

Loss of Core Cooling During RCS Mid-Loop on April 10, 1987 Resulted in RHR Pump Cavitation

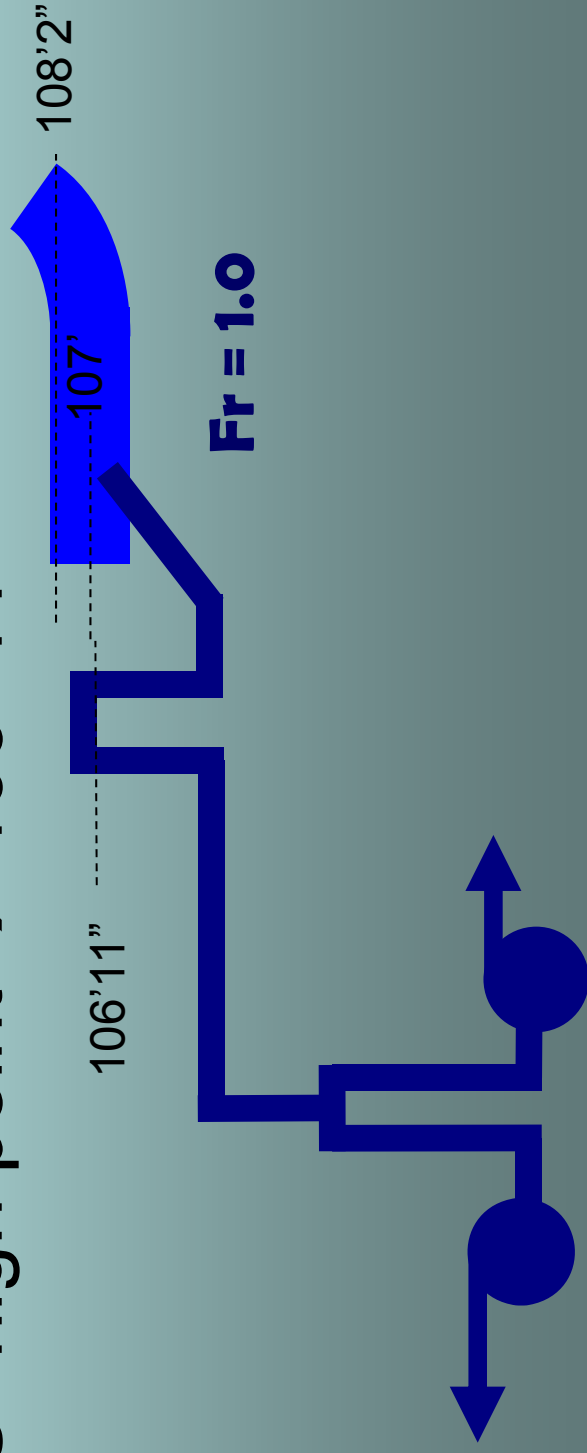
NRC Meeting On Vortexing

April 18, 2013

Anderson Lin
Diablo Canyon Power Plant
(805) 545-4286
Axle@pge.com

RCS / RHR Suction Layout

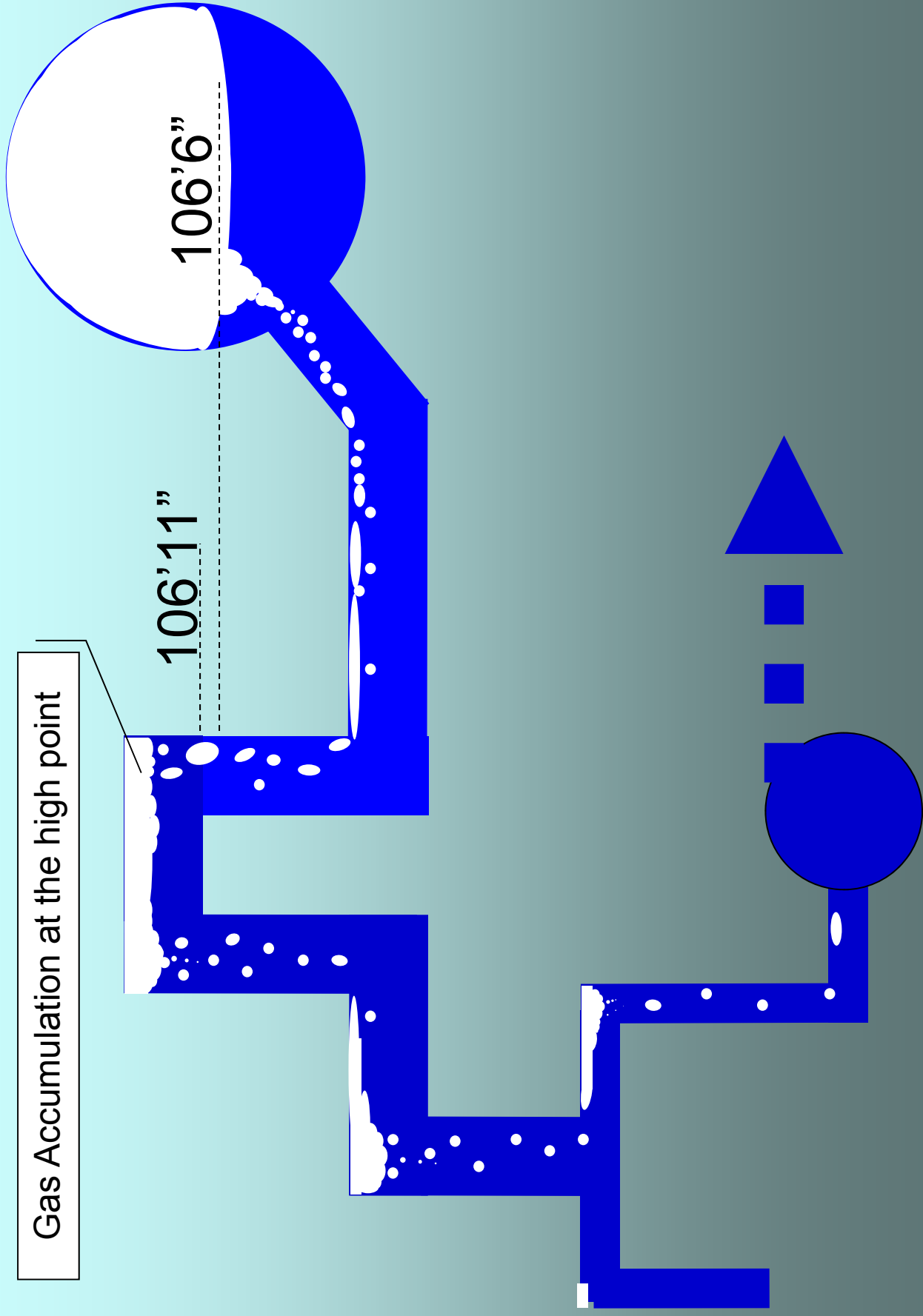
- Hot Leg centerline $\rightarrow 107'0''$
- Bottom of S/G Inlet $\rightarrow 108'-2''$
- Bottom of the 14" RHR suction inverted "U" high point $\rightarrow 106'-11''$



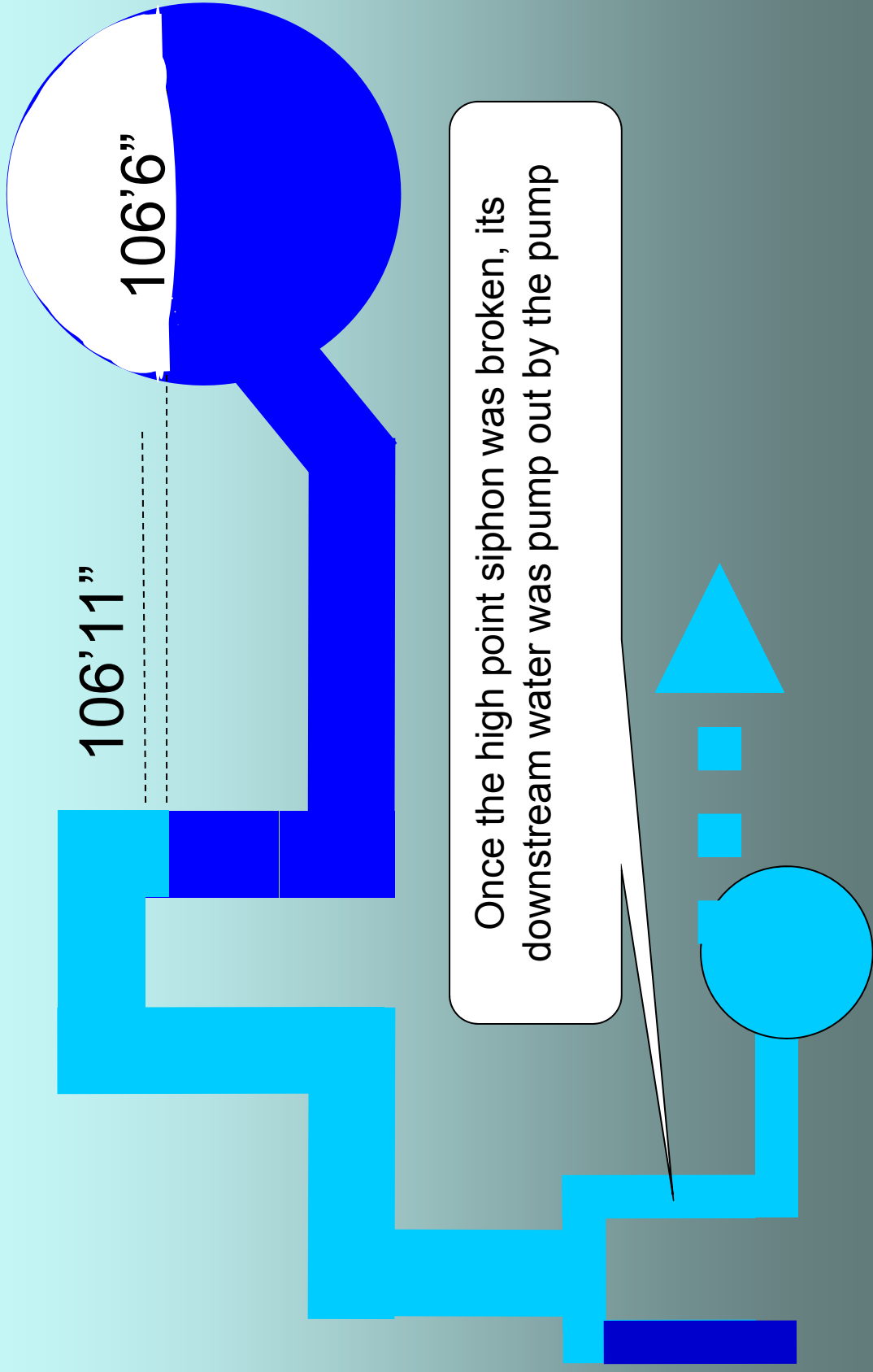
Event on April 10, 1987

- First Unit 2 Refueling
- RCS level maintained between 107' -- 107'8"
- 2043 An engineer open a containment penetration valve for local leak rate testing which resulted draining the RCS inventory
- 2123 RHRP 2-2 cavitated, then shutoff. RHRP 2-1 started, cavitated, then secured
- 2203 Vented both RHR pumps
- 2241 Refilled from RWST
- 2254 RHRP 2-2 restarted successfully

RCS / RHR Suction Layout



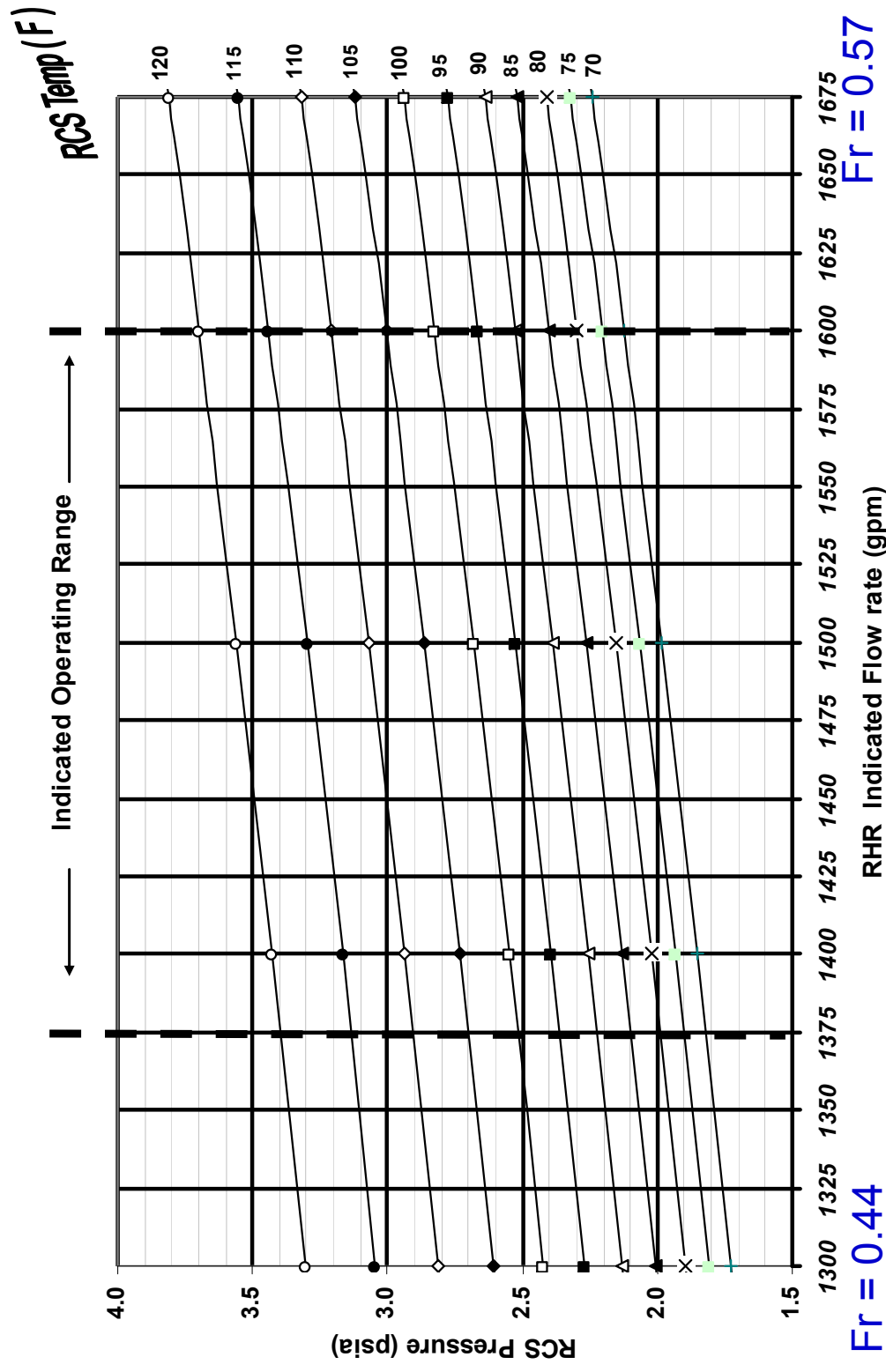
RCS / RHR Suction Layout



Current RCS Vacuum Refill

RVLIS & UT @ 107'8"

Figure 1: Unit 2 Lowest Allowable RCS Vacuum Pressure
(with Assumed Uncertainties)



$Fr = 0.44$

RHR Indicated Flow rate (gpm)

$Fr = 0.57$