



**Status and Update of NEI 09-10,
the Pump Roadmap Project, and
Other Gas Management Activities**

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Jennifer Gall
Reactor Systems Engineer
NRR/DSS



AGENDA

- NEI 09-10 Rev 1, "Guidelines For Effective Prevention And Management Of System Gas Accumulation"
- The Pump Roadmap Project
- Vortexing



NEI 09-10 Rev. 1

- Congressional Review Act (CRA) review
- Endorsement via Safety Evaluation
- NEI to issue Version A
- NRC to issue Regulatory Information Summary



The Pump Roadmap

- Published as an EPRI report, “Report of the Expert Panel on the Effect of Gas Accumulation on Pumps”
- Supports validation of NEI 09-10 pump ingestion limits



Vortexing

- NRC inspectors have reported inconsistencies in licensee treatment of vortices and the Office of Nuclear Reactor Regulation's (NRR's) Division of Safety Systems (DSS) has been requested to provide a consistent basis for evaluating vortex behavior
- DSS has found no acceptable generic vortex correlations in literature, during DSS reviews, or during support for inspections
- DSS is preparing a NUREG to address vortexing



DSS Review Approach to Vortexing

- vortex determinations must be based on acceptable test data
- NRC confirmatory tools
 - water depth above an exit pipe is greater than 9 feet
 - the exit Froude number ≤ 0.25
 - PWR hot leg water level to reasonably ensure vortexing will not occur when the RHR pipe connection is based on the following equation: $H/D = a N_{FR} + b$



NRC confirmatory PWR Hot Leg Vortex Correlation

$$H/D = a N_{FR} + b$$

H = distance from top of RHR pipe flow area where it is attached to hot leg to water level, D = RHR pipe diameter, Froude number = $N_{FR} = V/\sqrt{Dg}$

V = liquid velocity based on $\pi D^2 / 4$, g = gravitational constant

Plant	a	b
W 4-loop	0.478	0.086
Prairie Island, Kewaunee	0.255	1.98
Point Beach	0.478	0.212
Ginna	0.528	1.201
Others, bottom (90°) hot leg connection	0.528	1.021
Others, 60° hot leg connection	0.472	0.349



QUESTIONS?
