

**Risk Informing
Emergency Preparedness:
SPAR Model Evaluation of
Emergency Action Levels**

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Risk informing EP



NUREG/CR-7154, "Risk Informing
Emergency Preparedness Oversight:
Evaluation of Emergency Action Levels – A
Pilot Study of Peach Bottom, Surry and
Sequoyah"

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Research Objectives



1. Explore the feasibility of using probabilistic risk assessment methods to evaluate emergency action levels (EALs)
2. Evaluate consistency of EALs in a given Emergency Classification, (EC) by quantifying and comparing conditional core damage probabilities (CCDPs)
3. Provide risk insights to improve EAL scheme

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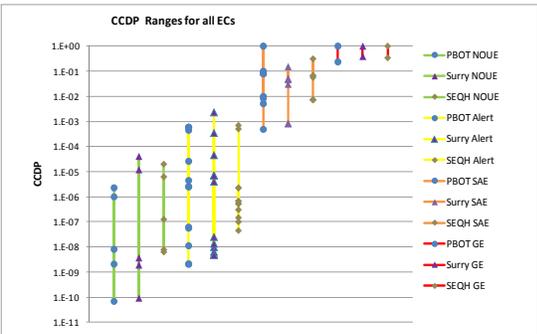
Project Scope



- Selected Plants:
 - Peach Bottom 2; Surry 1; Sequoyah 1
- Scenarios analyzed:
 - Loss of AC power,
 - Loss of DC,
 - Small reactor coolant system leakage (> technical specification limits),
 - Auto/manual trip failure
 - Loss of annunciation/indication
 - Toxic gas release in vital areas

EC	Initial Conditions Stated in NEI 99-00, V5	PBOT	SURY	SEQH
NOUE	Loss of all offsite AC power to emergency busses for 15 minutes or longer.	MU1	SU1.1	SU1
NOUE	Unplanned loss of safety system annunciation or indication in the control room for 15 minutes or longer.	MU6	SU4.1	SU3
NOUE	RCS leakage. Op. modes: power operation, startup, hot standby, hot shutdown	MU7	SU6.1	SU5
NOUE	Release of toxic, corrosive, asphyxiant or flammable gases deemed detrimental to normal operation of the plant.	HU7	HU3.1	HU3
Alert	AC power capability to emergency busses reduced to a single power source for 15 minutes or longer such that any additional single failure would result in station blackout.	MA1	SA1.1	SA5
Alert	Automatic scram (trip) fails to shut down the reactor and the manual actions taken from the reactor control console are successful in shutting down the reactor.	MA3	SA2.1	SA2
Alert	Unplanned loss of safety system annunciation or indication in control room with either (1) a significant transient in progress or (2) compensatory indicators are unavailable.	MA6	SA4.1	SA4
Alert	Access to a VITAL AREA is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of operable equipment required to maintain safe operations or safety shutdown the reactor.	HA7	HA3.1	HA3
SAE	Loss of all offsite and all onsite AC power to emergency busses.	MS1	SS1.1	SS1
SAE	Automatic scram (trip) fails to shut down the reactor and manual actions taken from the reactor control console are not successful in shutting down the reactor.	MS3	SS2.1	SS2
SAE	Loss of all vital DC power for 15 minutes or longer.	MS4	SS1.2	SS3
SAE	Complete loss of heat removal capability (NEI Revision 4 only; has been deleted in Revision 5)	MS5	n/a	n/a
SAE	Inability to monitor a significant transient in progress.	MS6	SS4.1	SS6
GE	Prolonged loss of all offsite and all onsite AC power to emergency busses.	MG1	SG1.1	SG1
GE	Automatic scram (trip) and all manual actions fail to shut down the reactor and indication of an extreme challenge to the ability to cool the core exists.	MG3	SG2.1	SG2

Results



NOUE --> Alert --> SAE --> GE



Questions?

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