

- 1   **Q:   What is the probability of two of the three units at Holyrood will be forced out**  
2   **of service at any given time assuming a 10% forced outage rate for each of the**  
3   **three units? Please provide the calculation.**  
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- 6   A.   The probability of two independent events, each of which takes out a different  
7       Holyrood unit, is simply the product of the probability of each event. In other  
8       words, with a forced outage rate of 10%, the probability of two units being forced  
9       offline due to independent events is 10% times 10%, or 1%.  
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11       Statistically speaking, one would call these independent events “mutually  
12       exclusive,” in which case it is appropriate to multiply the probabilities together.  
13       Note however that multiple unit trips are more likely to occur from events that are  
14       related; *i.e.*, that are not independent and that are not mutually exclusive. Consider  
15       for example the last simultaneous trip of all three Holyrood units. This resulted  
16       from a common cause (trouble in the terminal station). The calculation of this  
17       probability is highly complex. We can conclude, however, that the probability of a  
18       multi-unit trip is greater than the probability calculated by simply multiplying the  
19       individual forced outage rates together.