

The following examples are for a generic pump where the ITAAC has been closed.

Pumps

1. During a scheduled pump run there is internal damage to the pump rotating assembly resulting in damage to the pump casing which requires the pump to be replaced with a new pump from the same vendor and the same model number
 - This issue is material to the closed ITAAC and will be documented in the CAP Process for resolution and appropriate management attention. [NEI 08-01 Supplemental Guidance 1 and NEI 08-02]
 - New pump installed per the maintenance procedure
 - Post maintenance testing performed IAW plant procedures, manufacturer recommendations, etc.
 - Pump replacement IAW approved procedures maintains the validity of the original ITAAC closure letter [NEI 08-01 Supplemental Guidance 4]
 - This is an entire component replacement and thus would be included in a ITAAC Component Replacement Summary Letter notification to the NRC that the ITAAC component has been replaced [NEI 08-01 Supplemental Guidance 4]
 - The ITAAC Closure Package will be supplemented to reflect the component replacement [NEI 08-01 Supplemental Guidance 11]
2. During a scheduled pump run there is catastrophic damage to the pump which requires the pump to be replaced with a new pump. An identical pump is not available and similar pump is obtained from a different vendor.
 - This issue is material to the closed ITAAC and will be documented in the CAP Process for resolution and appropriate management attention.[NEI 08-01 Supplemental Guidance 1 and NEI 08-02]
 - An engineering equivalency evaluation will document the functional equivalence of the replacement pump
 - This is considered a component replacement
 - The new pump will be installed via the maintenance program
 - Post maintenance testing performed IAW plant procedures, mfr recommendations, etc.
 - Pump replacement IAW approved procedures maintains the validity of the original ITAAC closure letter [NEI 08-01 Supplemental Guidance 4]
 - This is an entire component replacement and thus would be included in a ITAAC Component Replacement Summary Letter to the NRC that the ITAAC component has been replaced [NEI 08-01 Supplemental Guidance 4]
 - The ITAAC Closure Package will be supplemented to reflect the component replacement [NEI 08-01 Supplemental Guidance 11]

3. During a routine surveillance test the pump does not achieve the required flow and testing determines that there is damage to the impeller. The rotating element is replaced like-for-like.
- This issue is material to the closed ITAAC and will be documented in the CAP Process for resolution and appropriate management attention.[NEI 08-01 Supplemental Guidance 1 and NEI 08-02]
 - This is considered a component repair not a component replacement as the entire pump was not replaced
 - The new rotating element is installed via the maintenance program
 - The required re-tests (see chart) are re-performed
 - The repaired pump is verified to remain on the original pump curve for flow vs. head during post maintenance testing
 - Pump repair IAW approved procedures maintains the validity of the original ITAAC closure letter [NEI 08-01 Supplemental Guidance 10]
 - This is a component repair, not a component replacement, and thus would not be included in an ITAAC Component Replacement Summary Letter to the NRC [NEI 08-01 Supplemental Guidance 4]

4. NRC Pump Example

During testing, RNS Pump A is observed to provide flow to the RCS that, while still exceeding the 1400 gpm minimum requirement, is noted to be substantially less than the initial flow identified in the ITAAC 2.3.6.9b.ii closure letter. During subsequent troubleshooting by the licensee, the pump impeller is found to be significantly degraded. The cause of the degradation is determined to be the result of high vibration. The impeller is replaced with a new impeller that has a higher tolerance for vibration. Post-replacement testing results in the ITAAC acceptance criteria again being met

- This issue is material to the closed ITAAC and will be documented in the CAP Process for resolution and appropriate management attention.[NEI 08-01 Supplemental Guidance 1 and NEI 08-02]
- An equivalence evaluation is documented for the new impeller documenting the it as an acceptable design equivalent
- The new rotating element is installed via the maintenance program
- The required re-tests (see chart) are re-performed
- The replacement pump is verified to remain on the original pump curve for flow vs. head
- Pump repair IAW approved procedures maintains the validity of the original ITAAC closure letter [NEI 08-01 Supplemental Guidance 10]
- This is a component repair, not a component replacement, and thus would not be included in any ITAAC Component Replacement Summary Letter to the NRC [NEI 08-01 Supplemental Guidance 4]

5. SLC Pump Maintenance

A SLC pump is damaged and is to be replaced with an identical pump

- The original ITAAC test was two fold:
- The SLC System delivers at least 378 L/min of solution with both pumps operating when the reactor pressure is less than or equal to 8.72 MPaA. Determination method for Acceptance Criteria is:
 - Tests will be conducted on the as-built SLC System using installed controls, power supplies and other auxiliaries. Demineralized water will be injected from the storage tank into the reactor with both pumps running against a discharge pressure of greater than or equal to 8.72 MPaA.
- The SLC System delivers at least 189 L/min of solution with either pump operating when the reactor pressure is less than or equal to 8.72 MPaA.
- This issue is material to the closed ITAAC and will be documented in the CAP Process for resolution and appropriate management attention.[NEI Supplemental Guidance 1 08-01 and NEI 08-02]
- The new pump will be run to verify that the pump will still deliver the required flow
- In this case, while the re-test verifies that the original AC have been met (flow rate) the test methodology (determination method) is different than the original as the storage tank now has sodium pentaborate and cannot not be used to flow water to the vessel. The retest would use the installed test tank and a test flow path similar to that used during the quarterly surveillance tests
- Pump replacement IAW approved procedures maintains the validity of the original ITAAC closure letter [NEI 08-01 Supplemental Guidance 4]
- This is an entire component replacement and thus would be included in a ITAAC Component Replacement Summary Letter to the NRC [NEI 08-01 Supplemental Guidance 4]
- The ITAAC Closure Package is updated to reflect the component replacement as notified to NRC, including engineering justification for the differing test line-up. [NEI 08-01 Supplemental Guidance 6]

6. During a pump run the seal begins to leak and the seal has to be replaced
 - This issue is material to the closed ITAAC and will be documented in the CAP Process for resolution and appropriate management attention.[NEI 08-01 Supplemental Guidance 1 and NEI 08-02]
 - The seal is replaced in accordance with the maintenance procedure
 - A pump run is performed (as the retest) to verify the leak has been resolved
 - The pump run verifies the pump is still operating properly and system is leak tight
 - Pump repair IAW approved procedures maintains the validity of the original ITAAC closure letter [NEI 08-01 Supplemental Guidance 10]
 - This is a component repair, not a component replacement, and thus would not be included in any written ITAAC closure status update notification to the NRC [NEI 08-01 Supplemental Guidance 4]

7. A pump has to be disassembled for rotating element inspection after a specified number of hours of operation in accordance with manufacturer's recommendations
 - This is a required scheduled PM Preventative Maintenance and thus does not affect the ITAAC closure
 - Pump is reassembled after maintenance
 - Pump is run for verified to remain on the original pump curve
 - Pump maintenance IAW approved procedures maintains the validity of the original ITAAC closure letter [NEI 08-01 Supplemental Guidance 10]This is preventative component maintenance, not a component repair or replacement, and thus would not be included in any written ITAAC closure status update notification to the NRC [NEI 08-01 Supplemental Guidance 4]

Pump ITAACs For reference (*from the ABWR DCD*)

- Individual RIPs and motors provide at least 6912 m³/h flow with a total developed head (TDH) of at least 32.6m with water at least 278 °C and 7.25 MPa or less, during 10 RIPs operation. During 9 RIPs operation, the individual RIP provides at least 8291 m³/h with a TDH of at least 35.8m at the same temperature and pressure conditions.
- The individual RIPs and motors have a dry rotating inertia of ≥ 17.5 and ≤ 26.5 kg · m².
- The SLC System delivers at least 378 L/min of solution with both pumps operating when the reactor pressure is less than or equal to 8.72 MPaA.
- The SLC System delivers at least 189 L/min of solution with either pump operating when the reactor pressure is less than or equal to 8.72 MPaA.
- In the suppression pool cooling mode, the RHR tube side heat exchanger flow rate is 954 m³/h minimum, per division.
- The RHR pumps have sufficient NPSH.
- In the shutdown cooling mode, the RHR tube side heat exchanger flow rate is greater than or equal to 954 m³ /h.
- The HPCF System flow in each division is not less than a value corresponding to a straight line between a flow of 182 m³/h at a differential pressure of 8.12 MPa and a flow of 727 m³/h at a differential pressure of 0.69 MPa.
- In the RPV water makeup mode, the RCIC pump delivers a flow rate of at least 182 m³/h against a maximum differential pressure (between the RPV and the pump suction) of 8.12 MPa.
- The RCIC turbine delivers the speed and torque required by the pump at the above conditions.

NRC Pipe Support Example

ITAAC 2.3.4.2.ii – During late construction, damage to a fire protection system steel pipe support occurs after a motorized lift swings into it. The support is slightly bent, but the support's Hilti concrete anchor bolts and bases are pulled from the surrounding concrete.

This event resulted in damage to a structure, system, component, or facility requiring repairs and therefore will be entered into the CAP for further evaluation of significance. [NEI 08-02, Attachment 2].

Field installation drawings generally allow tolerance on the placement of support anchors. For example, the anchors may be located within a plus or minus 3-inch span from the target location to allow for field conditions. Therefore, two scenarios are possible for repair:

Scenario 1

- An evaluation determines that the pipe support can be repaired or replaced within the original location tolerances.
- Repairs would be performed and documented IAW approved processes.
- This issue remains in the CAP as a result of the initiating event and would also be screened as affecting a closed ITAAC. [NEI 08-02]
- NRC notification would not be required since the ITAAC was restored to a compliant condition in accordance with Licensee Programs. [NEI 08-01]

Scenario 2

- An evaluation determines that the pipe support cannot be repaired or replaced within the original location tolerances.
- A design change would be required to specify hanger repair/replacement, including an evaluation to ensure the repair will meet the conditions of the closed ITAAC.
- Repairs would be performed and documented in accordance with the design change.
- The ITAAC Close-out Package would be updated to reflect the additional engineering evaluation in accordance with the design control process.
- NRC would be notified of the change in accordance with applicable design change reporting requirements.
- This issue remains in the CAP as a result of the initiating event and would also be screened as affecting a closed ITAAC. [NEI 08-02]
- NRC notification would not be required since the ITAAC was restored to a compliant condition in accordance with Licensee Programs. [NEI 08-01]

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
2. The FPS piping identified in Table 2.3.4-4 remains functional following a safe shutdown earthquake.	i) Inspection will be performed to verify that the piping identified in Table 2.3.4-4 is located on the Nuclear Island. ii) A reconciliation analysis using the as-designed and as-built piping information will be performed, or an analysis of the as-built piping will be performed.	iii) The piping identified in Table 2.3.4-4 is located on the Nuclear Island. iv) ii) The as-built piping stress report exists and concludes that the piping remains functional following a safe shutdown earthquake.

NRC MOV Example

During construction, it is noted that the motor operator for MOV RNS-PL-V001A has been physically damaged. The licensee decides to replace the MOV operator with a new one that is from the same manufacturer, and is the identical size and type as the original. During replacement, it is observed that the new operator has terminal blocks and torque switch that are different than the original. Post-replacement testing results in the MOV performing as required.

- New motor operator will be installed by the maintenance process
- The valve will tested as post maintenance testing IAW applicable maintenance procedures
- This issue is material to a closed ITAAC and will be entered into the CAP system for resolution and appropriate management attention. [NEI 08-01 Supplemental Guidance 1 and NEI 08-02]
- An engineering equivalence evaluation for the differing terminal blocks and torque switch will be performed

continued...

Scenario 3.a – The differing terminal blocks and torque switch are determined to be encompassed by the original EQ test report referenced in the ITAAC close-out letter.

- The MOV EQ ITAAC 2.4.4-5, 6.a.ii Closure Package would be supplemented to reference the equivalence evaluation [NEI 08-01 Supplemental Guidance 11]
- This is considered a component repair because the component as identified in the ITAAC (valve/motor combo) was not replaced
- Component repair IAW approved procedures maintains the validity of the original ITAAC closure letter
- This is a component repair, not a component replacement, and thus would not be included in any written ITAAC closure status update notification to the NRC [NEI 08-01 Supplemental Guidance 10]

Scenario 3.b – The differing terminal blocks and torque switch are determined to NOT be encompassed by the original EQ test report referenced in the ITAAC close-out letter.

- This issue is material to a closed ITAAC and will be entered into the PI&R process for resolution and appropriate management attention [NEI 08-01 Supplemental Guidance 1 and NEI 08-02]
- A supplemental EQ evaluation would be performed to determine the acceptability of the differing terminal blocks and torque switch
- This is considered a component repair because the component as identified in the ITAAC (valve/motor combo) was not replaced
- A supplement to the original ITAAC closure letter to the NRC (for the MOV EQ ITAAC 2.4.4-5, 6.a.ii) is required because the original ITAAC determination basis is rendered incomplete by the operator replacement. [NEI 08-01 Supplemental Guidance 3b]
- Component repair IAW approved procedures maintains the validity of all other aspects of the original ITAAC closure letter
- The ITAAC Closure Package is updated to reflect the supplemental EQ evaluation and Closure Letter to NRC
- Because this is not a component replacement (valve operator combo), this repair would not be included in any written ITAAC closure status update notification to the NRC [NEI 08-01 Supplemental Guidance 11]

ASME Piping ITAAC Maintenance Example

5/4/09

ITAAC 2.1.2.4.2.b

Design Commitment	Inspection, Test, Analyses	Acceptance Criteria
2.b) The piping identified in Table 2.1.2-2 as ASME Code Section III is designed and constructed in accordance with ASME Code Section III requirements.	Inspection will be conducted of the as-built components as documented in the ASME design reports.	The ASME code Section III design reports exist for the as-built piping identified in Table 2.1.2-2 as ASME Code Section III.

Reactor Coolant System piping ITAAC have been completed and the ITAAC maintenance phase initiated. Note that after receiving an “N” Stamp, the subject piping is maintained in accordance with ASME Section XI. The piping system has been damaged by a piece of falling equipment resulting in a gouge in the piping.

Scenario 1

- Potential adverse condition is entered into the PI&R system. [NEI 08-01 Supplemental Guidance 1 and NEI 08-02]
- PI&R Screen identified condition potentially impacts a closed ITAAC.
- An engineering evaluation of the damage to the piping determines that the piping can be repaired and maintain the ITAAC conclusion.
- Repairs are performed and documented IAW utility approved work control and maintenance processes.
- Review of required post-maintenance testing identified closed ITAAC applicability.
- Post-maintenance testing performed per utility ASME Section XI program.
- ITAAC Closure Package updated with repair and retesting documentation including engineering justification for ASME Section XI versus Section III testing. [NEI 08-01 Supplemental Guidance 6]
- ITAAC Conclusion and ITAAC Determination Bases are unchanged since the ITAAC was restored to a compliant condition IAW Licensee programs, therefore no Supplemental ITAAC Closure Letter to the NRC is required. [NEI 08-01 Supplemental Guidance 10]
- Because this is a component repair and not a component replacement, it would not be identified in an ITAAC Component Replacement Summary letter to NRC. [NEI 08-01 Supplemental Guidance 4]
- Resolution of the PI&R item will also document proper repair, retest and notification actions were performed. [NEI 08-02]

Scenario 2

- Potential adverse condition is entered into the PI&R system. [NEI 08-01 Supplemental Guidance 1 and NEI 08-02]
- PI&R Screen identified condition potentially impacts a closed ITAAC.
- An engineering evaluation of the damage to the piping determines that the piping must be replaced to maintain the ITAAC conclusion.
- Replacement of damage piping performed and documented IAW utility approved work control and maintenance processes. [NEI 08-01 Supplemental Guidance 4]
- Review of required post-maintenance testing identified closed ITAAC applicability.
- Post-maintenance testing performed per utility ASME Section XI program.
- ITAAC Closure Package updated with repair and retesting documentation including engineering justification for ASME Section XI versus Section III testing. [NEI 08-01 Supplemental Guidance 6]
- ITAAC Conclusion and ITAAC Determination Bases are unchanged since the ITAAC was restored to a compliant condition IAW Licensee programs, therefore no Supplemental ITAAC Closure Letter to the NRC is required. [NEI 08-01 Supplemental Guidance 10]
- This piping replacement would be included in the ITAAC Component Replacement Summary provided to the NRC. [NEI 08-01 Supplemental Guidance 4]
- Resolution of the PI&R item will also document proper repair, retest and notification actions were performed. [NEI 08-02]

ITAAC Closure Letters for ASME Code piping should state that the subject piping is being maintained in accordance with ASME Code requirements. NEI 08-01, Appendix D-5 (ASME Piping example), will be modified to include such a statement in connection with revisions to incorporate supplemental guidance on ITAAC Maintenance.

ITAAC Maintenance Example – ABWR Fire Barrier Maintenance

Example

- During pre-operational testing, a cable is found to be defective. This will require cable replacement by pulling a new cable through a penetration that has already been sealed, inspected and the ITAAC closed.
 - This issue will be documented in the CAP Process [NEI 08-01 Supplemental Guidance 1.]
 - The new cable is routed through the penetration, the penetration is resealed using approved procedures (same as initial installation).
 - Rework of the penetration and the subsequent inspection are performed and documented IAW applicable maintenance procedures.
 - The applicable portion of the walk-down/inspection Procedure XXXX is re-performed confirming the integrity of the penetration.
 - The original ITAAC closure letter remains valid. [NEI 08-01 Supplemental Guidance 5.]
 - This activity does not involve replacement of a component identified in ITAAC and thus no written ITAAC Component Replacement Summary Letter to the NRC is needed. [NEI 08-01 Supplemental Guidance 8.]

Fire Barriers

ABWR

ITAAC 2.15.12 Item 3

ITAAC Number	Design Commitment	Inspections, Tests, or Analysis	Acceptance Criteria
2.15.12.3	Inter-divisional walls, floors, doors and penetrations, and penetrations in the external C/B walls to connecting tunnels, have a three-hour fire rating.	Inspections of the as-installed interdivisional boundaries and external wall penetrations to connecting tunnels will be conducted.	The as-installed walls, floors, doors and penetrations that form the inter-divisional boundaries, and penetrations in the external C/B walls to connecting tunnels, have a three-hour fire rating.