

50-320

1 of 2

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Potential Core Melt Sequence of
Events Based on TMI Conditions on April 4, 1979

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1. Best technical judgment--core melt will not occur.
2. If core melt occurs--best technical judgment on sequence of events.

Time = 0

--All reactor core flow stops with system at 2500 psi, containment cooling starts soon.

Time = 30 hours

--Molten core melts through reactor vessel and falls into water in bottom of containment.

--Containment pressure goes to 23 psi.

--Do not expect simultaneous hydrogen burning, but if occurred, containment pressure could go up to about 90 psi.

Time = 3 days

--Molten core penetrating containment basemat--now about 3-4 feet into basemat.

Time = 1 week

--If there had been no containment cooling at all, predict containment failure by steam overpressure.

Expected Final Condition

Containment remains intact, core mass reaches thermal equilibrium after penetrating about halfway through the containment basemat, no significant release to environment.

Important Notes

1. Containment sprays and heat removal are required to prevent containment failure.
2. Steam explosions and hydrogen explosions may occur but not expected to rupture containment.

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POTENTIAL CORE MELT SCENARIO AT THE
BASED ON CONDITIONS OF 4/4/79

Assumptions in analysis: primary coolant pump fails. High pressure coolant injection operates to fill vessel. Pressure increases to 2500 psia. High pressure coolant assumed to fail. The time of high pressure coolant failure is seven days following reactor trip and is time 0 in the accident scenario described.

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Core Melt Times

Time	Comment
0	High Pressure Coolant Stops
28 hrs	Core uncovers
29	Melting Starts
30 hrs 10 min.	Core falls into plenum
30 hrs 15 min.	Lower head fails

Ⓢ RAPID H₂ BURNING AND HIGH STEAM GENERATION COULD FAIL CONTAINMENT AT THIS POINT.

Containment Parameters

Case	Time	Pressure without Hydrogen Burning (psia)	Pressure with Hydrogen Burning (psia)	Depth of Concrete Penetration (cm)	Comments
Containment Cooling Operates	30 hrs 15 min.	23	63	0	If sprays operate, release category PWR 7; if sprays fail, release category PWR 6
	47 hrs	24	91	92	
	64 hrs	27	88	126	
Sprays Operate, no cooling of containment	30 hrs 15 min.	29	95	0	Predict containment failure by over pressure at 169 hrs release category PWR 7
	47 hrs	37	88	147	
	64 hrs	43	55	178	

BECAUSE OF POSSIBILITY OF OVERPRESSURE FAILURE OF CONTAINMENT, WE RECOMMEND PROVISIONS FOR A FILTERED VENT OF CONTAINMENT SHOULD BE AVAILABLE.