

Question / Issue	Response
What is the distance from the wastage edge to nozzle #11 (Outside Circumference)?	The distance is 2" -2.5"
Has the wastage (at nozzle #3) been fully characterized?	Yes, Liquid Pen of bore upon removal of cavity to ensure.
Is analysis completed to meet Section III?	The Calc is in progress, the plate thickness has not yet been determined.
Why did you use '89 Section III?	This was the first edition to address ambient temper bead welding.
Who is performing the welding (for nozzle #3 repair)?	FTI will do a portion of the welding & Weld Services. Inc. for the plate installation.
What is the track record of the repair organization with this type of repair?	We are using the same material as used at VC Summer. Alignment is suitable for the process; the mock up will demonstrate the welding approach.
Are you using full scale mock up?	Yes.
What type of mock up will be used?	Full scale for cutting, repair, NDE.
How realistic is the mock up (Include Nozzles, etc)?	36" x 36" x 7" ; full thickness w/clad, flanges & nozzles in place; same material & heat number; size based on stress analysis
Are you measuring residual stresses since the weld area is bigger than 100in ² ?	We plan to take dimensions before & after welding on the mock up to check for nozzle distortion.
Are the residual stress measurements part of the justification for greater than 100in ² ?	The dimensions taken for nozzle distortion could be used as part of the justification for this item.
There is a 11/16" ligament between nozzles #3 & #11, does the mock up include a plug for nozzle #11 position?	Do not know yet; no appreciable effect on nozzle #11 as assumption.
Are you doing a procedure qualification test for the mock up (Tensile, Bend & Notch Toughness)?	FTI has a number of procedures (available to NRC) which include this; No actual mechanical specimens; Tests will be to code req'ts

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Are you radiographing the mock up?	Yes, PT, UT and RT will be done.
Maybe you can reconsider on the PQRs?	No Response.
How will you qualify the UT on mock up?	It will be discussed later in the presentation.
Are you submitting a Design Report?	We will be submitting a repair plan with details for the repair based on CAL.
Are you submitting a stress analysis?	Yes we can, to whatever detail required.
In the transient, normal & off-normal design conditions will you consider as-found condition effect including fatigue on nozzle, penetration & welds?	Analysis is on going. The as found condition will be addressed.
Will the remaining transients, normal and off normal design condition, be included in repair / replacement?	Analysis will be applied to all remaining cycles for 15 year duration.
What is the "third party design"? 10CFR50 App B applies.	FTI design(stress analysis) is the design agent; SIA is a independent third party design analysis; reviews of SIA Calc will be done by FENOC.
Is this analysis done per approved calc procedure and are you including analysis and calculation?	We are not planning to submit entire package but can discuss to decide.
Since this weld is thick (nozzle #3 repair), will heat input be controlled in mock up?	The mock up will be treated as safety related with all requirements of actual.
How do you accommodate for radiation field in the mock up?	We will be using the same automated machinery.
Are the examinations automated?	PT & UT are not (Exposure limits will not be exceeded).
Is code UT possible?	UT on buttered surface; RT for main structural weld for code; final inspection still under consideration.

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Is UT proposed for the ISI baseline of the structural weld?	This is still under consideration; it could be a RT.
Will the qualification for ISI baseline be appropriately demonstrated?	Yes.
For nozzle #2 & #11, how are the plugs fabricated?	One piece of bar stock with core machined out.
How will you repair nozzle #2 damage?	Blend the area for stress analysis, so there are no stress risers in the area.
Is there a gap at corrosion area (#2 nozzle)?	A structural weld will secure the plug outside the gap area.
How big is the cavity for nozzle #2?	It starts at 1-1/2" – 2" from bottom/clad; attachment weld will not infringe on waste area.
Are you taking samples from nozzle #2?	No actual physical samples; We have dental molding, chemical scrapings and the nozzle has been retained; We have everything we need from nozzle #2.
Will you do a mock up for nozzle #2?	The weld is the same as #1, 5 & 47, so the same equipment will be used; no additional mock up.
Are you concerned about ferritic exposure in head?	Root cause identified if no oxygen is present, corrosion is not a concern. No change to design.
Will there be any analysis of nozzle #2 grooves?	This will be addressed.
Will the design condition consider the past operation and the as found impact on future operation?	We will verify that we have not exceeded the plant design specification. We will look at accumulated fatigue and will consider past ops on future ops (15yrs).
Will new plug installed at nozzle #3 distort adjacent control rod drives? Will you measure distortion in control rod drives?	Photogrametry will be used before & after the repair is completed.
Are you performing a leak test in addition to code min Enhanced VT?	This is being evaluated; We may use cameras, European air humidity sampling system, operating temp, press. hold and then leak check exam.

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Do you plan on preparing the surface prior to PT with regard to nozzle #3?	Yes.
How do you treat finite element discontinuity strength reduction factor/SIF and are you submitting for comment?	Text books will be consulted for calculating factors; calculate based on known factors & increase finite element results by same; The justification will be available for staff review.
How are you treating root condition/consumable insert (at nozzle #3)?	Ceramic backing; full penetration weld; semi automated grinding; PT; RT.
So you have limits on grinding/lack of penetration – What is your approach?	The weld will not be incomplete; backgrind, PT, may be accepted as is; We will fully define limits; the weld will be a full penetration weld; This will be demonstrated in the full mock up.
Are you doing anything more than code min. in-process req't for examination (of nozzle #3 repair)?	Could be; We will have more detail in the work plan; use mock up for RT; progressive volumetric inspection; do surface exam prior to volumetric each time.
Geometric vertical lines on RT are a challenge for inspection; incomplete fusion; how do you distinguish between geometry or incomplete fusion?	We will do RT in 4 quadrants; determine plane & distance; above and beyond code req't; established by mock up.
Do you have a contingency plan if you find additional missing material (at nozzle #3) during water jet?	We have a contingency plan – fill & machine before weld; start-stop areas will be removed.
What is your plan for problems with disc installation and additional repair if required?	We will fully repair the hole prior to machining the disk to final dimension.
Do you have concerns with cracks propagating from exist J-groove weld to buttering/new weld or plug?	UT'd area not removed, there is no PWSCC concerns; We considered worst case flaw in existing J-groove weld.
Why not butter to the top on the uphill side; It may collect boric acid?	The plug is near full thickness; That is not a concern: Root cause shows that cracks from below caused the wastage.
Do you consider fatigue crack growth rate & usage factor?	Usage factor will be used; no crack growth rate analysis.
Something causes cracks through the nozzle wall. If you find the cause will you consider it in new analysis?	The new material is different than original, therefore there is no cracking concern; results of root cause will be addressed in design.
Will you justify why the crack growth is not included in design?	Yes.

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You do not have to analyze fatigue crack growth. Address why there is no longer a concern?	Understand.
The repair sequence is nozzles #2 & 11 then 3; does your analysis look at residual stresses at nozzle #11 in above sequence? You may want to go #3 then 2 & 11.	The sequence is due to possible distortion at nozzle #3; There is no reason to be concerned about residual stresses.
Suggest to PT nozzle #11 when nozzle #3 is complete.	Sounds like good suggestion; We will consider.
Your repair is designed for 15 yr but you only plan to use it for one cycle?	We have not committed to one cycle.
You want approval for nozzle #3 repair weld relief since weldment is massive; how do you justify heat control?	Temper bead welding has been used in many applications on highly restrained components; We'll apply thermocouples & monitor mock up as demo-reduces dose in actual; will submit data.
Other welding is done to what?	Preheat for shielded metal arc manual welding.
Do you need relief for thickness of base metal (Ref. code case N-638)?	Thickness of buttering applies – ref. VC Summer - Not thru wall thick.
Code case N-638 was not written for thru wall configurations.	Code case N-638 does not address configuration.
100 sq. in. limitation issue is in the code committee, what is the basis of your justification for exceeding code limit?	It is still being discussed in code committee; The limit is an arbitrary number. There is no technical basis; SIA modeled nozzle up to 130 sq. in. – more conservative than 100sq. in; EPRI investigating up to 500sq. in. limit.
Is the mock up going to provide adequate justification for going over 100 sq. in?	The mock up will provide detailed justification.
Provide evidence (per mock up & other detailed data) in lieu of code.	We Agree.
RT qualified per mock up; how confident are you of achieving good RT without film modeling and back scatter; how will radiation environ. affect real results?	Should be do-able; discussed with Level III has been done before.
Are fatigue considerations, thermal expansion and ligaments remaining at nozzles #3 & #11 being submitted in summary or detail?	Analysis is ongoing at FTI; SIA has not started.

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What is your time frame (for submitting analysis information)?	We need several weeks to establish date.
How are you leak checking?	Camera, European air humidity sampling system, operating pressure & temp. then go down and inspect.
Have you considered pressure testing head?	Not practical.
Is humidity sensing equipment sensitive enough?	Still working, no answer to date.
Are any tests being done on penetrations which may be affected by repairs?	Drop time test at full temp. & press.
Is there an effect on peaking factor?	No; slight at low power but within tech specs.
Do you verify individual Rod position indications?	Yes.
Flux distribution at vessel wall will not change?	Correct.