

Analysis of a terrorist attack on a spent fuel cask has several steps.

1. Estimate damage done to the cask, the canister, and the spent fuel rods by
 - a. Impact Loads
 - b. () Loads *EX2*
 - c. Thermal/Fire Loads
2. Given an estimate of the damaged configuration of the spent fuel, examine criticality issues.
3. Given estimates of rod failure fractions and canister and/or cask leak path characteristics, estimate
 - a. release of fission products from failed rods to the cask/canister interior
 - b. fission product transport through the canister/cask to the environment
4. Given an estimate of fission product release from the cask to the environment (the environmental source term), estimate downwind-transport, radiological exposures, radiological health effects, contamination of property, and economic consequences.

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Ex-positions
EX2

HP vs. SWN
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Calculation	Proposed Codes	Initial Geometry			Output	Issues
		Cask	Canister	Fuel		
1a	PRONTO, ANSYS ZAPOTEK	U	U	U	Damage to Cask and Canister; maybe to Fuel	Is fuel modeled? If yes, then how?
1b	CTH	U	U	U	Damage to Cask and Canister; maybe to Fuel	Is fuel modeled? If yes, then how?
1c	CAFE/PThermal, VULCAN, Coyote	U or D	U or D	U or D	Failure elastomeric seals, burst rupture of canister and fuel rods	Quality of estimate of damaged condition of fuel generated by 1a or 1b calculations
2	KENO, MCNP	D	D	D	Criticality condition of damaged spent fuel	Quality of estimate of damaged condition/configuration of fuel generated by 1a, 1b, and/or 1c calculations
3a	None exists	NA	NA	D	Rod-to-Cask release fractions	Rod failure criteria; quality of NUREG/CR-6672 Rod-to-Cask release models
3b	MELCOR	D	D	NA	Retention of fission products in cask; Cask-to-Environment release fractions	Precision of leak path specification generated by 1a, 1b, or 1c. Fission product chemical and physical forms; vapor pressure data, particle size distribution and shape factors
4	MACCS, RADTRAN	NA	NA	NA	Environmental transport, air and ground concentrations, radiological exposures, health effects, property contamination, costs	Effect wind, cask wake, fire plume rise, surface roughness on short range doses; availability of attack site wind rose; uncertainties in cleanup criteria and effect lawsuits on cleanup timing; use of linear/no-threshold dose/response cancer models; choice/effectiveness/cost of decontamination methods

U = undamaged, D = damaged