Swanson, Greg

From: Gregg, Wayne
Sent: Thursday, February 20, 2003 9:23 AM
To: Swanson, Greg
Subject: RE: Node 2 FYI

Updates..

MSFC CONCLUSION:

The Node 2 primary structure does not meet the requirements of SSP 30558, Section 4.2.4.3, Non-Hazardous Leak Mode of Failure, even though a large portion of the structure can be shown to have a critical flaw of at least 10 times the wall thickness (Note: There are 4 locations in the pressure wall parent material where this does not occur {Ref: N2-TN-AI-0129, Node 2 Leak Before Burst Analysis, page 16}). Inherent to the non-hazardous leak before burst philosophy is the elimination of pressure load in the structure due to leakage, thereby eliminating further flaw growth. The Node 2 is designed to maintain a pressurized environment; therefore, no pressure load loss occurs. The fracture classification for the primary structure pressure walls and welds in N2-LI-AI-0010, Fracture Critical Item List, of safe-life (fracture critical) is correct, and all requirements for fracture critical components must be maintained.

The Fracture Control Requirements for Space Station (SSP 30558, Section 3.3.1) states; "Each Space Station major element or experiment hardware system shall be governed by a Fracture Control Plan ...". The Node 2 Fracture Control Plan (N2-PL-AI-0002, Section 13.2.f) states that performance of nondestructive evaluation inspections includes posttest NDE of all proof tested items. In addition, SSP 30558 Section 3.4.2 states; "As a minimum, changes in design or process specifications, manufacturing discrepancies, repairs, and finished part modification for all fracture critical parts shall be reviewed according to criteria established by the responsible fracture control authority ...". MSFC Memo ED30-01-26 recommends that a post-proof eddy current inspection on both sides of Node 2 welds in non-conformance locations be conducted.

Based on lack of post-proof NDE, which violates fracture control requirements as outlined in the previous paragraph, the PIDS requirement item, 3.3.12.1.4, Fracture Control, is not verified.

-----Original Message-----
From: Swanson, Greg
Sent: Thursday, February 20, 2003 8:50 AM
To: Gregg, Wayne
Subject: RE: Node 2 FYI

See below

-----Original Message-----
From: Gregg, Wayne
Sent: Thursday, February 20, 2003 8:44 AM
To: Swanson, Greg; McGill, Preston; Wells, Doug; Bonine, Lisa
Subject: Node 2 FYI

FYI,

My summary for fracture control verification.

Please provide comments.

Thanks,
Wayne

MSFC CONCLUSION:

The Node 2 primary structure ***[Swanson, Greg]*** does not appear to meet the requirements of SSP 30558, Section 4.2.4.3, Non Hazardous Leak Mode of Failure, by demonstration of a critical through flaw length being at least 10 times the wall thickness and by demonstration of safe-life ***[Swanson, Greg]*** because: There are 4 locations in the pressure wall parent material where this does not occur {Ref: N2-TN-AI-0129, Node 2 Leak Before Burst Analysis, page 16}). ***[Swanson, Greg]*** Moreover, inherent to the ***[Swanson, Greg]*** non-hazardous leak before burst philosophy is the elimination of pressure load in the structure due to leakage, thereby eliminating further flaw growth. The Node 2 is designed to maintain a pressurized environment; therefore, no pressure load loss occurs. The fracture classification for the primary structure pressure walls and welds in N2-LI-AI-0010, Fracture Critical Item List, of safe-life (fracture critical) is correct, and all requirements for fracture critical components must be maintained.

The Fracture Control Requirements for Space Station (SSP 30558, Section 3.3.1) states; "Each Space Station major element or experiment hardware system shall be governed by a Fracture Control Plan ...". The Node 2 Fracture Control Plan (N2-PL-AI-0002, Section 13.2.f) states that performance of nondestructive evaluation inspections includes posttest NDE of all proof tested items. In addition, SSP 30558 Section 3.4.2 states; "As a minimum, changes in design or process specifications, manufacturing discrepancies, repairs, and finished part modification for all fracture critical parts shall be reviewed according to criteria established by the responsible fracture control authority ...". MSFC Memo ED30-01-26 recommends that a minimum post-proof eddy current inspection on both sides of Node 2 welds in non-conformance locations be conducted.

Based on lack of post-proof NDE, which violates fracture control requirements as outlined in the previous paragraph, the PIDS requirement item, 3.3.12.1.4, Fracture Control, is not verified.