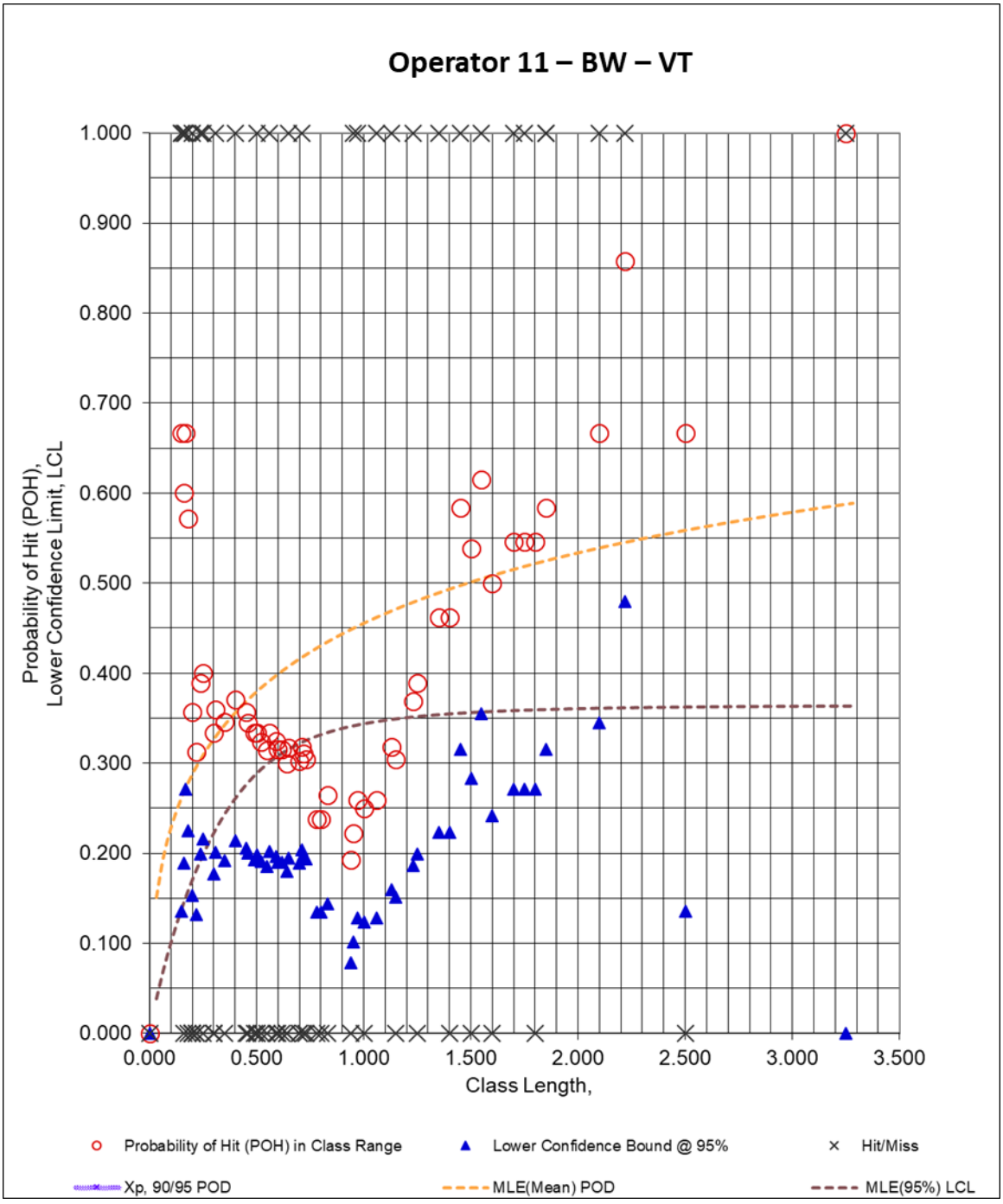

Figure 390. DOEPOD – BW – VT – Operator 11

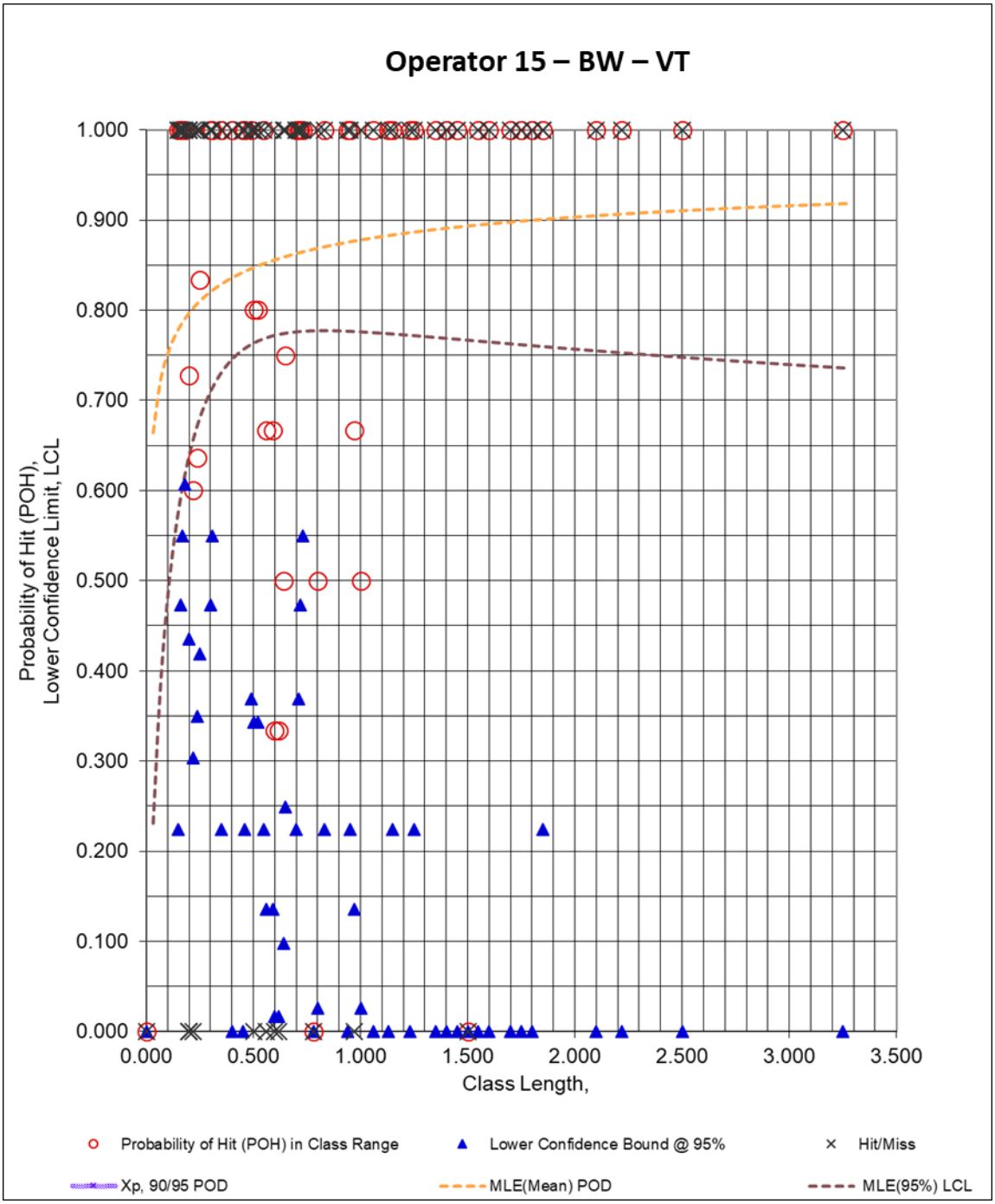

Figure 391. DOEPOD – BW – VT – Operator 15

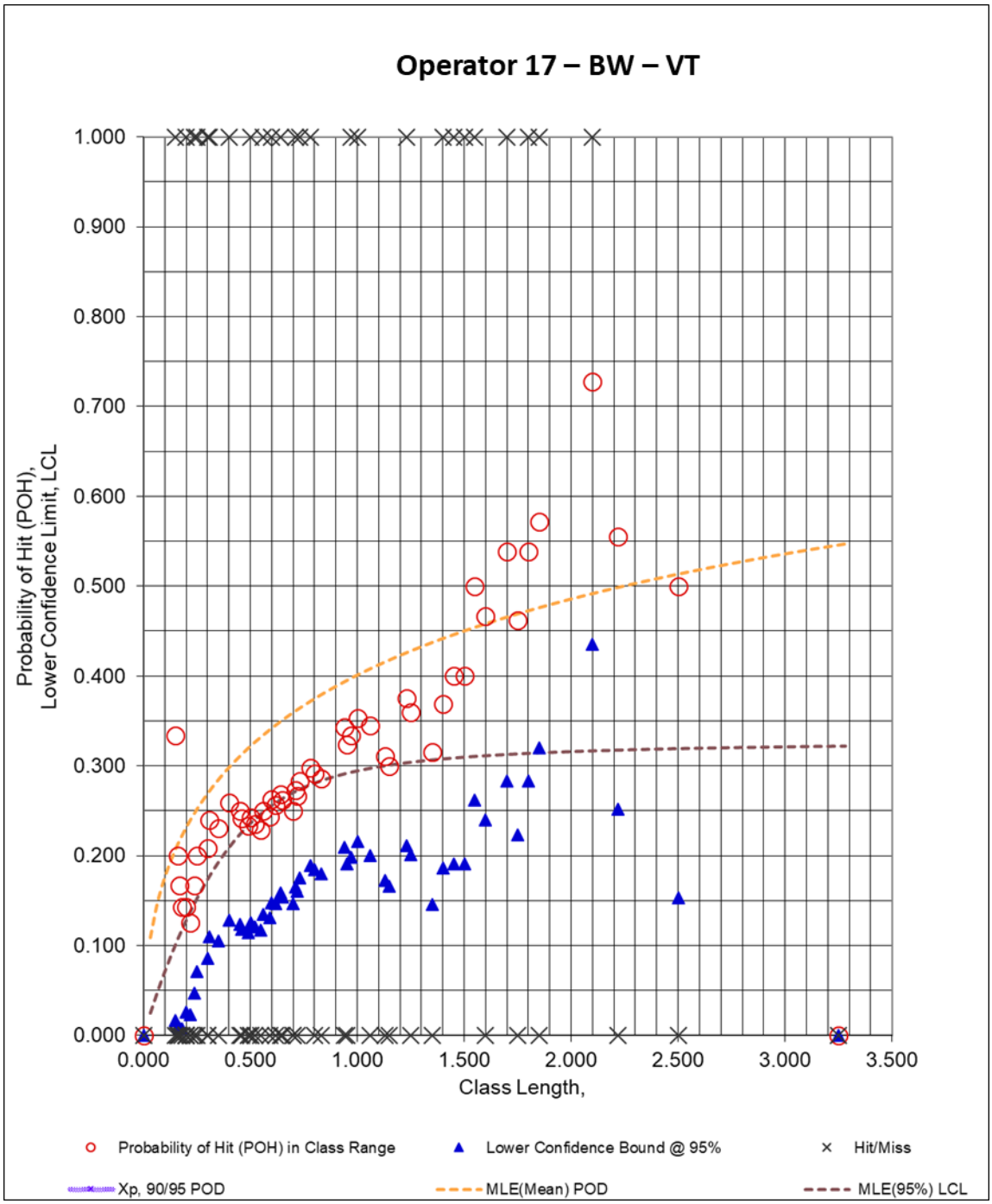

Figure 392. DOEPOD – BW – VT – Operator 17

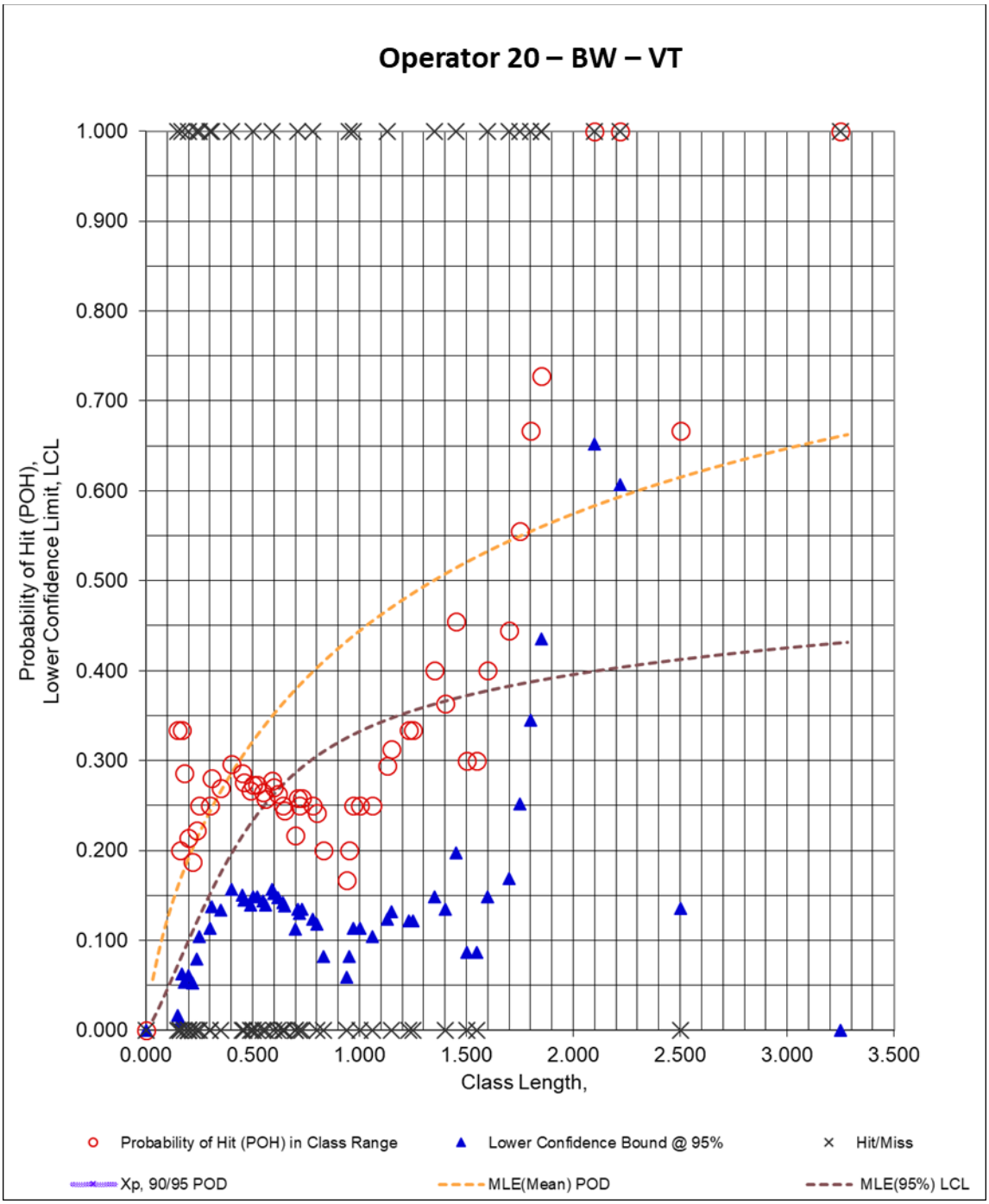

Figure 393. DOEPOD – BW – VT – Operator 20

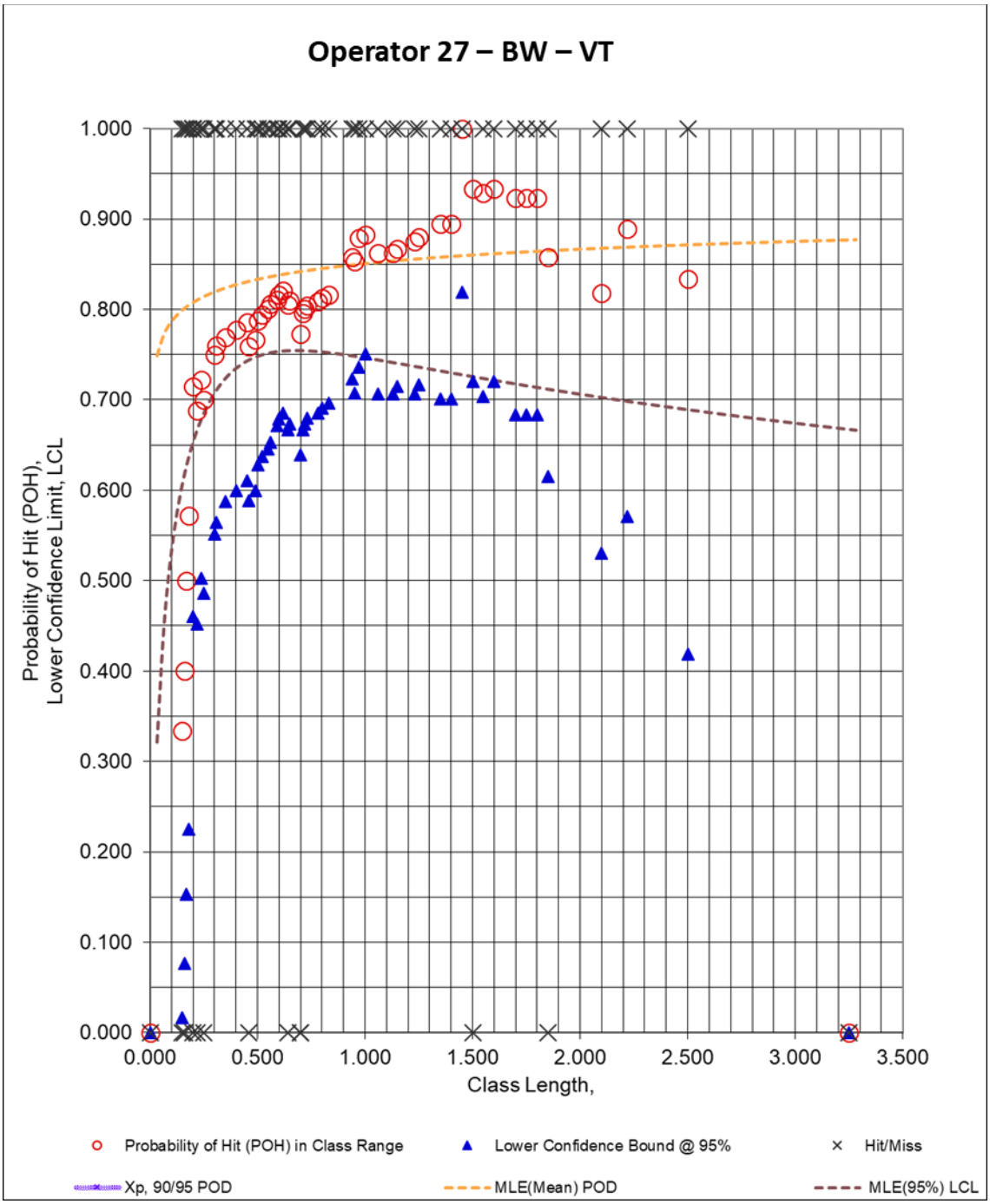

Figure 394. DOEPOD – BW – VT – Operator 27

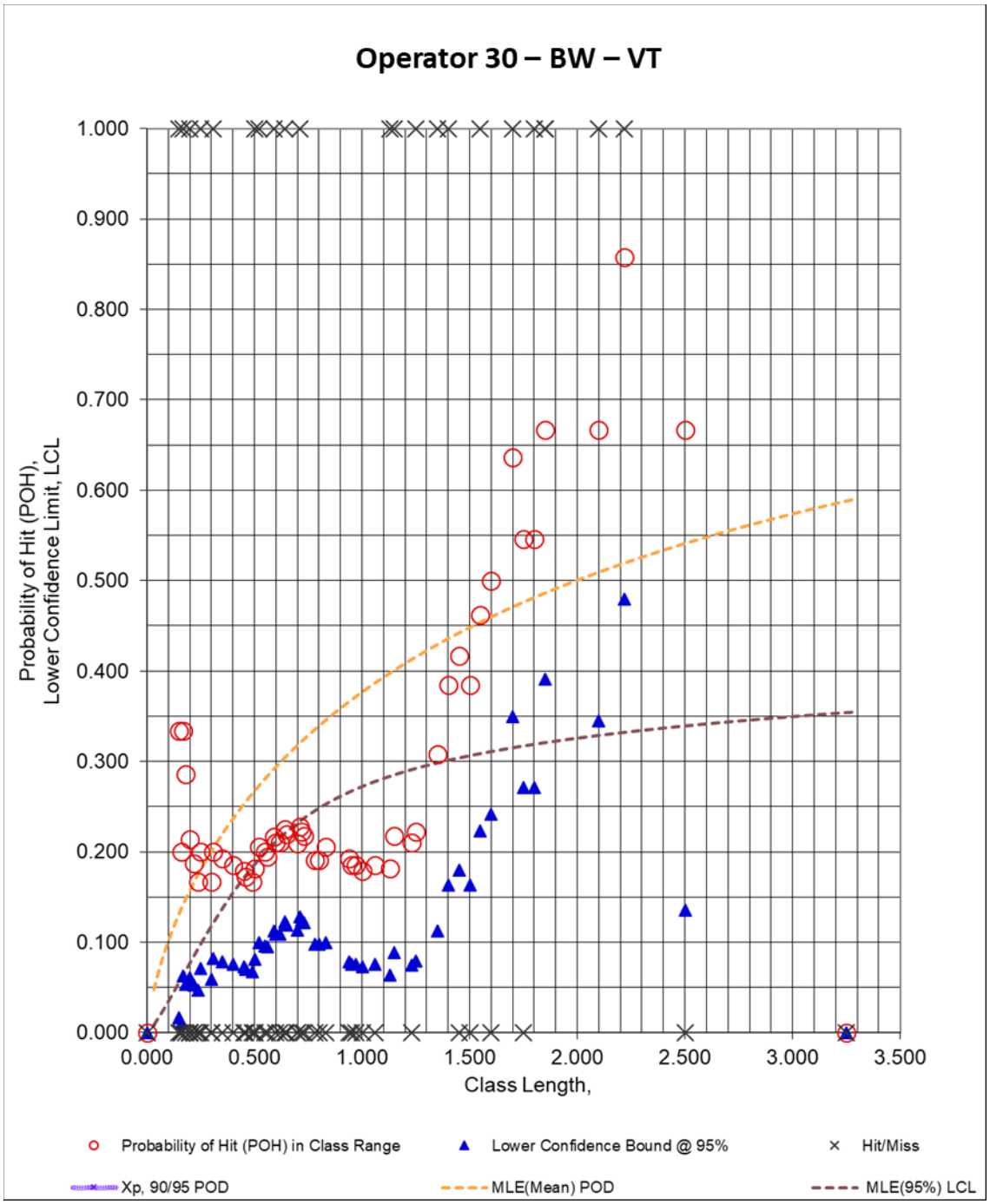

Figure 395. DOEPOD – BW – VT – Operator 30

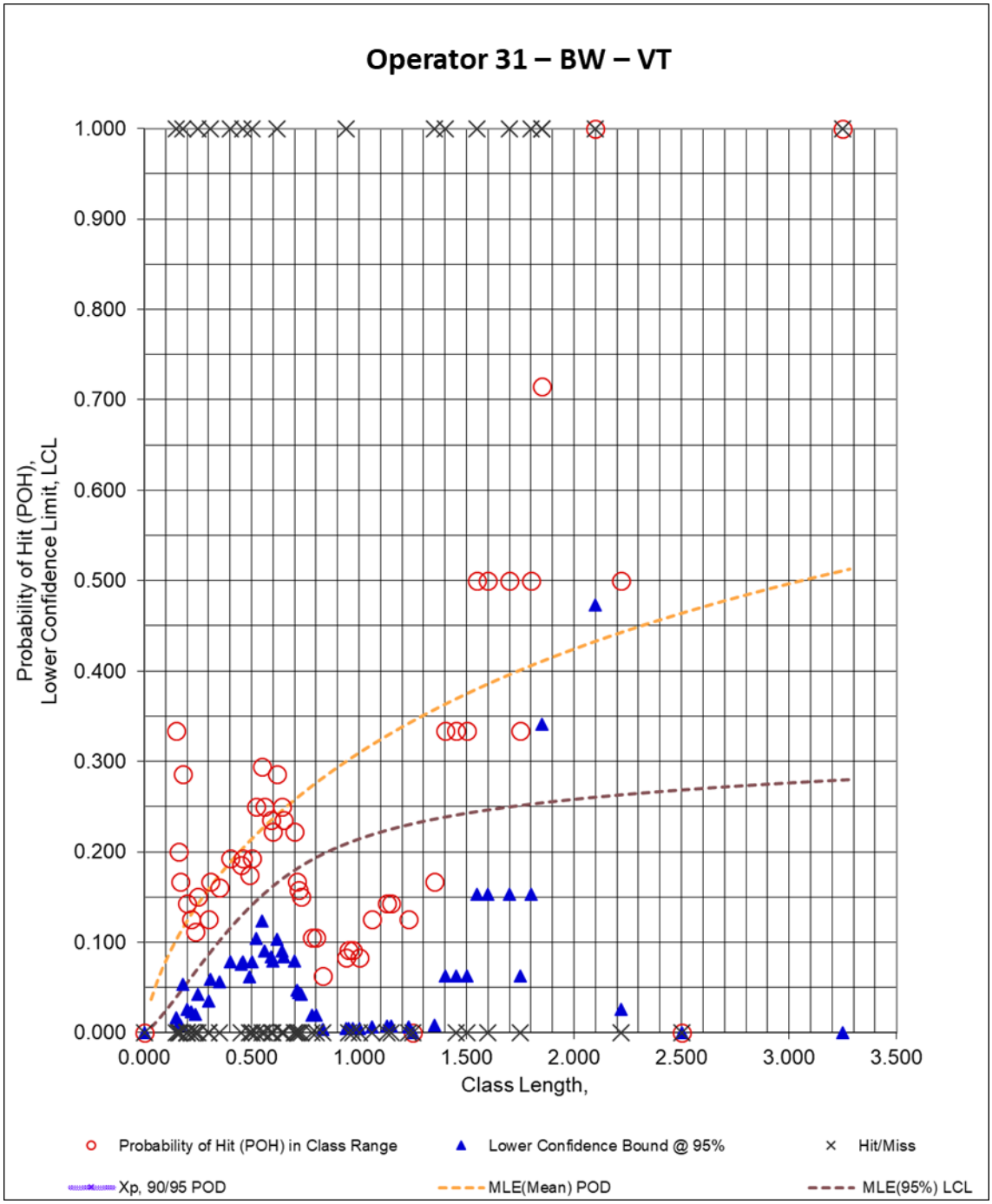

Figure 396. DOEPOD – BW – VT – Operator 31

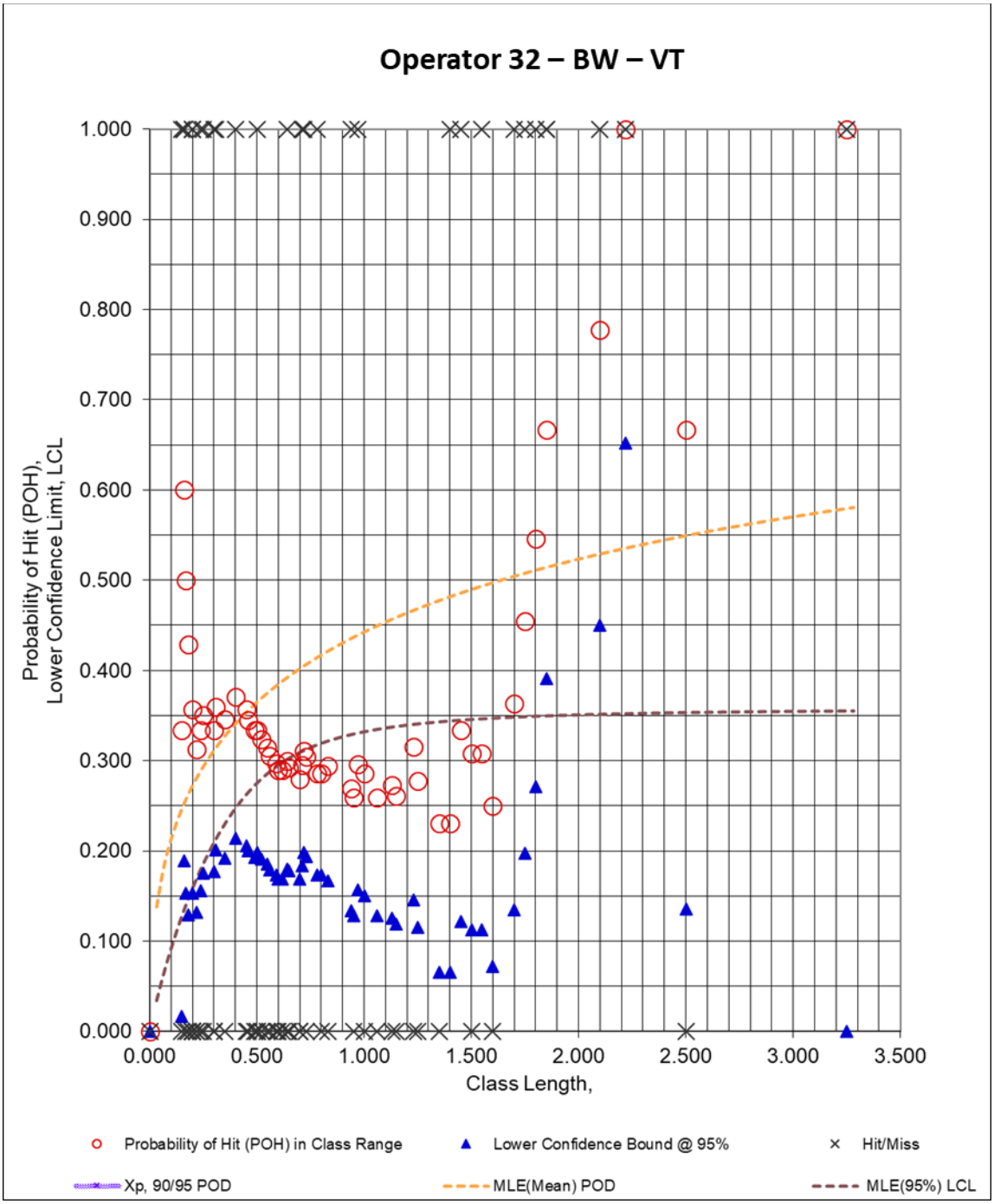

Figure 397. DOEPOD – BW – VT – Operator 32

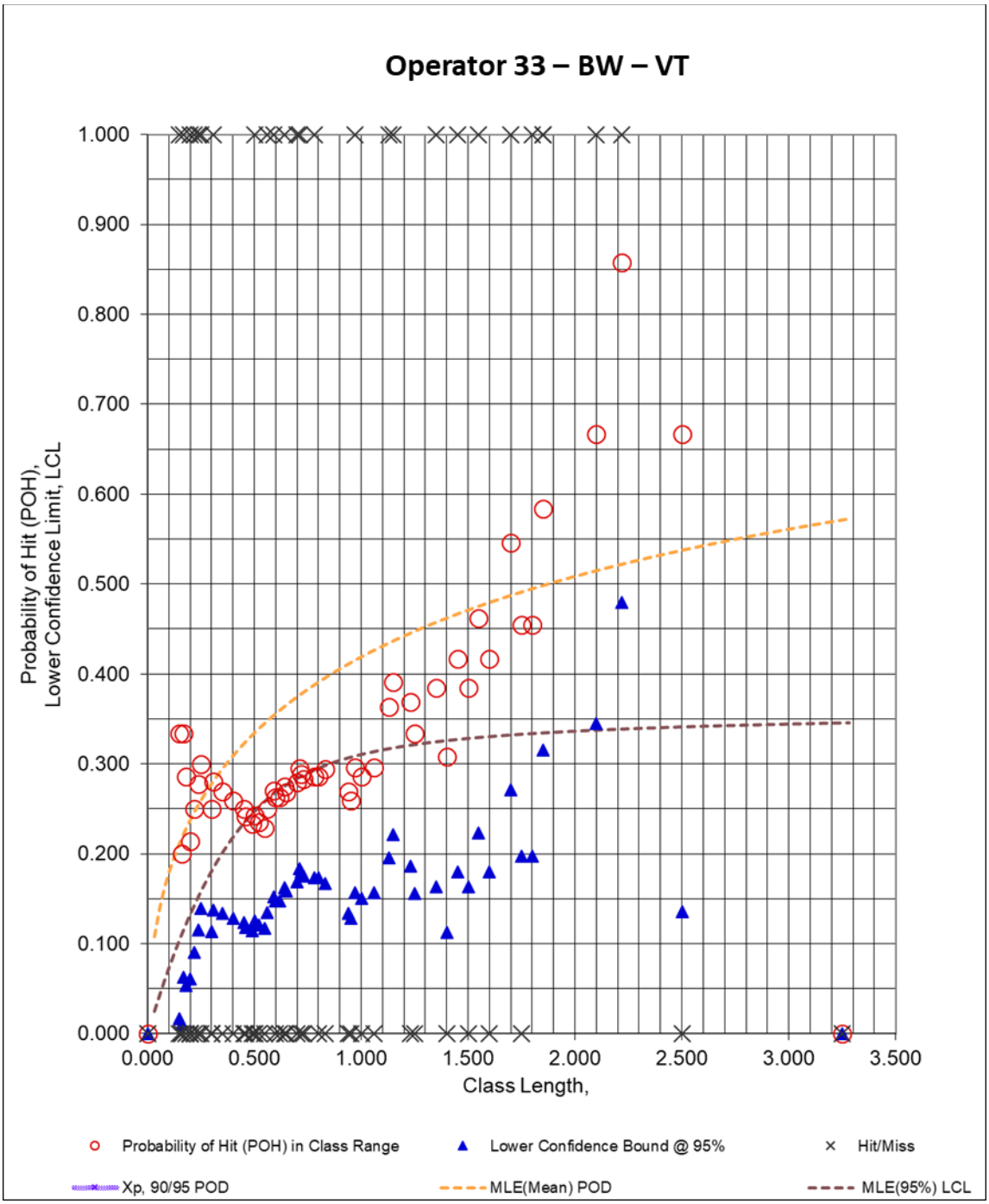

Figure 398. DOEPOD – BW – VT – Operator 33

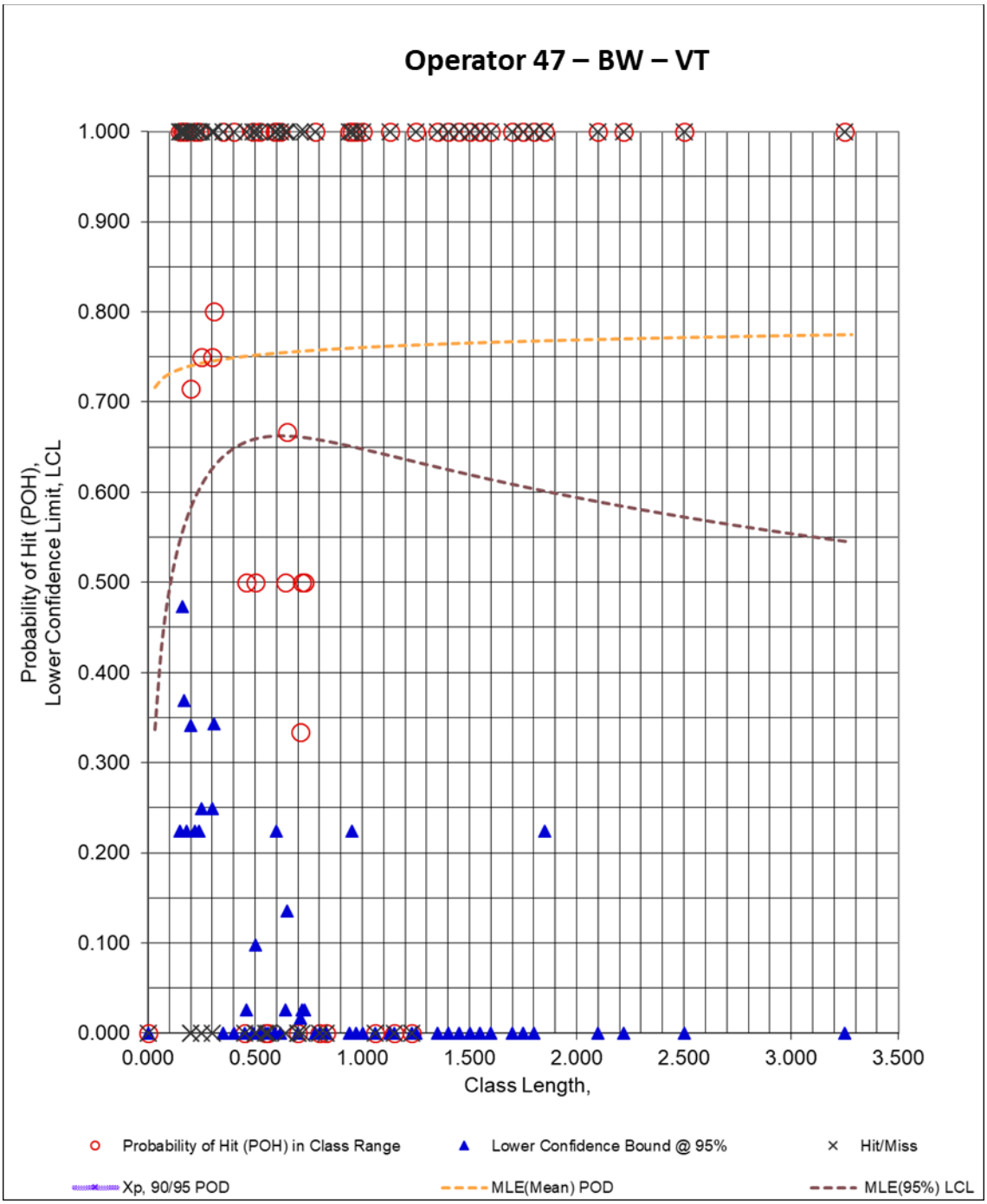

Figure 399. DOEPOD – BW – VT – Operator 47

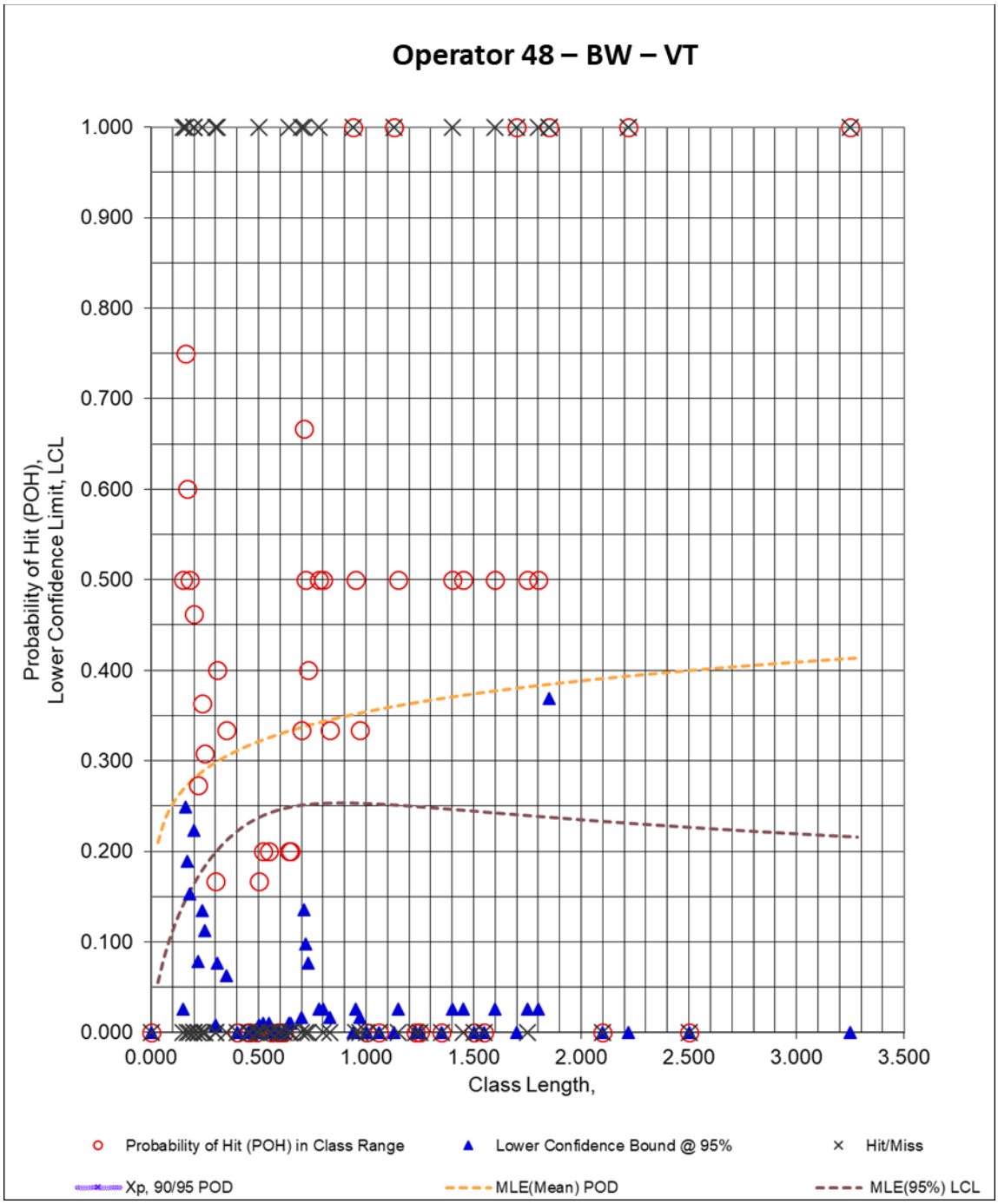

Figure 400. DOEPOD – BW – VT – Operator 48

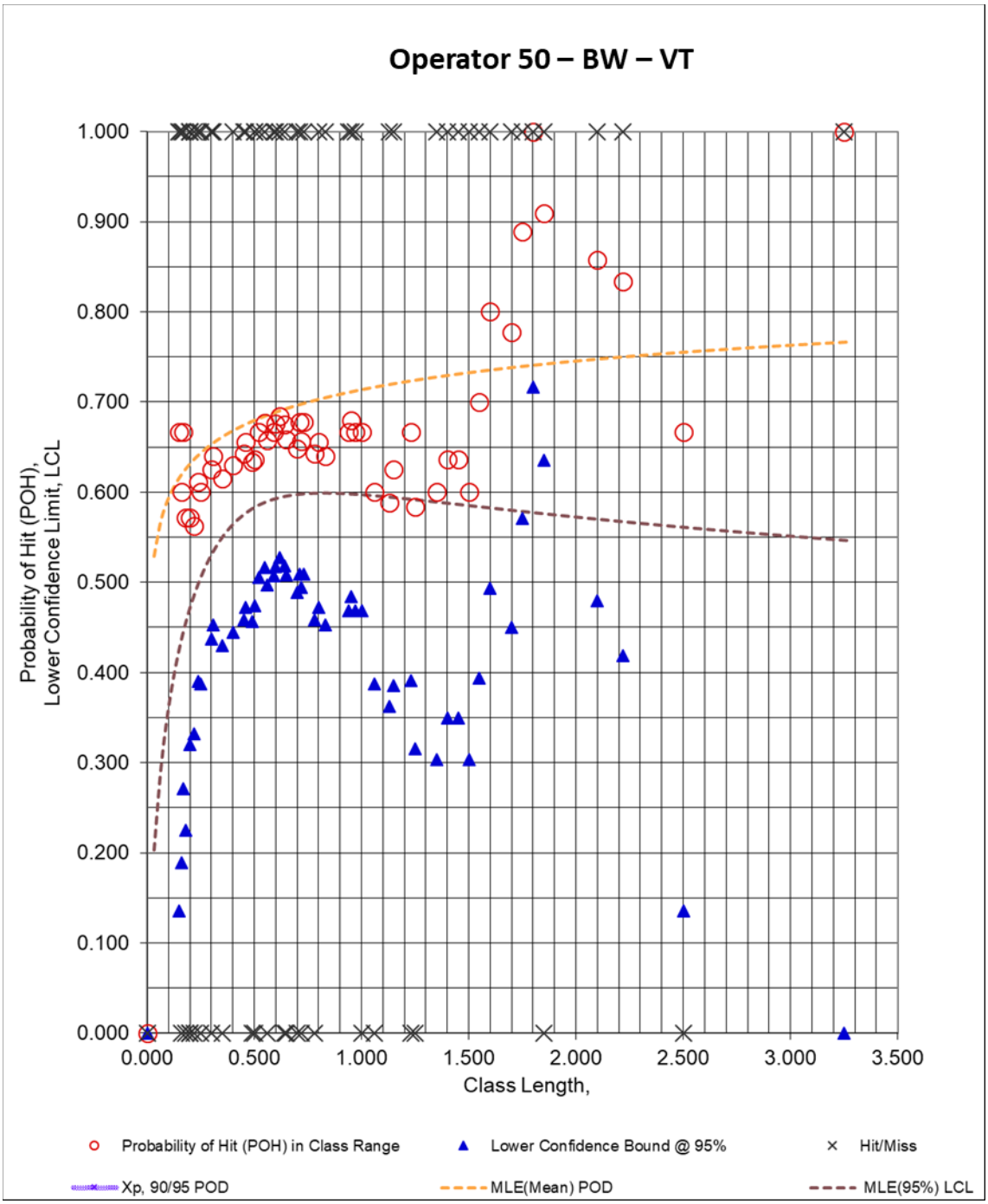

Figure 401. DOEPOD – BW – VT – Operator 50

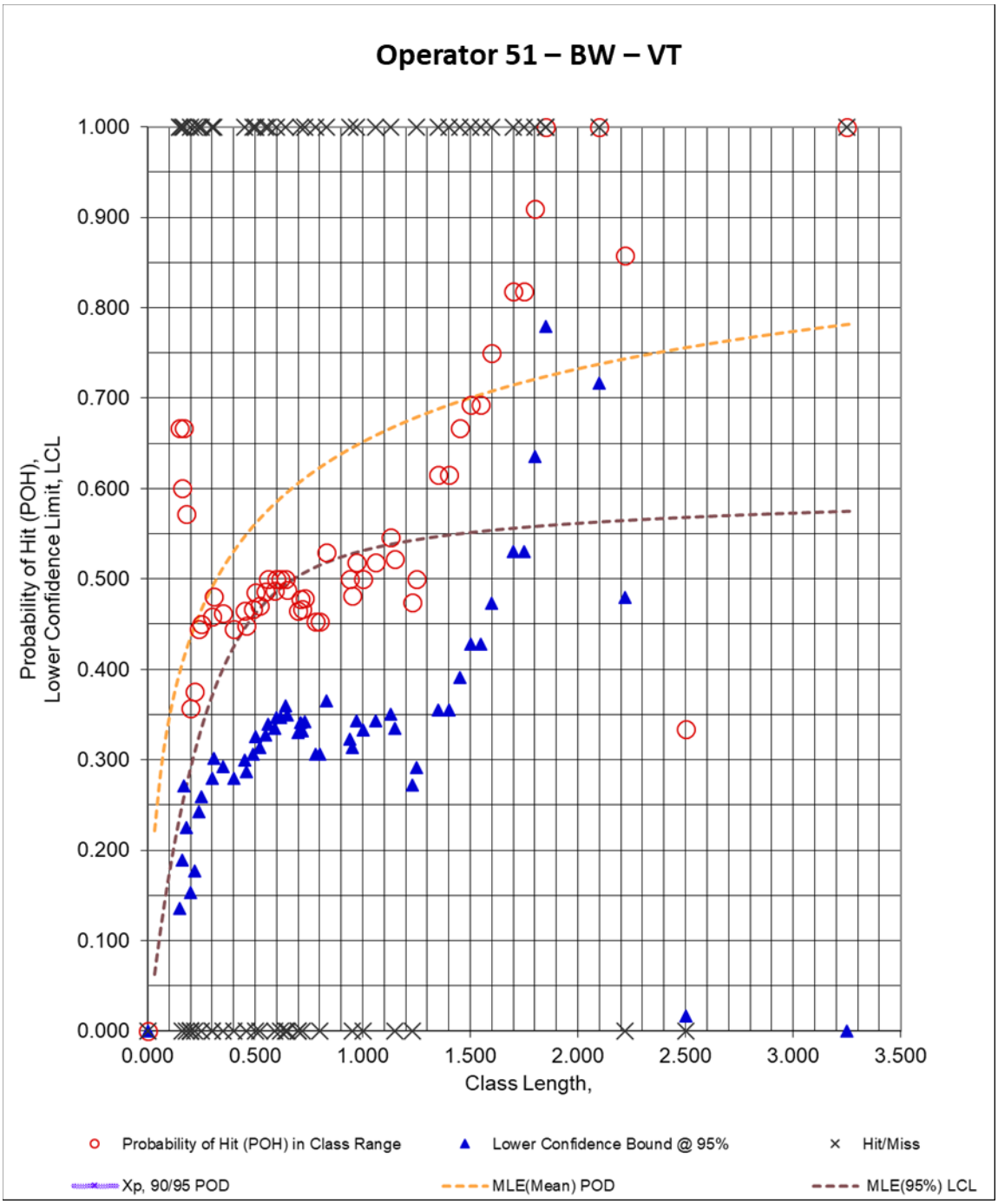

Figure 402. DOEPOD – BW – VT – Operator 51

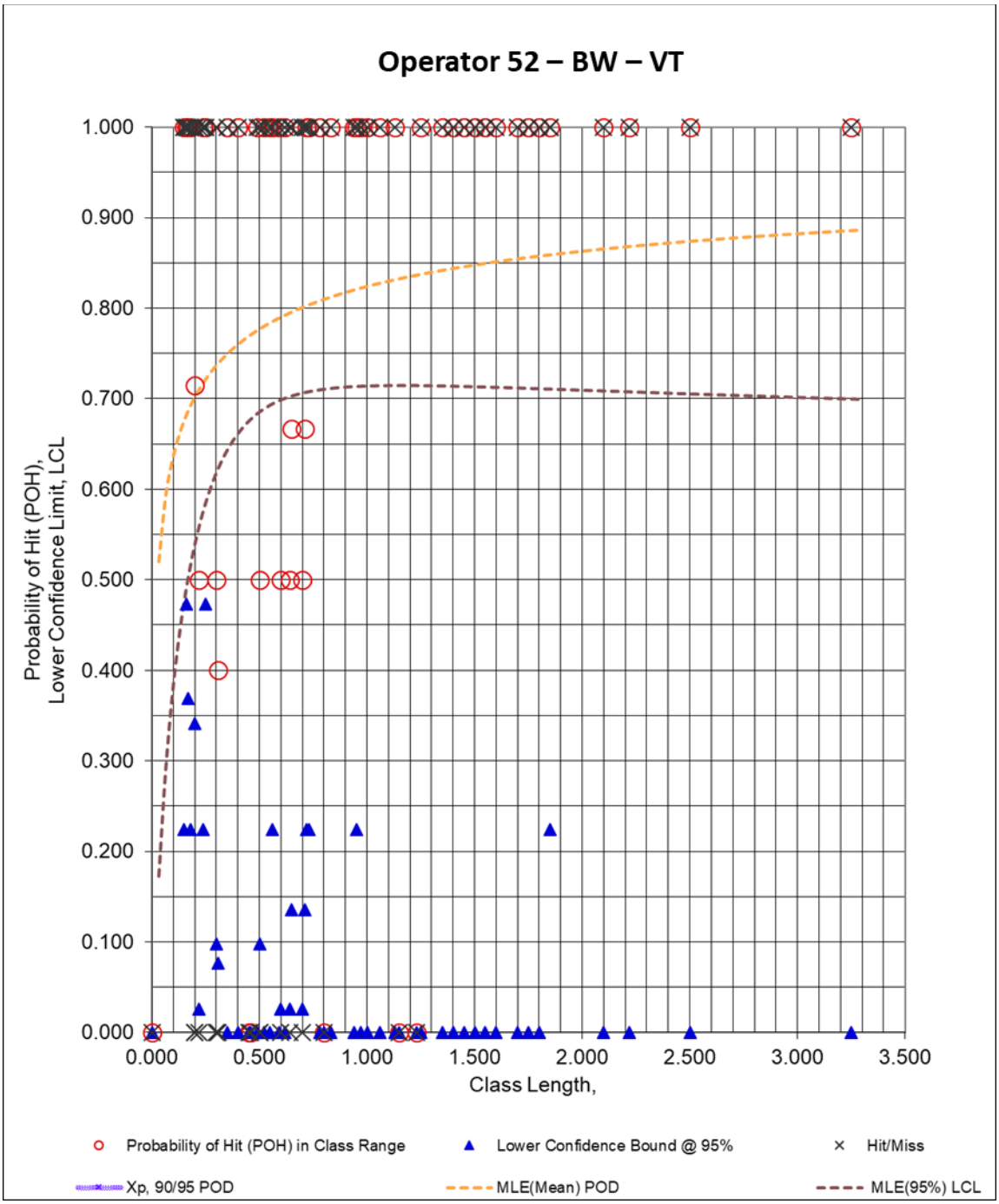

Figure 403. DOEPOD – BW – VT – Operator 52

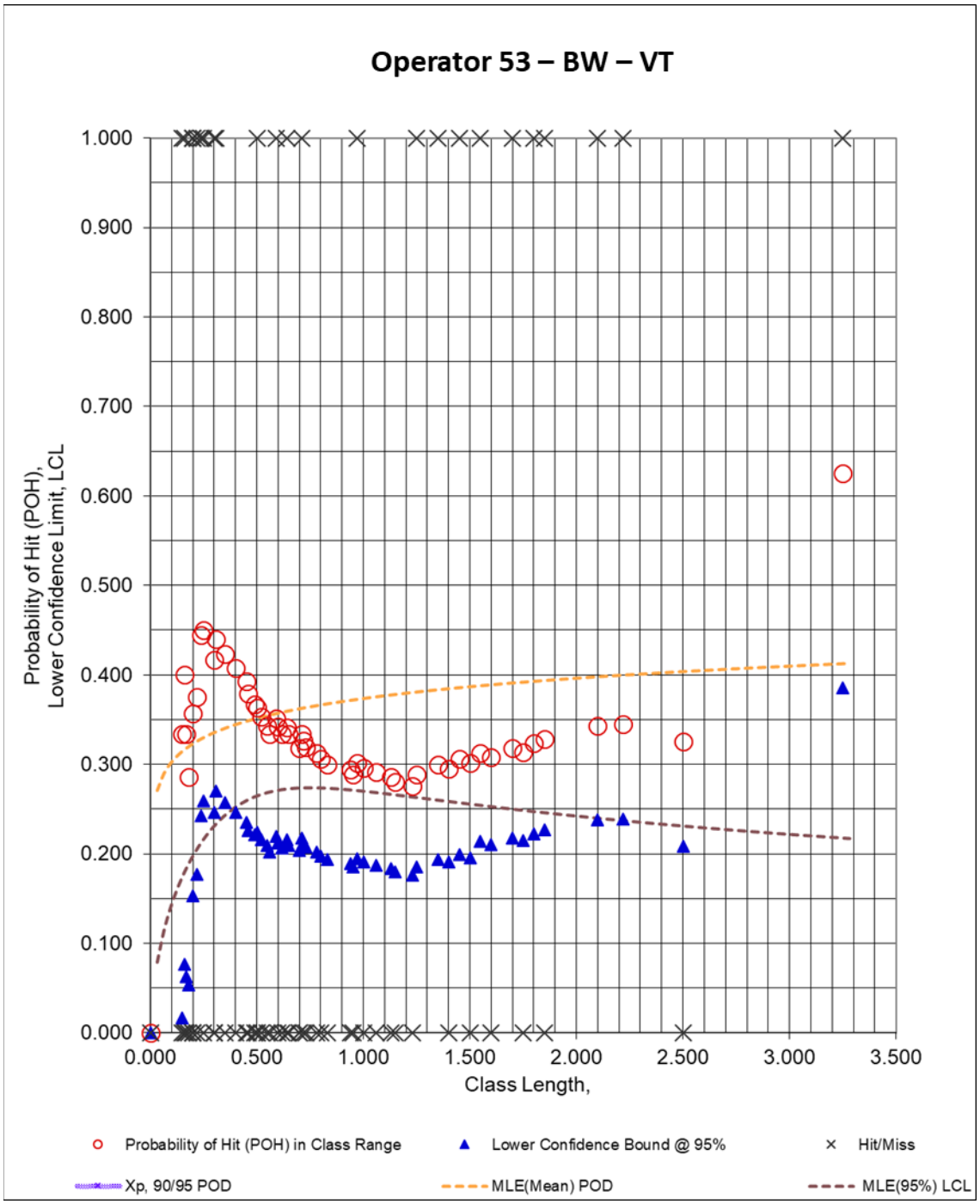

Figure 404. DOEPOD – BW – VT – Operator 53

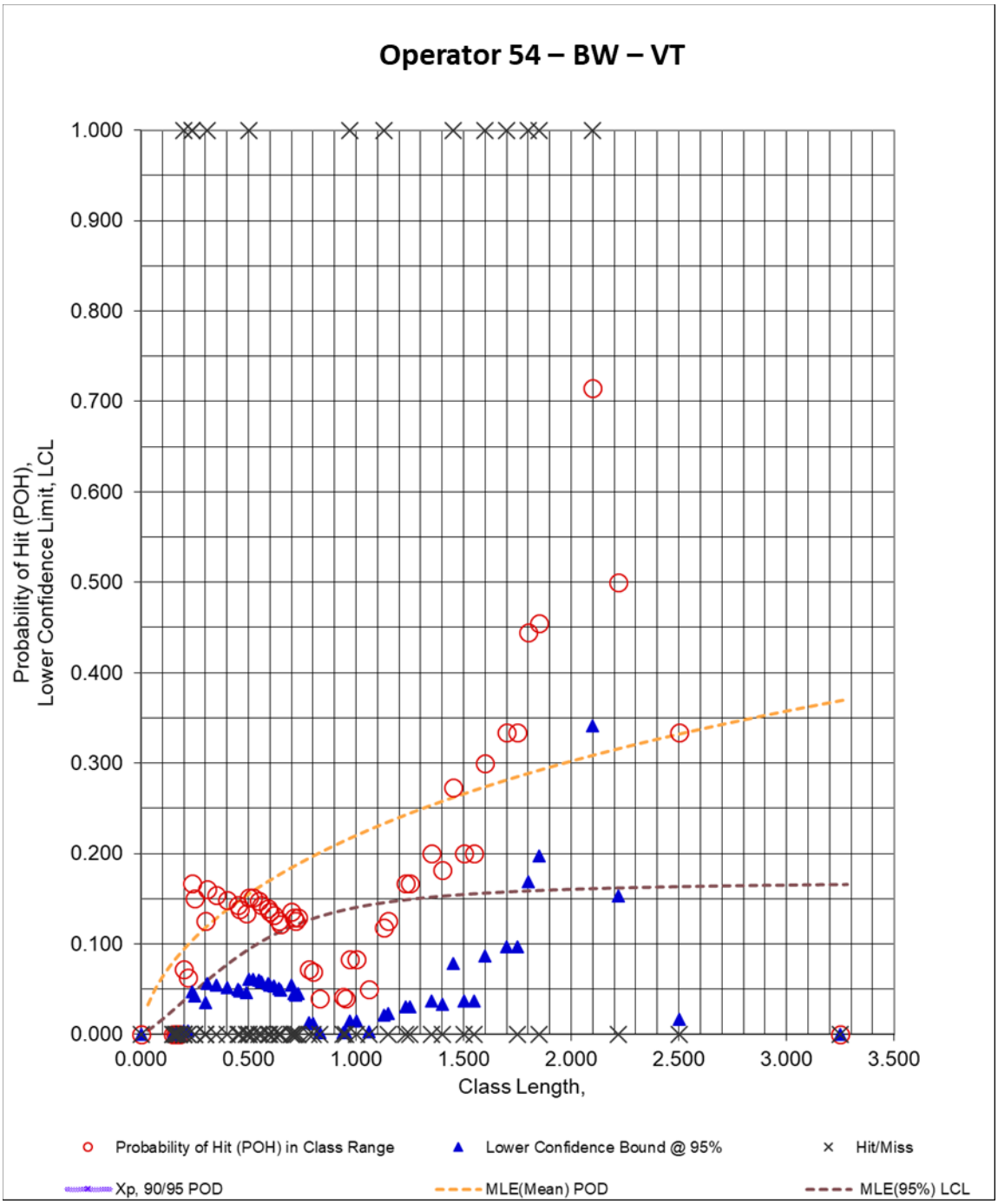

Figure 405. DOEPOD – BW – VT – Operator 54

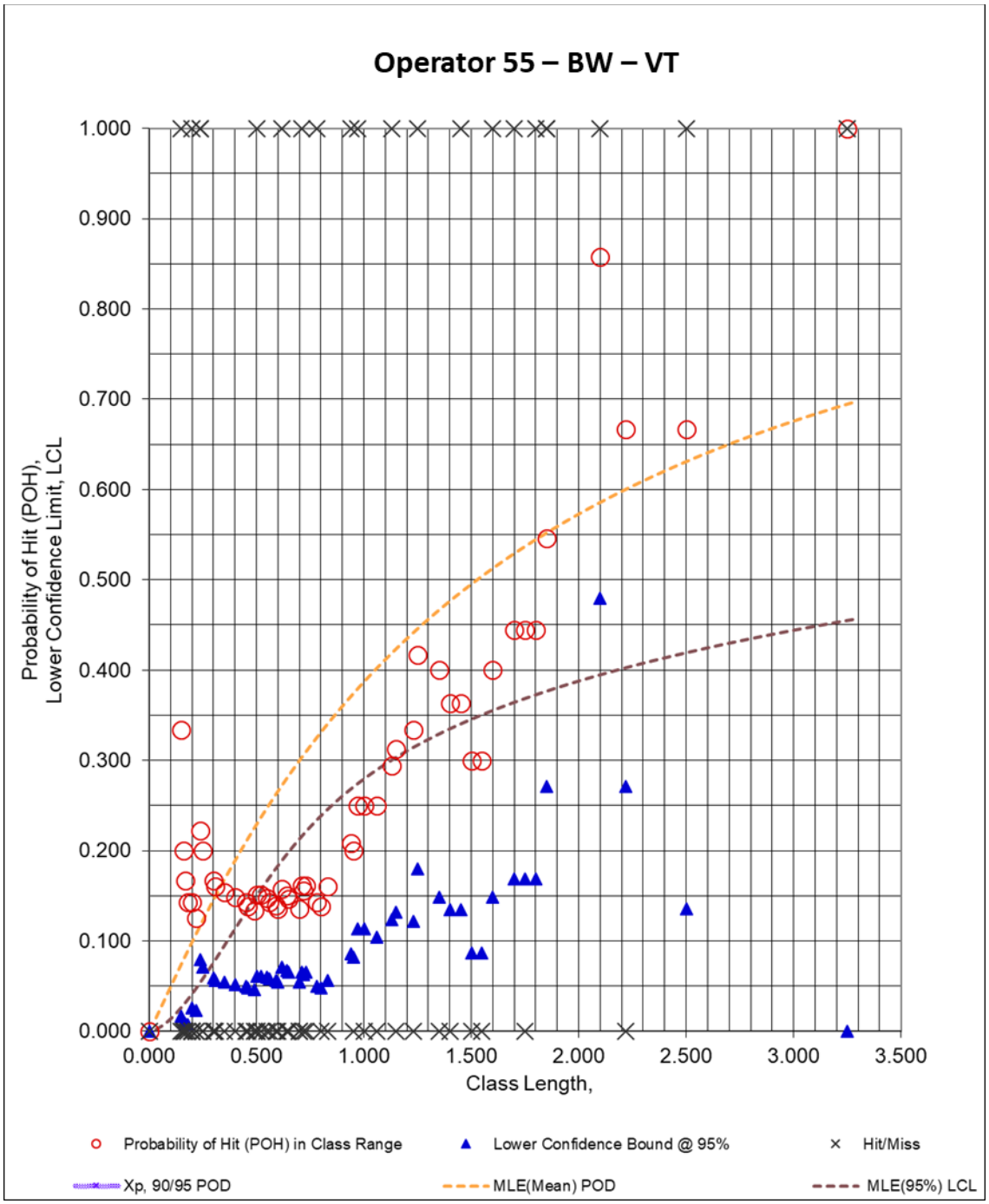

Figure 406. DOEPOD – BW – VT – Operator 55

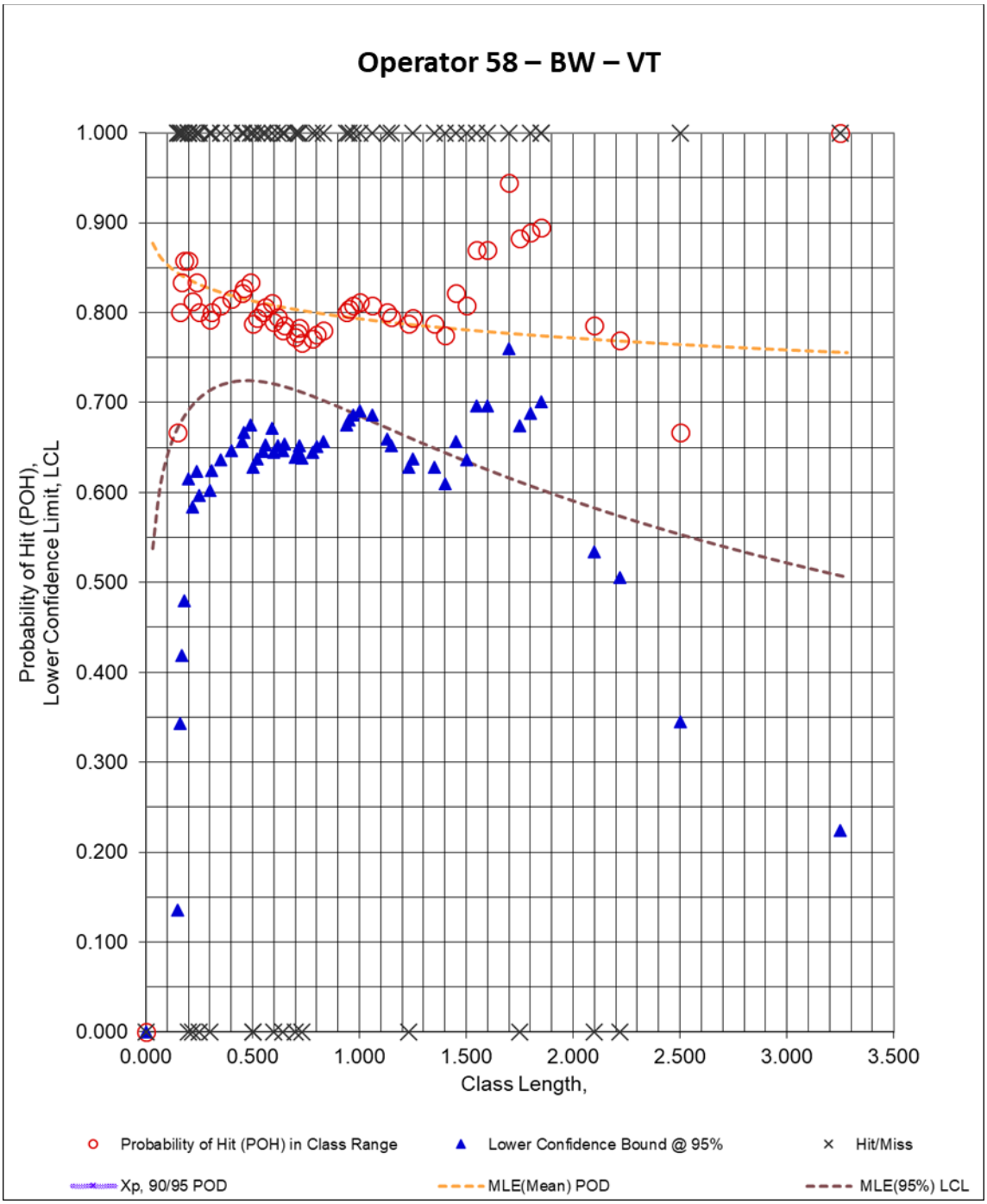

Figure 407. DOEPOD – BW – VT – Operator 58

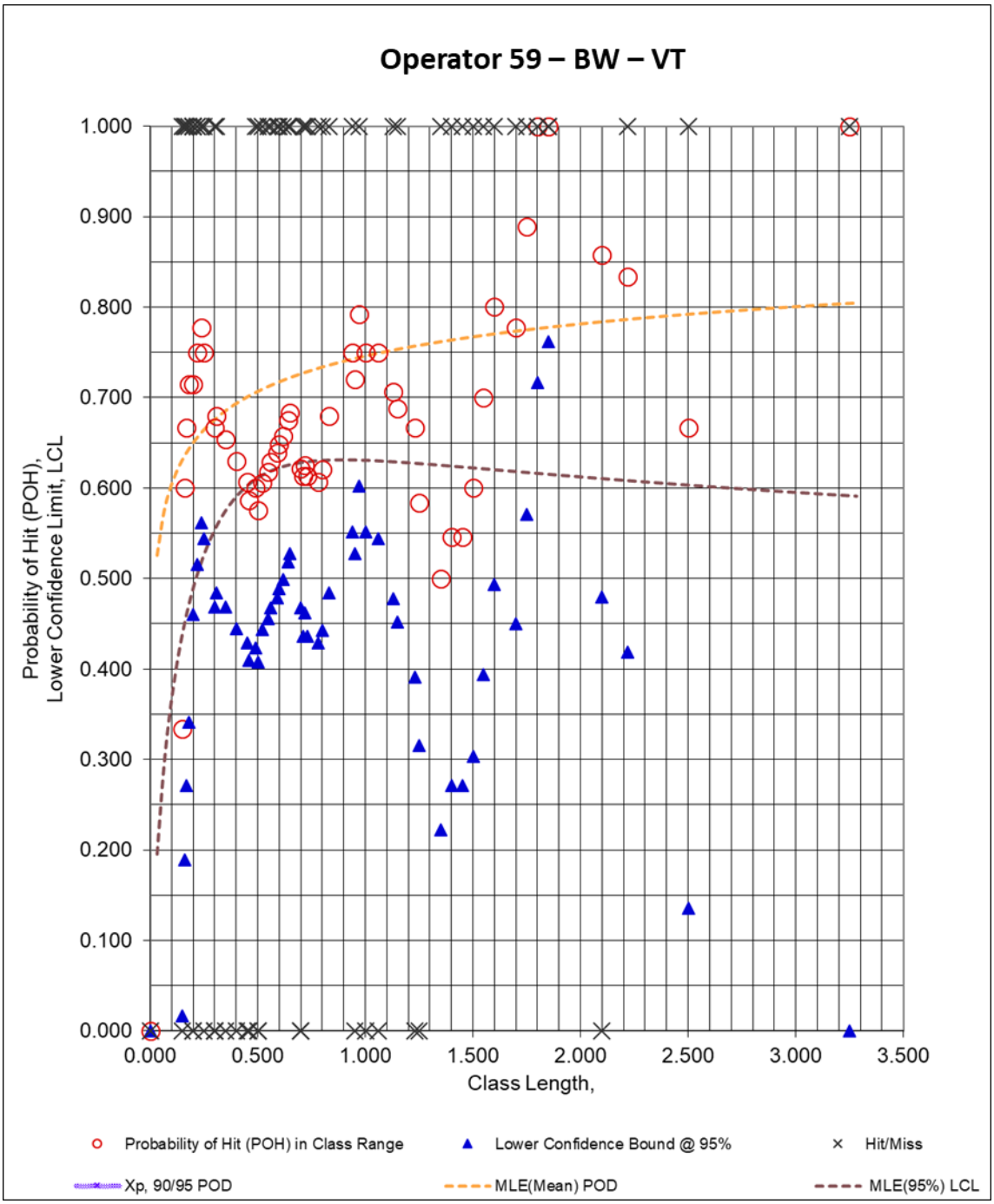

Figure 408. DOEPOD – BW – VT – Operator 59

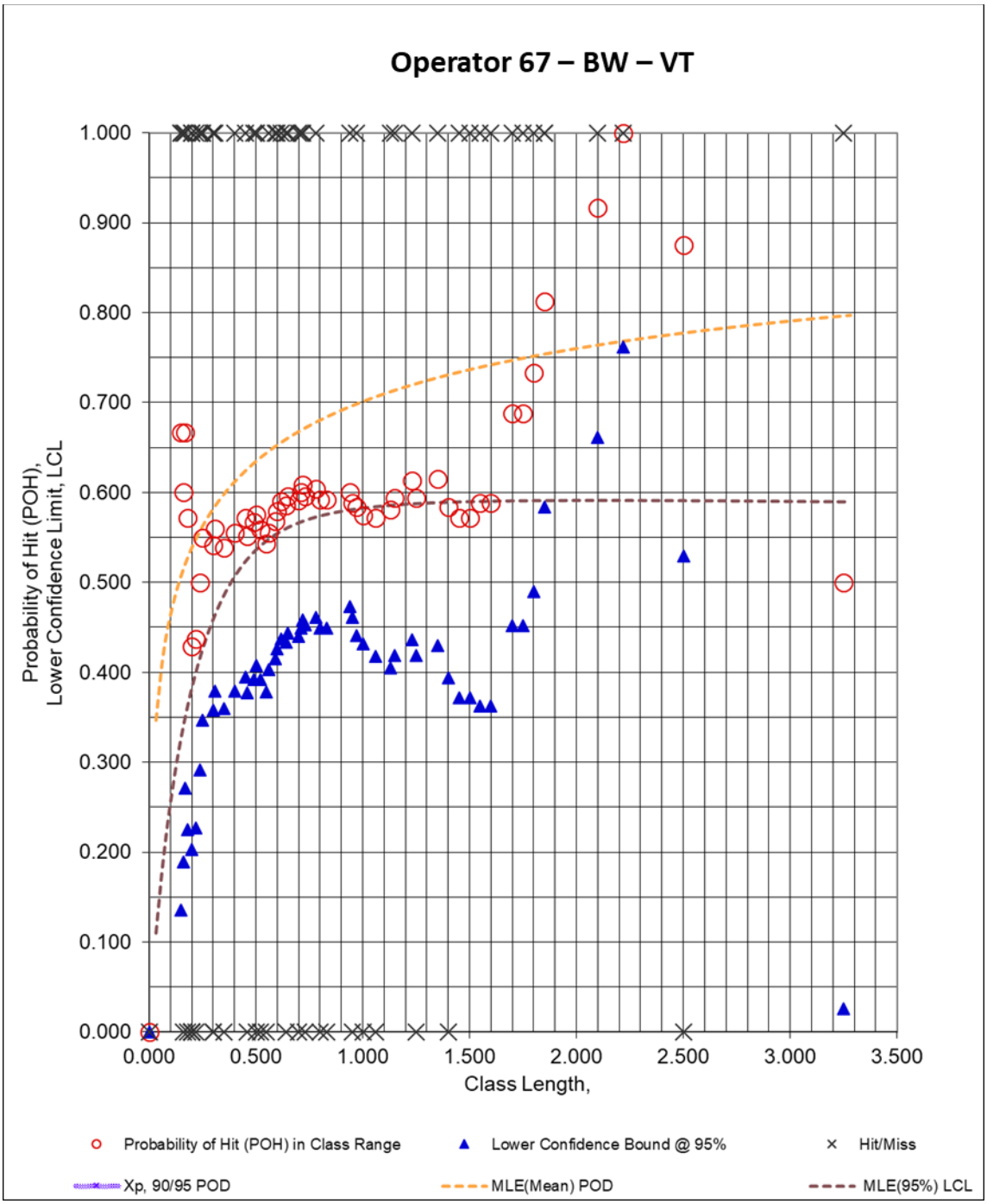

Figure 409. DOEPOD – BW – VT – Operator 67

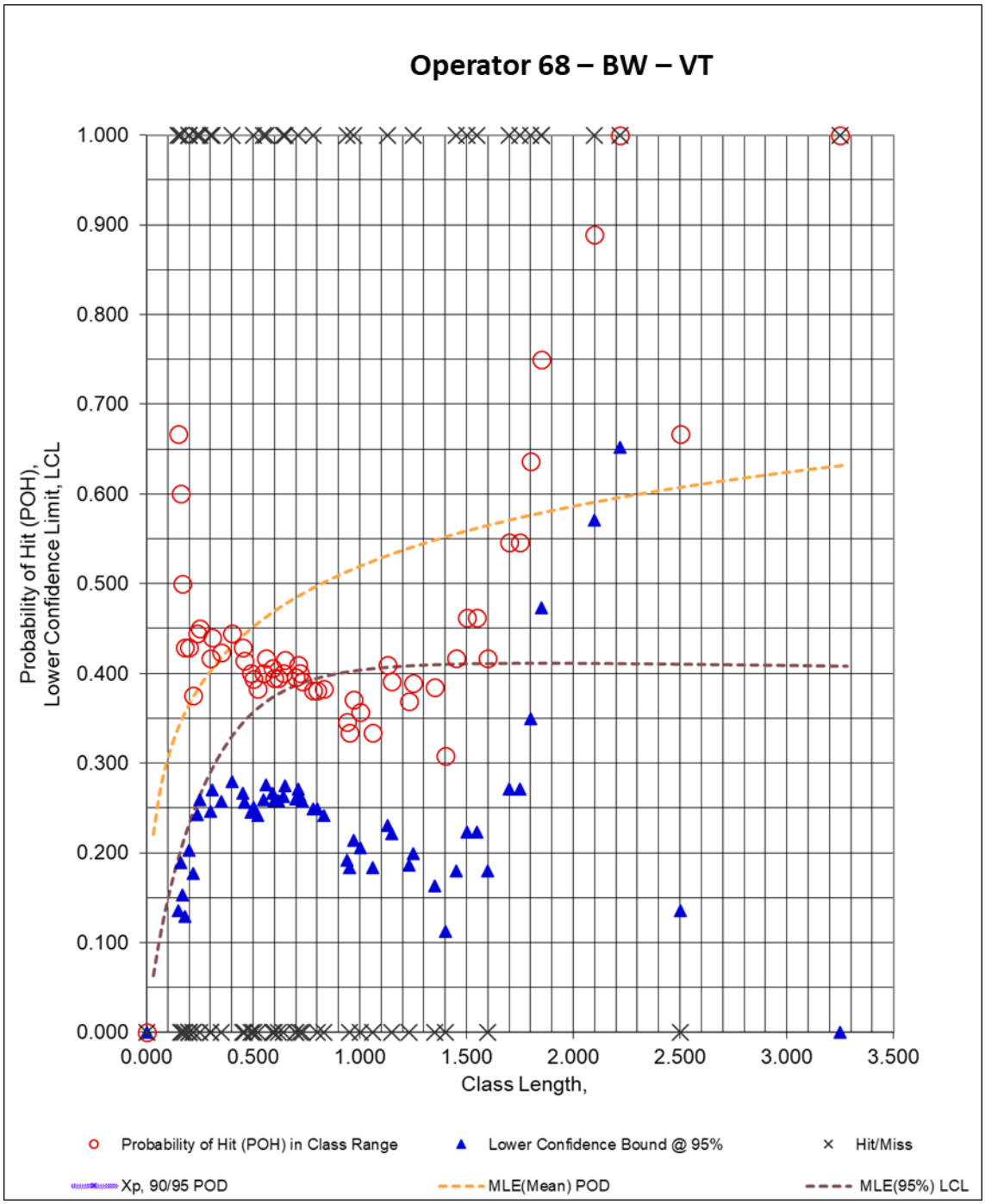

Figure 410. DOEPOD – BW – VT – Operator 68

Appendix G.
DOEPOD Plots – DOEPOD Summary Tables for Fillet Welds Panels

Table 1 through Table 5 summarizes DOEPOD fillet welds panels.

Table 1. DOEPOD Summary Table for VT – FW

Operator Number	Hits	Misses	False Calls	90/95 X_{POD} Reached	90/95 X_{POD} [inch]	$X_{Best\ LCL}$ [inch]	BEST LCL/ POH [%]	Probability of False Call [%]	Case #	Recommendations
1	47	42	7	Not Reached		2.45	0.7699	0.0490	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
5	67	22	11	Not Reached		2.1	0.7411	0.0666	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
6	45	44	13	Not Reached		1.9	0.5493	0.0775	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
Operator 11	33	56	5	Not Reached		3.75	0.3684	0.0387	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
14	77	12	20	Not Reached		1	0.5493	0.1063	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
15	88	1	16	Reached	0.9			0.0903	1+	Inspector Qualification CONDITIONAL PASS: Excessive false calls. Explain misses and false calls.
17	52	37	7	Not Reached		1.9	0.6366	0.0490	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
19	44	45	8	Not Reached		1.3	0.5493	0.0549	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
20	61	28	8	Not Reached		0.55	0.7033	0.0549	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.

Operator Number	Hits	Misses	False Calls	90/95 X_{POD} Reached	90/95 X_{POD} [inch]	$X_{Best\ LCL}$ [inch]	BEST LCL/ POH [%]	Probability of False Call [%]	Case #	Recommendations
27	53	36	7	Not Reached		4.3	0.6613	0.0490	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
30	60	29	20	Not Reached		0.95	0.6092	0.1063	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
31	26	63	9	Not Reached		3.8	0.2504	0.0576	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
32	66	23	19	Not Reached		2.05	0.6877	0.1014	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
33	19	70	7	Not Reached		1.4	0.2236	0.0490	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
47	72	17	21	Not Reached		2.5	0.7616	0.1113	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
48	33	56	4	Not Reached		1.5	0.3684	0.0338	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
50	51	38	6	Not Reached		2	0.5493	0.0451	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
51	20	69	3	Not Reached		0.85	0.1893	0.0286	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
52	51	38	8	Not Reached		4.3	0.6877	0.0549	4	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L and the greater of X_{POH} or X_{LCL}.
53	39	50	12	Not Reached		3.8	0.5493	0.0721	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
54	30	59	10	Not Reached		3.95	0.4182	0.0632	7	90/95 X_{POH} is not reached anywhere. Recommend satisfying $2X_L$.
55	19	70	5	Not Reached		0.8	0.2008	0.0387	7	90/95 X_{POH} is not reached anywhere. Recommend satisfying $2X_L$.

Operator Number	Hits	Misses	False Calls	90/95 X_{POD} Reached	90/95 X_{POD} [inch]	$X_{Best\ LCL}$ [inch]	BEST LCL/ POH [%]	Probability of False Call [%]	Case #	Recommendations
58	68	21	10	Not Reached		1.35	0.5493	0.0632	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
59	46	43	12	Not Reached		0.5	0.4600	0.0721	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
67	61	28	13	Not Reached		4.3	0.6964	0.0775	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
70	46	43	5	Not Reached		3.8	0.5009	0.0387	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.

Table 2. DOEPOD Summary Table for MT with Contrast – FW

Operator Number	Hits	Misses	False Calls	90/95 X_{POD} Reached	90/95 X_{POD} [inch]	$X_{Best\ LCL}$ [inch]	BEST LCL/ POH [%]	Probability of False Call [%]	Case #	Recommendations
5	75	14	13	Not Reached		0.55	0.6070	0.0775	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
6	70	19	9	Not Reached		4.3	0.7942	0.0576	4	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L and the greater of X_{POH} or X_{LCL}.
12	85	4	22	Reached	2.15			0.1161	1	Inspector Qualification CONDITIONAL PASS: Excessive false calls. Explain misses and false calls.
14	89	0	22	Reached	1			0.1161	1	Inspector Qualification CONDITIONAL PASS: Excessive false calls. Explain false calls.
17	74	15	7	Not Reached		1.8	0.6518	0.0490	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
18	85	4	15	Reached	2.15			0.0851	1	Inspector Qualification CONDITIONAL PASS: Excessive false calls. Explain false calls.

Operator Number	Hits	Misses	False Calls	90/95 X_{POD} Reached	90/95 X_{POD} [inch]	$X_{Best\ LCL}$ [inch]	BEST LCL/ POH [%]	Probability of False Call [%]	Case #	Recommendations
19	48	41	3	Not Reached		3.85	0.6070	0.0286	7	90/95 X_{POH} is not reached anywhere. Recommend satisfying 2XL.
23	73	16	5	Not Reached		2.45	0.7998	0.0387	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and 2XL.
24	71	18	10	Not Reached		2.7	0.7734	0.0632	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying 2XL.
26	58	31	9	Not Reached		4.3	0.6877	0.0576	4	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L and the greater of X_{POH} or X_{LCL}.
30	85	4	15	Reached	2.8			0.0851	1#	90/95 X_{POD} may be VALIDATED from X_{POD} to X_L. X_p used to satisfy X_L and X_m requirements. An alternate 90/95 X_{POH} is available if X_{podopt} or Optimum X_{POH} (if listed) is also satisfied.
31	86	3	18	Reached	2.8			0.1006	1#	90/95 X_{POD} may be VALIDATED from X_{POH} to X_L. X_p used to satisfy X_L and X_m requirements. An alternate 90/95 X_{POD} is available if X_{podopt} or Optimum X_{POH} (if listed) is also satisfied.
32	79	10	13	Not Reached		2.7	0.8965	0.0775	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
34	82	7	13	Reached	2.15			0.0775	1	Inspector Qualification CONDITIONAL PASS: Excessive false calls. Explain false calls.
39	81	8	12	Not Reached		1	0.6877	0.0721	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
40	88	1	17	Reached	1			0.0954	1	Inspector Qualification CONDITIONAL PASS: Excessive false calls. Explain false calls.
47	89	0	20	Reached	1			0.1063	1	Inspector Qualification CONDITIONAL PASS:

Operator Number	Hits	Misses	False Calls	90/95 X_{POD} Reached	90/95 X_{POD} [inch]	$X_{Best\ LCL}$ [inch]	BEST LCL/ POH [%]	Probability of False Call [%]	Case #	Recommendations
										Excessive false calls. Explain false calls.
48	84	5	15	Reached	1.75			0.0851	2	Inspector Qualification FAIL. Missed large flaws. Excessive false calls. Retrain & retest.
50	88	1	22	Reached	1			0.1161	1	Inspector Qualification CONDITIONAL PASS: Excessive false calls. Explain false calls.
51	81	8	16	Reached	3.3			0.0903	1#	90/95 X_{POD} may be VALIDATED from X_{POH} to X_L. X_p used to satisfy X_L and X_m requirements. An alternate 90/95 X_{POD} is available if X_{podopt} or Optimum X_{POH} (if listed) is also satisfied.
52	84	5	10	Reached	1.75			0.0632	1+	Inspector Qualification CONDITIONAL PASS: Excessive false calls. Explain misses and false calls.
53	86	3	17	Reached	1			0.0954	1+	Inspector Qualification CONDITIONAL PASS: Excessive false calls. Explain Misses and false calls.
54	75	14	11	Not Reached		2.5	0.8153	0.0666	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
55	35	54	2	Not Reached		0.7	0.4182	0.0233	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.

Table 3. DOEPOD Summary Table for MT Without Contrast - FW

Operator Number	Hits	Misses	False Calls	90/95 X_{POD} Reached	90/95 X_{POD} [inch]	$X_{Best\ LCL}$ [inch]	BEST LCL/ POH [%]	Probability of False Call [%]	Case #	Recommendations
1	79	10	10	Reached	2.15			0.0632	1	Inspector Qualification CONDITIONAL PASS: Excessive false calls. Explain false calls.
30	82	7	12	Reached	2.8			0.0721	1	Inspector Qualification CONDITIONAL PASS: Excessive false calls. Explain false calls.
31	84	5	22	Reached	3.3			0.1161	1#	90/95 X_{POD} may be VALIDATED from X_{POD} to X_L. X_p used to satisfy X_L and X_m requirements. An alternate 90/95 X_{POD} is available if X_{podopt} or Optimum X_{POH} (if listed) is also satisfied.
32	82	7	14	Reached	2.15			0.0799	1	Inspector Qualification CONDITIONAL PASS: Excessive false calls. Explain false calls.
35	87	2	9	Reached	1			0.0576	1*	90/95 X_{POD} is reached. X_p used to satisfy X_L and X_m requirements. VALIDATION GAP exists. X_p may VALIDATE between X_p and X_L when causes of Misses are understood and corrected.
39	83	6	19	Reached	1.4			0.1014	1*	90/95 X_{POD} is reached. Xp used to satisfy X_L and alternate X_m requirements. VALIDATION GAP exists. X_p may VALIDATE between X_p and X_L when causes of Misses are understood and corrected.
41	89	0	21	Reached	1			0.1113	1	Inspector Qualification CONDITIONAL PASS: Excessive false calls. Explain false calls.
58	89	0	21	Reached	1			0.1113	1	Inspector Qualification CONDITIONAL PASS:

Operator Number	Hits	Misses	False Calls	90/95 X_{POD} Reached	90/95 X_{POD} [inch]	$X_{Best\ LCL}$ [inch]	BEST LCL/ POH [%]	Probability of False Call [%]	Case #	Recommendations
										Excessive false calls. Explain false calls.
59	82	7	25	Reached	1.75			0.1307	2	Inspector Qualification FAIL. Missed large flaws. Excessive false calls. Retrain & retest.
66	89	0	23	Reached	1			0.1210	1	Inspector Qualification CONDITIONAL PASS: Excessive false calls. Explain false calls.

Table 4. DOEPOD Summary Table for PT - FW

Operator Number	Hits	Misses	False Calls	90/95 X_{POD} Reached	90/95 X_{POD} [inch]	$X_{BEST\ LCL}$ [inch]	BEST LCL/POH [%]	Probability of False Call [%]	Case #	Recommendations
1	48	41	4	Not Reached		3.95	0.6044	0.0338	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
5	71	18	5	Not Reached		1.55	0.7688	0.0387	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
6	50	39	4	Not Reached		2.15	0.5480	0.0338	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
12	83	6	15	Reached	0.9			0.0851	1	Inspector Qualification CONDITIONAL PASS: Excessive false calls. Explain false calls.
14	82	7	19	Reached	0.8			0.1014	2	Inspector Qualification FAIL. Missed large flaws. Excessive false calls. Retrain & retest.
15	53	36	5	Not Reached		3.95	0.5965	0.0387	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
17	55	34	3	Not Reached		1.55	0.6044	0.0286	6	90/95 X_{POD} is not reached anywhere.

Operator Number	Hits	Misses	False Calls	90/95 X_{POD} Reached	90/95 X_{POD} [inch]	$X_{BEST\ LCL}$ [inch]	BEST LCL/POH [%]	Probability of False Call [%]	Case #	Recommendations
										Recommend satisfying X_L, X_{POH}, and $2X_L$.
19	39	50	1	Not Reached		2.1	0.4793	0.0176	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
21	58	31	3	Not Reached		2.45	0.7791	0.0286	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
22	47	42	1	Not Reached		2.45	0.7791	0.0176	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
30	57	32	14	Not Reached		3.85	0.7033	0.0799	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
32	67	22	5	Not Reached		2.45	0.7933	0.0387	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
35	42	47	2	Not Reached		2.45	0.5493	0.0233	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
38	70	19	9	Not Reached		3.95	0.7417	0.0576	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
39	64	25	6	Not Reached		1.7	0.7066	0.0451	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
40	64	25	5	Not Reached		2.45	0.7484	0.0387	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
41	69	20	4	Not Reached		2.45	0.8368	0.0338	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
47	75	14	7	Not Reached		1	0.5493	0.0490	6	90/95 X_{POD} is not reached anywhere.

Operator Number	Hits	Misses	False Calls	90/95 X_{POD} Reached	90/95 X_{POD} [inch]	$X_{BEST\ LCL}$ [inch]	BEST LCL/POH [%]	Probability of False Call [%]	Case #	Recommendations
										Recommend satisfying X_L, X_{POH}, and $2X_L$.
48	84	5	4	Reached	1.4			0.0338	1	Inspector Qualification CONDITIONAL PASS: At X_p = 2.8 inch. Explain false calls.
50	78	11	8	Not Reached		1	0.5493	0.0549	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
51	82	7	7	Reached	1.4			0.0490	1#	90/95 X_{POD} may be VALIDATED from X_{POD} to X_L. X_p used to satisfy X_L and X_m requirements. An alternate 90/95 X_{POD} is available if X_{podopt} or Optimum X_{POD} (if listed) is also satisfied.
52	65	24	4	Not Reached		1.95	0.8666	0.0338	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
53	82	7	19	Reached	1.4			0.1014	1	Inspector Qualification CONDITIONAL PASS: Excessive false calls. Explain misses and false calls.
54	66	23	6	Not Reached		2.5	0.8012	0.0451	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
55	76	13	7	Not Reached		1.9	0.8190	0.0490	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
58	51	38	3	Not Reached		1.7	0.6070	0.0286	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
59	15	74	0	Not Reached		1.55	0.1376	0.0111	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.

Table 5. DOEPOD Summary Table for UT - FW

Operator Number	Hits	Misses	False Calls	90/95 X_{POD} Reached	90/95 X_{POD} [inch]	$X_{Best\ LCL}$ [inch]	BEST LCL/ POH [%]	Probability of False Call [%]	Case #	Recommendations
61	74	15	12	Not Reached		1.9	0.8190	0.0721	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
62	79	10	12	Not Reached		1.9	0.8719	0.0721	6	90/95 X_{POH} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
63	77	12	10	Not Reached		1	0.5493	0.0632	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.

Appendix H.
DOEPOD Plots – DOEPOD Summary Tables for Butt Weld Panels

Table 6 through Table 11 summarizes DOEPOD for butt weld panels.

Table 6. DOEPOD Summary Table for VT – BW

Operator Number	Hits	Misses	False Calls	90/95 X_{POD} Reached	90/95 X_{POD} [inch]	$X_{Best\ LCL}$ [inch]	BEST LCL/ POH [%]	Probability of False Call [%]	Case #	Recommendations
1	46	27	22	Not Reached		0.16	0.472869133	0.18108	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
6	31	42	13	Not Reached		2.22	0.651835849	0.12122	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
11	29	44	7	Not Reached		2.22	0.479294479	0.07691	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
15	62	11	5	Not Reached		0.18	0.606961852	0.06094	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
17	25	48	0	Not Reached		2.1	0.435625449	0.01762	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
20	26	47	6	Not Reached		2.1	0.651835849	0.07079	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
27	61	12	54	Not Reached		1.45	0.818965047	0.3908	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
30	22	51	26	Not Reached		2.22	0.479294479	0.21069	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
31	17	56	4	Not Reached		2.1	0.472869133	0.05317	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
32	28	45	19	Not Reached		2.22	0.651835849	0.15852	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
33	26	47	3	Not Reached		2.22	0.479294479	0.04514	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.

Operator Number	Hits	Misses	False Calls	90/95 X_{POD} Reached	90/95 X_{POD} [inch]	$X_{Best\ LCL}$ [inch]	BEST LCL/ POH [%]	Probability of False Call [%]	Case #	Recommendations
47	53	18	25	Not Reached		0.16	0.472869133	0.20334	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
48	24	49	12	Not Reached		1.85	0.368401017	0.11289	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
50	49	23	12	Not Reached		1.8	0.716868717	0.11289	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
51	42	31	19	Not Reached		1.85	0.779079128	0.15852	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
52	57	16	46	Not Reached		0.16	0.472869133	0.3386	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
53	26	47	5	Not Reached		3.25	0.385457461	0.06094	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
54	13	60	3	Not Reached		2.1	0.341259658	0.04514	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
55	21	52	9	Not Reached		2.1	0.479294479	0.09041	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
58	59	14	68	Not Reached		1.7	0.759633946	0.41071	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
59	52	21	40	Not Reached		1.85	0.761593531	0.29849	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
67	47	26	3	Not Reached		2.22	0.761593531	0.04514	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
68	34	39	4	Not Reached		2.22	0.651835849	0.05317	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.

Table 7. DOEPOD Summary Table for MT with Contrast – BW

Operator Number	Hits	Misses	False Calls	90/95 X_{POD} Reached	90/95 X_{POD} [inch]	$X_{Best\ LCL}$ [inch]	BEST LCL/ POH [%]	Probability of False Call [%]	Case #	Recommendations
6	23	50	8	Not Reached		1.85	0.529913624	0.08619	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
17	35	38	4	Not Reached		2.22	0.761593531	0.05317	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
19	22	51	3	Not Reached		2.5	0.687657409	0.04514	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
23	46	26	58	Not Reached		1.45	0.661319995	0.41637	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
24	35	36	38	Not Reached		2.1	0.651835849	0.28493	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
26	25	48	17	Not Reached		3.25	0.529913624	0.149	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
29	52	21	29	Not Reached		3.25	0.683659401	0.22271	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
31	51	22	32	Not Reached		1	0.472869133	0.24367	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
32	54	19	18	Not Reached		0.59	0.472869133	0.15687	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
47	58	15	30	Not Reached		0.71	0.844444027	0.22972	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
48	45	28	34	Not Reached		1.85	0.807363152	0.25752	6	90/95 X_{POD} is not reached anywhere.

Operator Number	Hits	Misses	False Calls	90/95 X_{POD} Reached	90/95 X_{POD} [inch]	$X_{Best\ LCL}$ [inch]	BEST LCL/ POH [%]	Probability of False Call [%]	Case #	Recommendations
										Recommend satisfying X_L, X_{POH}, and $2X_L$.
50	60	12	76	Not Reached		0.95	0.844444027	0.45833	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
51	57	16	40	Not Reached		1.45	0.870669699	0.29849	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
52	58	15	27	Not Reached		0.71	0.844444027	0.21802	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
53	46	27	42	Not Reached		2.5	0.687831825	0.31195	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
54	40	33	22	Not Reached		2.22	0.761593531	0.18108	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
55	52	21	24	Not Reached		2.5	0.761593531	No probability	4	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L and the greater of X_{POH} or X_{LCL}.

Table 8. DOEPOD Summary Table for MT Without Contrast – BW

Operator Number	Hits	Misses	False Calls	90/95 X_{POD} Reached	90/95 X_{POD} [inch]	$X_{Best\ LCL}$ [inch]	BEST LCL/ POH [%]	Probability of False Call [%]	Case #	Recommendations
1	56	17	26	Not Reached		0.5	0.368401017	0.21069	5	This is a survey data set. 90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L and Survey X_{POH} (if listed)
30	34	39	11	Not Reached		1.8	0.687657409	0.10452	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
31	51	22	28	Not Reached		1	0.472869133	0.22531	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
32	44	29	18	Not Reached		1.8	0.761593531	0.15687	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
35	39	34	5	Not Reached		1.85	0.736044594	0.06094	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
39	39	34	15	Not Reached		3.25	0.683659401	0.13314	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
40	63	10	16	Not Reached		0.5	0.368401017	0.14109	5	This is a survey data set. 90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L and survey X_{POH} (if listed)
41	69	4	32	Reached	1.06			0.24367	1#	90/95 X_{POH} may be VALIDATED from X_{POH} to X_L. X_p used to satisfy X_L and X_m requirements. An alternate 90/95 X_{POD} is available if X_{podopt} or optimum X_{POH} (if listed) is also satisfied.
58	68	5	28	Not Reached		0.2	0.479294479	0.22531	5	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L and X_{POH}.
59	37	36	25	Not Reached		2.22	0.606961852	0.20334	7	90/95 X_{POH} is not reached anywhere. Recommend satisfying $2X_L$.
66	47	26	6	Not Reached		3.25	0.606961852	0.07079	4	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L and the greater of X_{POH} or X_{LCL}.

Table 9. DOEPOD Summary Table for PT – BW

Operator Number	Hits	Misses	False Calls	90/95 X_{POD} Reached	90/95 X_{POD} [inch]	$X_{Best\ LCL}$ [inch]	BEST LCL/ POH [%]	Probability of False Call [%]	Case #	Recommendations
1	38	35	7	Not Reached		2.22	0.720602012	0.07691	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
6	39	34	7	Not Reached		2.22	0.687831825	0.07691	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
15	41	32	37	Not Reached		2.22	0.636559056	0.27811	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
17	40	33	8	Not Reached		0.64	0.606961852	0.08619	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
19	26	47	4	Not Reached		3.25	0.51560788	0.05317	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
21	34	39	12	Not Reached		2.22	0.606961852	0.11289	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
22	36	37	6	Not Reached		2.22	0.687831825	0.07079	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
30	20	53	8	Not Reached		2.22	0.570865861	0.08619	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
32	29	44	8	Not Reached		2.22	0.720602012	0.08619	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
35	36	37	17	Not Reached		2.22	0.716868717	0.149	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
37	30	43	19	Not Reached		1.85	0.472869133	0.15852	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
38	33	40	15	Not Reached		0.97	0.606961852	0.13314	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
39	25	48	14	Not Reached		2.22	0.716868717	0.12515	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
40	28	45	12	Not Reached		1.85	0.651835849	0.11289	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.

Operator Number	Hits	Misses	False Calls	90/95 X_{POD} Reached	90/95 X_{POD} [inch]	$X_{Best\ LCL}$ [inch]	BEST LCL/ POH [%]	Probability of False Call [%]	Case #	Recommendations
41	37	36	14	Not Reached		2.22	0.687831825	0.12515	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
47	43	30	16	Not Reached		2.22	0.604354808	0.14109	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
48	61	12	116	Not Reached		0.22	0.570865861	0.76118	5	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L and X_{POH}.
50	45	28	21	Not Reached		2.22	0.589897733	0.17359	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
51	43	29	31	Not Reached		2.22	0.716868717	0.23671	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
52	46	27	38	Not Reached		2.22	0.748390959	0.28493	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
53	43	30	25	Not Reached		0.97	0.368401017	0.20334	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
54	35	38	16	Not Reached		2.22	0.677004646	0.14109	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
55	43	30	26	Not Reached		2.22	0.651835849	0.21069	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
58	41	32	13	Not Reached		2.22	0.748390959	0.12122	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
59	37	36	13	Not Reached		2.22	0.720602012	0.12122	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.

Table 10. DOEPOD Summary Table for UT – BW

Operator Number	Hits	Misses	False Calls	90/95 X_{POD} Reached	90/95 X_{POD} [inch]	$X_{Best\ LCL}$ [inch]	BEST LCL/ POH [%]	Probability of False Call [%]	Case #	Recommendations
1	41	32	19	Not Reached		3.25	0.636559056	0.15852	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
6	21	52	18	Not Reached		0.5	0.472869133	0.15687	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
11	41	32	19	Not Reached		1.6	0.687657409	0.15852	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
15	46	27	39	Not Reached		2.1	0.716868717	0.29172	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
17	15	58	5	Not Reached		2.22	0.354404659	0.06094	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
Operator 19	15	58	4	Not Reached		0.83	0.223606096	0.05317	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
25	47	26	10	Not Reached		0.73	0.529324582	0.09913	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
26	33	40	5	Not Reached		0.97	0.368401017	0.06094	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
29	55	18	22	Not Reached		1.45	0.818965047	0.18108	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
30	56	17	48	Not Reached		0.97	0.606961852	0.35179	6	90/95 X_{POD} is not reached anywhere. Recommend

Operator Number	Hits	Misses	False Calls	90/95 X_{POD} Reached	90/95 X_{POD} [inch]	$X_{Best\ LCL}$ [inch]	BEST LCL/ POH [%]	Probability of False Call [%]	Case #	Recommendations
										satisfying X_L, X_{POH}, and $2X_L$.
33	46	27	15	Not Reached		2.1	0.716868717	0.13314	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
Operator 34	24	49	5	Not Reached		3.25	0.716868717	0.06094	4	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L and the greater of X_{POH} or X_{LCL}.
36	28	44	6	Not Reached		1.85	0.716868717	0.07079	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
37	39	34	3	Not Reached		1.75	0.794184129	0.04514	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
38	62	11	58	Not Reached		1.23	0.820924573	0.41637	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
44	51	22	32	Not Reached		0.2	0.479294479	0.24367	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
45	50	23	25	Not Reached		1.13	0.748390959	0.20334	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
46	49	24	24	Not Reached		2.22	0.794184129	0.19595	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
48	35	38	4	Not Reached		0.97	0.368401017	0.05317	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.

Operator Number	Hits	Misses	False Calls	90/95 X_{POD} Reached	90/95 X_{POD} [inch]	$X_{Best\ LCL}$ [inch]	BEST LCL/ POH [%]	Probability of False Call [%]	Case #	Recommendations
49	47	26	8	Not Reached		0.73	0.54928154	0.08619	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
55	26	47	32	Not Reached		1.6	0.54928154	0.24367	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
56	34	39	13	Not Reached		2.5	0.687657409	0.12122	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
57	47	26	11	Not Reached		0.8	0.54928154	0.10452	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
59	35	38	14	Not Reached		0.97	0.368401017	0.12515	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
60	17	56	4	Not Reached		3.25	0.349807606	0.05317	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.

Table 11. DOEPOD Summary Table for PAUT – BW

Operator Number	Hits	Misses	False Calls	90/95 X_{POD} Reached	90/95 X_{POD} [inch]	X_{BEST} LCL [inch]	BEST LCL/ POH [%]	Probability of False Call [%]	Case #	Recommendations
36	32	41	5	Not Reached		2.22	0.482353887	0.06094	7	90/95 X_{POD} is not reached anywhere. Recommend satisfying $2X_L$.
42	60	13	15	Not Reached		0.31	0.716868717	0.13314	6	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L, X_{POH}, and $2X_L$.
43	55	18	12	Not Reached		0.64	0.368401017	0.11289	5	90/95 X_{POD} is not reached anywhere. Recommend satisfying X_L and X_{POH}.

Appendix I.
Breakdown of Individual Participants by Different Methods

Table 12 shows the list of participants by different NDE methods for BW and Table 13 shows the list of participants by different NDE methods for FW.

Table 12. List of Participants by Different NDE Methods for BW

VT	PT	MT with Contrast	MT No Contrast	UT	PAUT
1	1	6	1	1	36
6	6	17	30	6	42
11	15	19	31	11	43
15	17	23	32	15	
17	19	24	35	17	
19	21	26	39	19	
20	22	29	40	25	
27	30	30	41	26	
30	32	31	58	29	
31	35	32	59	30	
32	37	39	66	33	
33	38	47		36	
47	39	48		37	
48	40	50		38	
50	41	51		44	
51	47	52		45	
52	48	53		46	
53	50	54		48	
54	51	55		49	
55	52			55	
58	53			56	
59	54			57	
67	55			59	
68	58			60	
	59			69	
24	**25**	**19**	**11**	**25**	**3**

Table 13. List of Participants by Different NDE Methods for FW

VT	PT	MT with Contrast	MT No Contrast	UT
1	1	5	1	61
5	5	6	30	62
6	6	12	31	63
11	12	14	32	
14	14	17	35	
15	15	18	39	
17	17	19	41	
19	19	23	58	
20	21	24	59	
27	22	26	66	
30	30	30		
31	32	31		
32	35	32		
33	38	34		
47	39	39		
48	40	40		
50	41	47		
51	47	48		
52	48	50		
53	50	51		
54	51	52		
55	52	53		
58	53	54		
59	54	55		
67	55			
70	58			
	59			
26	**27**	**24**	**10**	**3**

Abbreviations and Acronyms

ACRONYMS	EXPLANATION
BW	Butt Weld
$X_{BEST\ LCL}$	Class length (flaw size) exhibiting the maximum LCL
X_{POD}	Class length at which the lower confidence limit (value) is 0.90 or greater (90/95 POD) @ 95% confidence
X_{POH}	Class length where there are no misses above this class length, and POH = 1 above this class length
DOEPOD	Design of Experiments Probability of Detection
FW	Fillet Welds
X_L	Largest Class Length in Entire Dataset
NDE	Nondestructive Evaluation
PT	Penetrant Testing
PAUT	Phased Array Ultrasonic Testing
POD	Probability of Detection
POH	Probability of Hits
UT	Ultrasonic Testing
VT	Visual Testing