Risk Informing Nuclear Power Plant Emergency Preparedness

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Informing EP Oversight

- Significant progress in nuclear plant accident analysis
- Possible to inform regulatory structure with risk and consequence information
  - Quantify protection provided by EP
  - Develop analytical techniques for EP regulatory oversight
  - Site-specific basis

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Informing EP Oversight

- Identify suite of credible scenarios appropriate for regulatory oversight
  - Used 1 X 10-7 per reactor year probability for failures
  - Consider important scenarios below 10-7
  - Hostile action (dominates)

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Informing EP Oversight

- Credible scenario - define source term and timing
- Calculation allows health consequence estimate
- Estimate allows calculation of benefit of EP program
- Significance of individual elements estimated, e.g., notification systems

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Informing EP Oversight

- Selection of credible scenarios does not bound worst case imaginable
- Represents scenarios appropriate for oversight
- Spectrum of early release accidents
- Considering SBO scenario for mitigation capability oversight

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Scenario Selection

- PWR
  - Short-term SBO, immediate loss of TDAFW, consequential SGTR
  - Large LOCA, failure of coolant injection, early containment failure

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Scenario Selection

- BWR
  - SBO - loss of DC, stuck open relief valve, failure of turbine-driven systems
  - Interfacing system LOCA

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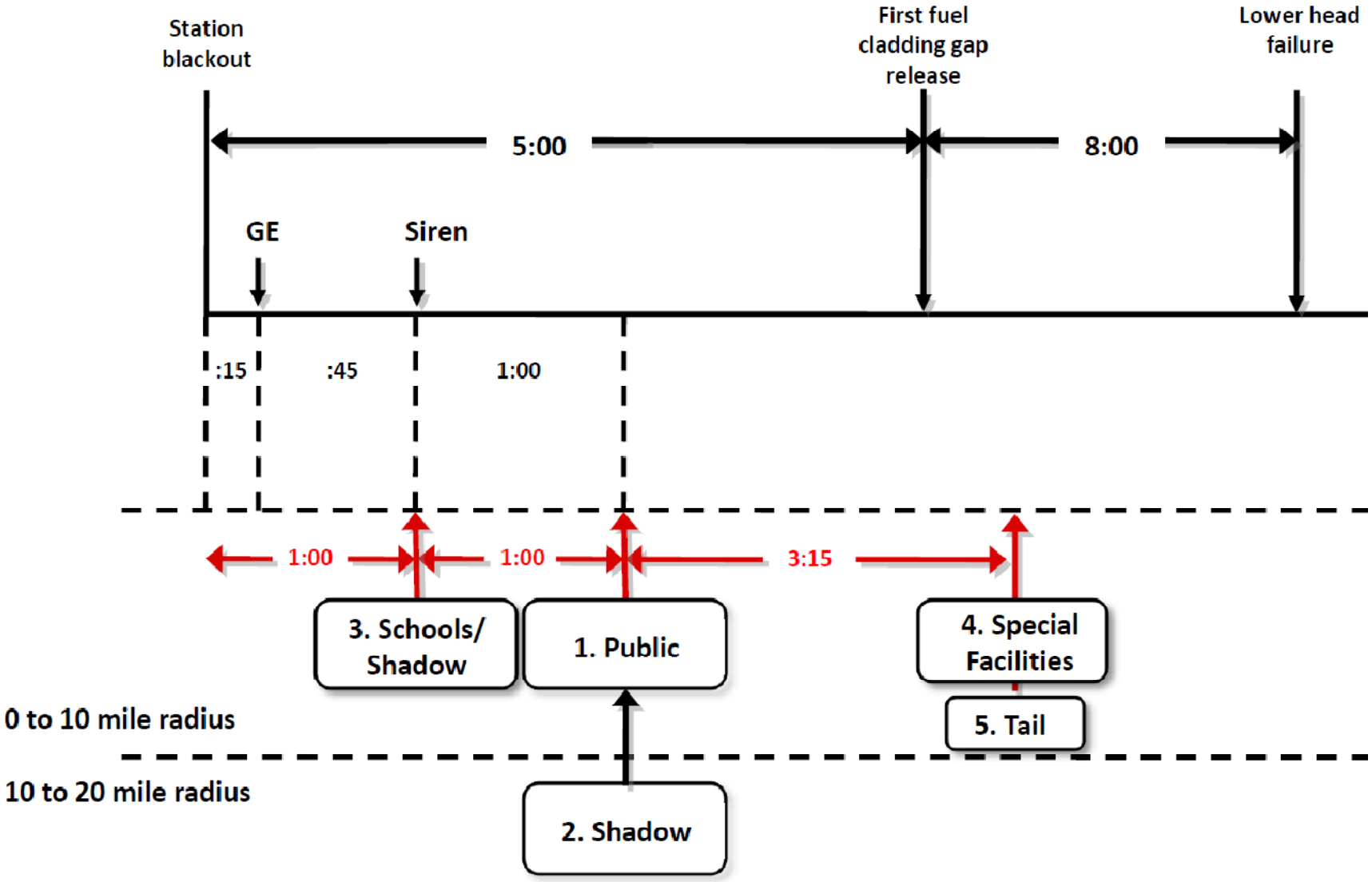
EP Response Timeline



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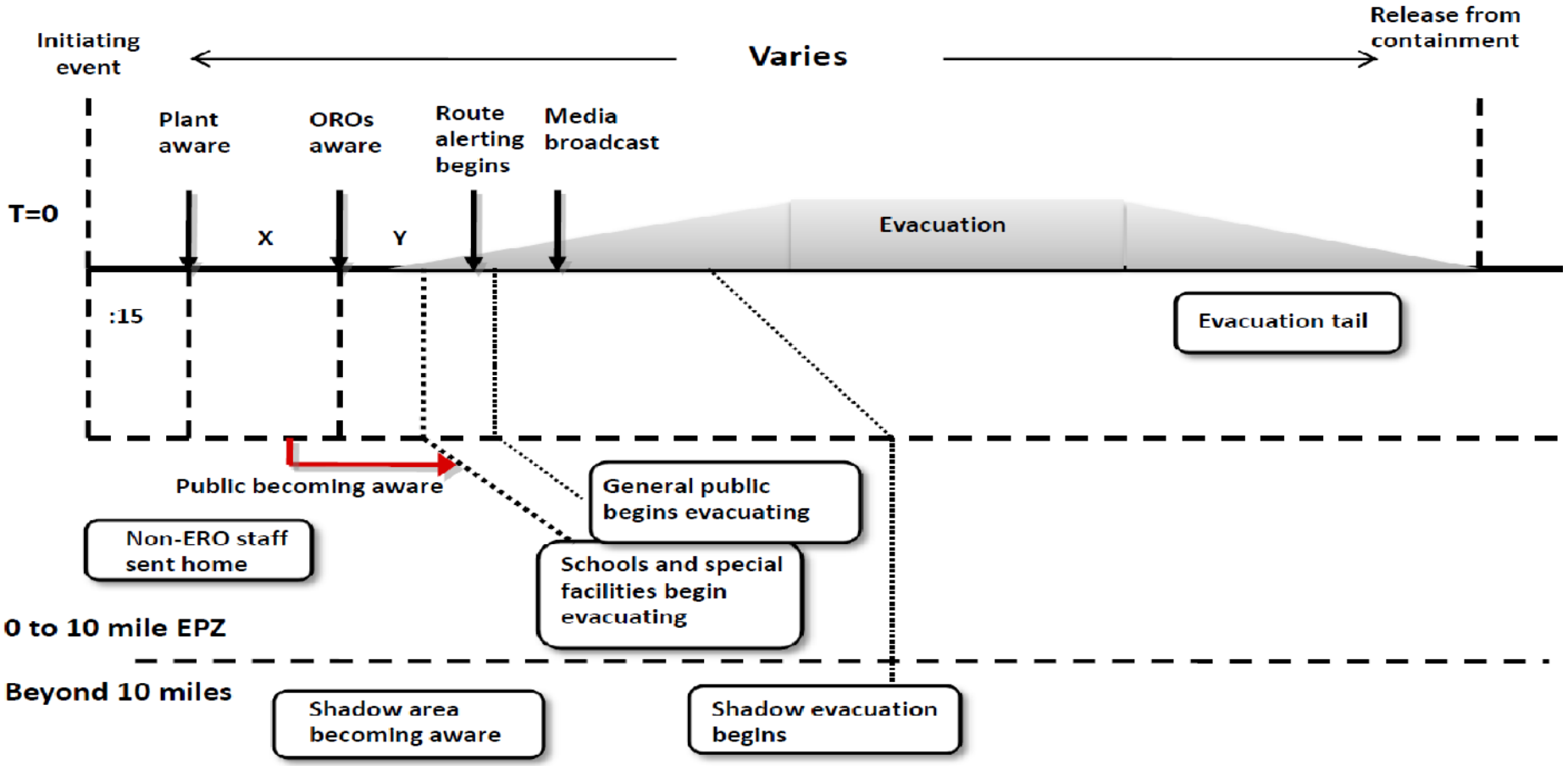
Ad Hoc Timeline



Equation for ad hoc ETE:

$$ETE_{ad\ hoc} = 1.2ETE_{normal} + X + Y$$

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Quantitative EP Goals

- In severe nuclear plant accident there will be no early fatalities among public who follow protective action direction
- In severe nuclear plant accident there will be no measurable increase in cancer fatalities among public who follow protective action direction

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Process to Enhance EP Oversight

- Multi-year development effort
- Initial effort to determine feasibility and direction (proof of concept)
- Policy paper for Commission consideration

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Questions?

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