



FPL

**St. Lucie Unit 2
Request for Relaxation from Order EA-03-009
Establishing Interim Inspection Requirements
for RPV heads**

NRC/FPL Meeting April 14, 2003

Background

- Combustion Engineering 2 loop unit
- Fabricated by Combustion Engineering
- High susceptibility unit (EDY 14.0 approx)
- Unit has 102 reactor head penetrations
 - 91 CEDM, 10 ICI, 1 head vent
- Unit has been VT examined -bare metal visual once-no evidence of leakage found

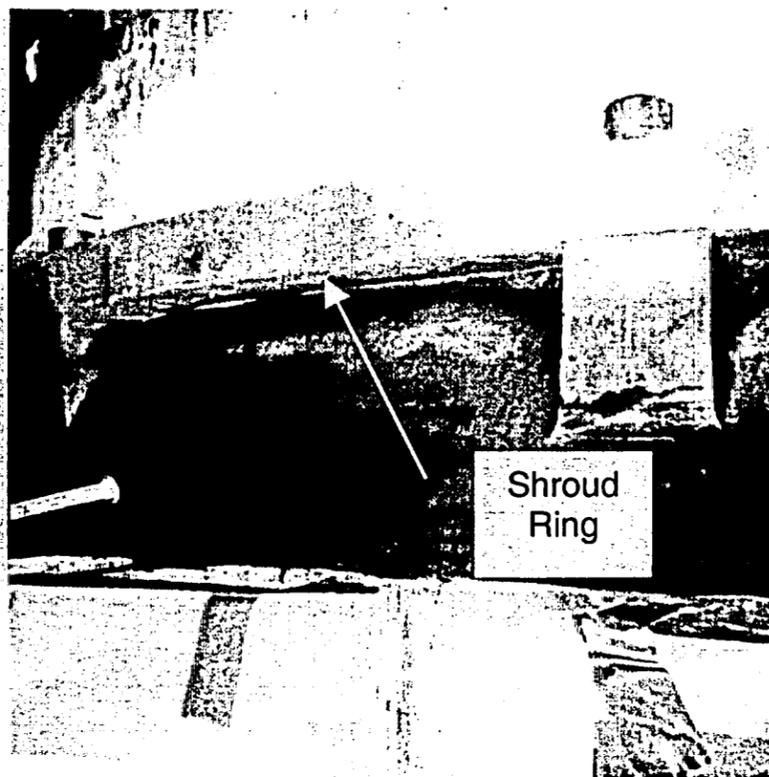
Request for Relaxation

- FPL requests relaxation from requirement (C)(1)(a) and (C)(1)(b) of the Order
 - Bare Metal Visual examination of 100% of the RPV head surface
 - NDE of each RPV head penetration nozzle to the bottom of the nozzle
- Relaxation is requested to perform Visual and Ultrasonic examinations to the maximum extend possible

Basis For Visual Relaxation

- Hardship
 - Area under shroud ring and vertical insulation panels not accessible without shroud removal
 - Shroud ring removal requires shroud and coil stack removal
 - Potential for damage to 91 CEDM coil stack components during removal
 - Potential damage to integrated insulation system
 - Estimated dose for the removal of the coil stacks and insulation is approx. 37R

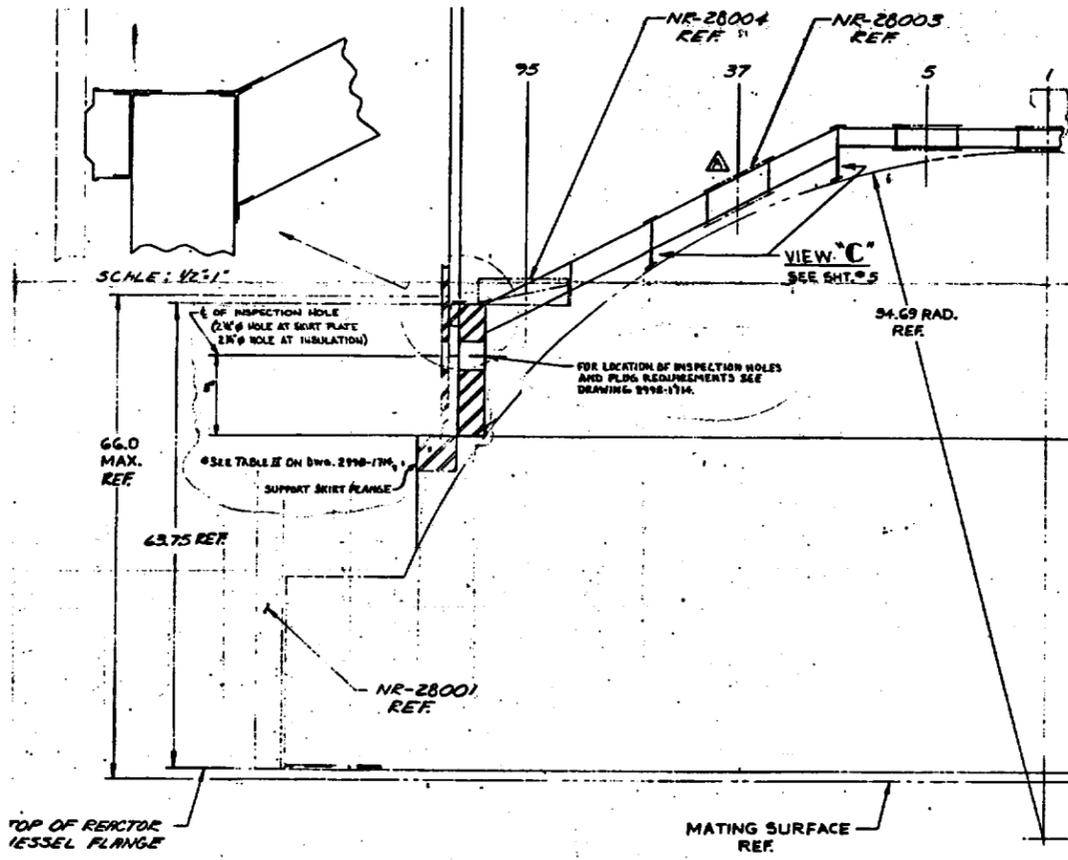
Bare Head Visual Relaxation



Bare Head Visual Relaxation



Bare Head Visual Relaxation



Basis For Visual Relaxation

- Visual examination will be accomplished for approximately 96% of the bare head surface for evidence of wastage
- Visual examination of the bare head surface to penetration interface will be accomplished 360° around each penetration for evidence of leakage
- Visual examination of the RPV head bare surface adjacent to the interior of the Reflective Metal Insulation (RMI) and exterior of the shroud ring will be performed for evidence of staining and material wastage

Basis For Visual Relaxation

- Assessment to determine if leakage has occurred into the interference fit zone will be performed.
- UT inspection of the nozzle base material of the 102 penetrations will be performed.
- Previous bare head visual examination, including 360° around each RPV head penetration nozzle, identified no evidence of leakage or staining leading downhill toward the RMI.

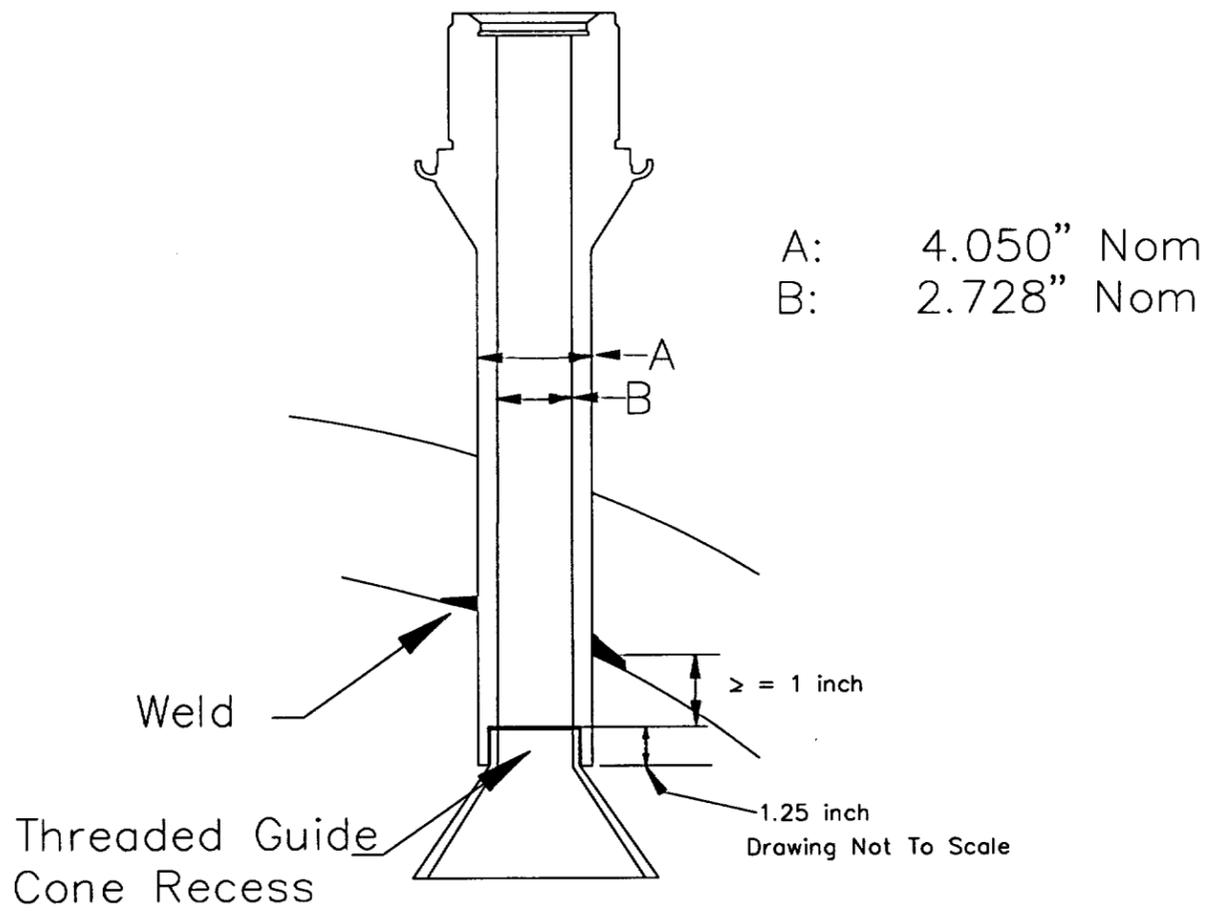
Bare Head Visual Relaxation

- Uninspected Area Determination
 - Total Area = Areas of dome + flange - penetrations - bolt holes
= 37,000 + 7,000 - 1,450 - 2,700 = 39,850 sq. in
 - Uninspected Area= Area under shroud Ring + area under tabs
= 1,500 + 100 = 1,600 sq.in.
 - % Uninspected = Uninspected area / Total area (x 100%)
= 1600/39850 x100% = 4%

Basis For NDE Relaxation

- Hardship
 - Removal of the permanently attached cones
 - Development of UT equipment to achieve the complete coverage in the non-pressure-boundary threaded portion of the RPV nozzle material below the weld
 - Manual PT is the only available option for interior threaded and exterior area examination

NDE Relaxation



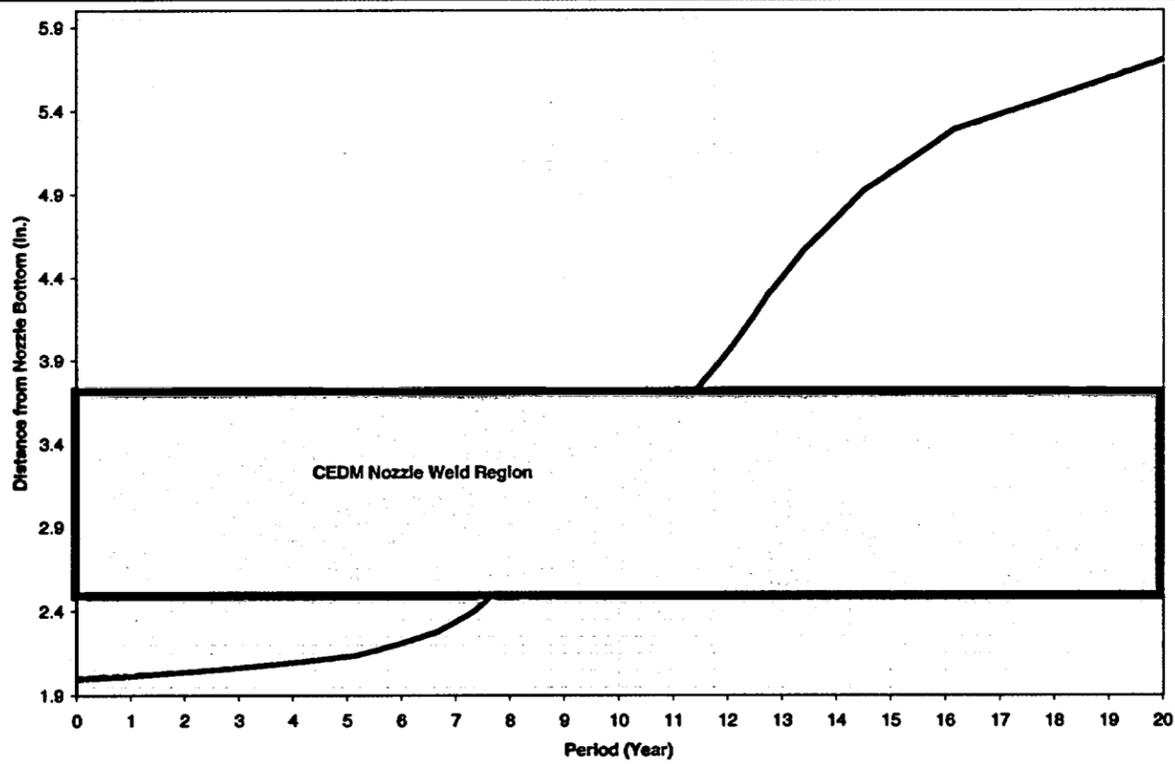
Basis For NDE Relaxation

- UT inspection of the most highly stressed portion of the nozzle (the weld heat affected zone) is unaffected by this limitation
- UT of the interference fit zone above the weld (for leakage assessment) is unaffected by the limitation

Basis For NDE Relaxation

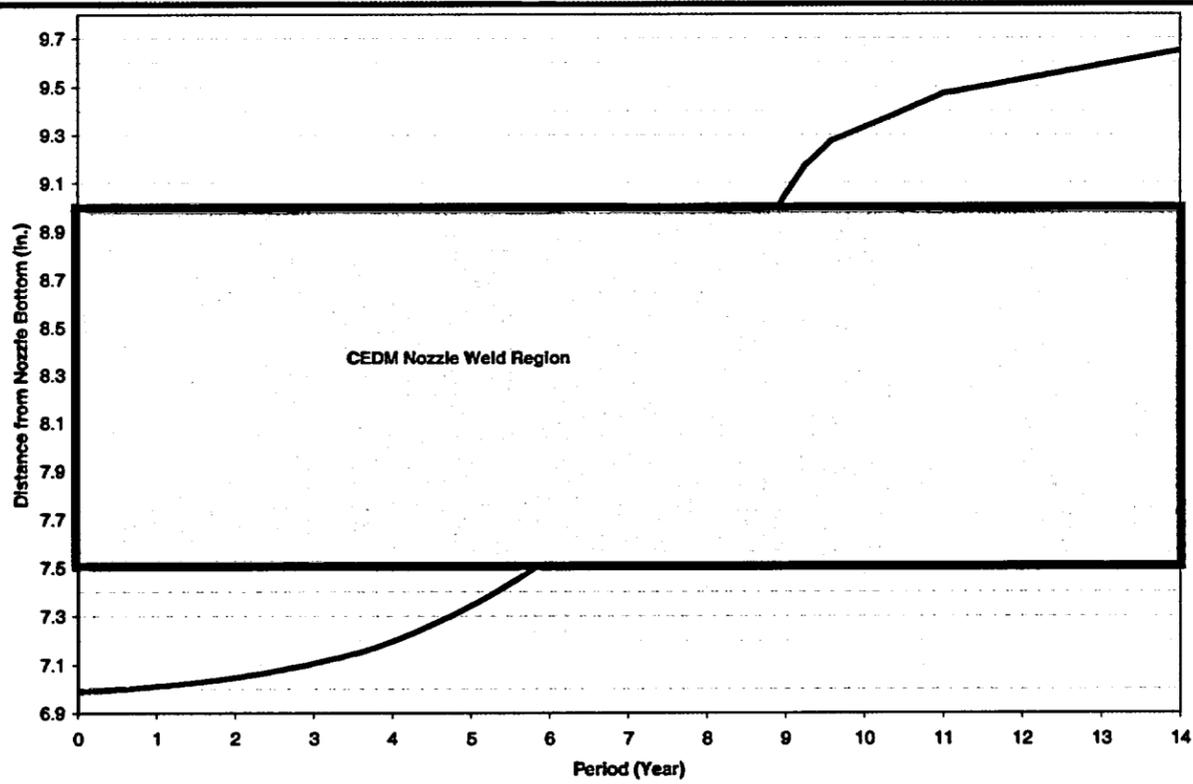
- Cracks initiating in the unexamined bottom portion (non-pressure-boundary) of the nozzle would be of minimal safety significance with respect to leakage or nozzle ejection
 - Any cracks in this area would have to grow through the examined portion of the tube to reach the weld
 - The time required for the crack to grow to the weld is greater than 5 years
 - The stresses in this area are well below those near the weld (inspected area)

Basis For NDE Relaxation



Through-Wall Axial Flaws Located in the 49.7 Degrees Row of Penetrations, Downhill Side - Crack Growth Predictions

Basis For NDE Relaxation



Through-Wall Axial Flaws Located in the 49.7 Degrees Row of Penetrations, Uphill Side - Crack Growth Predictions

Summary

- Bare metal Visual examination will be performed of 102 penetrations to detect leakage
- Bare metal Visual examination of approximately 96% of the head bare surface will be performed to detect wastage
- 102 penetrations will be UT inspected
- Leakage assessment will be performed
- These examinations provide reasonable assurance that the RCS pressure boundary will not be compromised.