REVISED RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

APR1400 Design Certification

Korea Electric Power Corporation / Korea Hydro & Nuclear Power Co., LTD

Docket No. 52-046

RAI No.:	558-9456
SRP Section:	14.03.03 – Piping Systems and Components - Inspections, Tests, Analyses, and Acceptance Criteria
Application Section:	2.4.1.2 Inspections, Tests, Analyses, and Acceptance Criteria
Date of RAI Issue:	03/15/2018

Question No. 14.03.01-1

Please see the attachment to this Request for Additional Information.

Title 10, Section 52.47(b)(1) of the Code of Federal Regulations (CFR) requires that a design certification application contain the proposed inspections, tests, analyses, and acceptance criteria (ITAAC) that are necessary and sufficient to provide reasonable assurance that, if the inspections, tests, and analyses are performed and the acceptance criteria met, a facility that incorporates the design certification has been constructed and will operate in accordance with the design certification, the provisions of the Atomic Energy Act of 1954, as amended (AEA), and the NRC's rules and regulations. For the ITAAC to be "sufficient," (1) the inspections, tests, and analyses (ITA) must clearly identify those activities necessary to demonstrate that the acceptance criteria (AC) are met; (2) the AC must state clear design or performance objectives demonstrating that the Tier 1 design commitments (DCs) are satisfied; (3) the ITA and AC must be consistent with each other and the Tier 1 DC; (4) the ITAAC must be capable of being performed and satisfied prior to fuel load; and (5) the ITAAC, as a whole, must provide reasonable assurance that, if the ITAAC are satisfied, the facility has been constructed and will be operated in accordance with the design certification, the AEA, and the NRC's rules and regulations.

The staff has reviewed all DCD Rev. 1 Tier 1 ITAAC tables and Section 1 of Tier 1 against these objectives, and in light of NRC guidance, Commission policy, and lessons learned from plants that are currently under construction that are in the process of implementing ITAAC. Based on this review, the staff has compiled the attached list of ITAAC wording changes. The applicant is requested to make these changes in the Tier 1 ITAAC tables and in Section 1 of Tier 1, or otherwise show that the ITAAC comply with 10 CFR 52.47(b)(1). Additionally, the applicant is requested to address the following items, or otherwise show that the ITAAC comply with 10 CFR 52.47(b)(1):

1. In Table 2.4.1-4, ITAAC 9.a.iii, what does "full" as used in the ITA mean in this context? Where is "full" specifically defined? The AC seems to contemplate testing at a range of pressures (testing at pressures until the POSRVs open) while the ITA is about testing at one pressure level ("full"). If "full pressure" is more than 3% of test pressure, then how would one know that the AC is met? Does the ITA need to specify the pressure?

2. Since ITAAC 12 in Table 2.4.1-4 cannot be completed until after fuel load, please remove this item completely from the ITAAC table.

3. In Table 2.4.2-4, ITAAC 9.a, the ITA and AC are not specific as to whether the calculated volume is simply a total volume or more appropriately a useable volume which excludes inventory below the suction lines. It is also unclear if these volumes are overlapping or dedicated volumes. Clarify the volume being measured as total volume or useable volume. Clarify the volume being measured as overlapping or dedicated volumes.

4. In Table 2.4.2-4, ITAAC 9.c.ii, why is analysis required in the ITA?

5. In Table 2.4.2-4, ITAAC 9.c, the design commitment (DC) only reflects the design attribute in ITAAC 9.c.i. Provide a DC that reflects all of the various design attributes being verified by the ITAAC in 9.c.

6. In Table 2.4.2-4, ITAAC 9.c.iii, the ITA and AC are not compatible. How can one verify the acceptance criteria will be met based on the current wording of the ITA and AC? Please provide a specific AC that the top of the strainer can be evaluated against (i.e. the height of the top of the strainer is equal to or less than X ft. from Y). The AC includes the statement "under design basis accident condition" while the ITA does not. Please rectify this discrepancy.

7. In Table 2.4.2-4, ITAAC 9.c.v, the ITA is for all insulation in containment, whereas the AC is limited to insulation for component and piping. Please rectify this discrepancy.

8. In Table 2.4.2-4, ITAAC 9.d, the DC only reflects the AC for 9.d.i. Please provide a DC that reflects all of the various design attributes being verified by the ITAAC in 9.d.

9. In Table 2.4.2-4, ITAAC 9.e, the DC only reflects the AC for 9.e.i. Please provide a DC that reflects all of the various design attributes being verified by the ITAAC in 9.e.

10. In Table 2.4.3-4, ITAAC 9.a.i, the ITA lacks specificity. What is low tank pressure? Please specify a pressure band for the start of the test.

11. In Table 2.4.3-4, ITAAC 9.d, the DC and AC are not in alignment. The DC requires that the "...pumps deliver full flow...," and the AC requires that the "...pumps initiates and begins to deliver flow..." Please specify in the AC, the value of flow that must be provided within 40 seconds.

12. What is the purpose of ITAAC 9.f in Table 2.4.4-4? The DC identifies two specific attributes. The first is the SCP auto starts when aligned for the CSP function on either of

two safety signals, and the second that the CSP does not auto start when not aligned for the CSP function if a safety signal is actuated. The ITA and AC are not aligned with this DC. Please ensure the DC, ITA, and AC align with one another. To verify that a signal starts a pump "only when" the pump is aligned a certain way, one would have to test the pump both when it is aligned that way and when it is not aligned that way. The ITA does not do this.

13. In Table 2.4.6-4, ITAAC 9.b please specify the minimum required flow rate to each pump in the AC.

14. In Table 2.4.7-1, ITAAC 1.a, the DC says "containment sump level monitor" while the ITA and AC say "containment sump level instruments." Please ensure the DC, ITA, and AC consistent.

15. In Table 2.4.7-1, ITAAC 1.c, the AC says "as-built containment sump level has the capability." Should the word "monitor" or "instruments" follow "as-built containment sump level"? This word should be consistent with the DC, ITA, and AC used in Table 2.4.7-1, ITAAC 1.

16. In Table 2.4.7-1, ITAAC 1.c and 1.d test the leak detection capacity of the containment sump level monitor and containment airborne particulate radioactivity monitor, but there is no ITAAC testing the leak detection capacity of the containment atmosphere humidity monitor. What is the reason for this?

17. In Table 2.4.7-1, ITAAC 2, use of the word "monitor" or "instruments" should be consistent with their use in Table 2.4.7-1, ITAAC 1. Please ensure the DC, ITA, and AC consistent between ITAAC 1 and 2 in Table 2.4.7-1.

18. In Table 2.6.2-3, ITAAC 14, the AC lacks sufficient detail to ensure the EDG function is maintained. Please provide criteria for separation of the intake and exhaust of each DG.

19. Table 2.7.1.1-1, ITAAC 7 should be deleted because it is a programmatic ITAAC, which the Commission generally does not find necessary (SECY-05-0197), on a topic that is the responsibility of a COL applicant. If the COL applicant fully describes the program, then an ITAAC should not be necessary.

20. In Table 2.8-2, ITAAC 1, the AC is not valid because it provides no criteria to evaluate the as-built shielding against. Please revise the AC.

21. In Table 2.11.1-2, ITAAC 1, the AC is ambiguous in use of the word "large." Please define the size of the area as greater than or equal to a specific area.

22. In Table 2.11.1-2, ITAAC 3, the AC does not align with the DC and is not specific. Please specify the minimum required thickness of the concrete slab and any specifications for the type of concrete to be used.

23. In Table 2.11.4-3, ITAAC 2, why isn't this ITAAC similar to others with a 2.a, 2.b, and 2.c? Specifically, why is there no ITAAC 2.b, requiring type testing, analysis, or a combination of type testing and analysis of the seismic category I components? And why is there no

ITAAC 2.c requiring an inspection of the as-built components, including supports and anchorages, to verify that the as-built components are bounded by the tested or analyzed conditions?

Finally, all changes to the wording of design commitments should also be reflected in the corresponding text in the Tier 1 design descriptions.

Response – (Rev. 1)

1. The word of "full" in ITAAC 9.a.iii is not defined in DCD and not clear even though it was intended to give maximum condition such as a maximum capacity or a maximum pressure.

   The standard ITAAC for relief valves specifies in its Acceptance Criteria that an ASME Code Section III Data Report exists and concludes that the [XXX system] relief valves listed in [Table x.x.x-x] meet the valve's required set pressure, capacity, and overpressure design requirements. Since Table 2.4.1-4, ITAAC 9.a.i, ii, and iv address some of those ASME BPV Code requirements, the ITAAC 9.a will be revised as presented in Attachment 1.

2. Agree. Since the CEA releasing tests are performed on the as-built CEDMs to confirm scram ability after fuel load, it is not appropriate to be included as an ITAAC item for DCD stage. The ITAAC No. 12 in Table 2.4.1-4 will be removed as presented in Attachment 2.

3. The water volumes indicated in Table 2.4.2-4 are usable volumes which exclude the inventory below the water level gauge lower tap of El. 81.25 ft., i.e. the water volume below the water level 0% is excluded. The water volume for flooding the refueling pool includes the water volume for ECCS and CSS operation during DBA conditions and is non-safety related.

   ITAAC 9.a.i will be revised and ITAAC 9.a.ii will be deleted to be consistent with the changed design commitment in response to Sub-question 5 as indicated in Attachment 3.

4. The analysis in ITAAC 9.c.ii will be deleted as indicated in Attachment 3.

5. The design commitment, ITA, and AC regarding ITAAC 9.c will be thoroughly revised to clarify the IWSS function for safety injection and containment spray during DBA conditions as indicated in Attachment 3.

6. The IRWST minimum water level for ESF pump operation under DBA conditions is El. 86 ft., which is higher than the top of strainers of El. 84 ft. It is confirmed in the inspection of the as-built IRWST sump strainers and their analysis report.

   ITAAC 9.c.iii will be revised to be consistent with the changed design commitment in response to Sub-question 5 as indicated in Attachment 3.

7. AC 9.c.v will be corrected to be consistent with the ITA 9.c.v as indicated in Attachment 3.

8. ITA AC 9.d regarding the trash racks will be revised to clarify the IWSS function for safety injection and containment spray during DBA conditions as indicated in Attachment 3.

9. ITA AC 9.e regarding the swing panels will be revised to clarify the IWSS function for protection from overpressure and vacuum of the IRWST as indicated in Attachment 3.

10. Agree. The testing will be performed to open the SIT isolation valves with the conservative differential pressure condition between SITs and RCS. SITs are pressurized to normal operation pressure of 42.9 kg/cm^{2}G (610 psig) and the RCS is depressurized to atmospheric pressure. So, the wording “low tank pressure” in 9.a.i is not appropriate and will be revised as presented in Attachment 4.

11. Agree. 9 d AC in Table 2.4.3-4 will be revised to incorporate the comment as presented in Attachment 5.

    The flow rate of 3,085 L/min (815 gpm) in Section 6.3 of the DCD is the design flow of an SIP excluding the miniflow at rated condition for the concern of SIP performance requirements. For reference, the runout flow in SIP performance requirements is the sum of the main injection flow of 1,130 gpm and a miniflow which is provided by pump vendor and usually less than 105 gpm. The flow rates in table 6.3.2-4 of the DCD are created based on pump performance requirements and plus/minus margins for the safety analysis injection flow. The flow rates of 3,915 L/min (1,034 gpm) ~ 4,201 L/min (1,110 gpm) given in ITAAC are developed considering additional instrument uncertainty to the above flow and to set the required flow rates at the plants.

    Additionally, it is better to keep current expression of “or” instead of “and” because ESF-SIAS signal is actuated separately with DPS-SIAS signal, not at the same time.

12. Agree. 9.f in Table 2.4.4-4 will be revised to incorporate the comment as presented in Attachment 6.

13. Agree. The total seal water flow rate to the four RCPs is 99.9 L/min (26.4 gpm), which is the sum of the flow rate of 25.0 L/min (6.6 gpm) to each RCP. Therefore, as requested by the NRC, the minimum flow rate of 25.0 L/min (6.6 gpm) required by each pump will be revised as presented in Attachment 7.

14. For consistency, the word “Containment sump level monitors” will be used in relevant DC, ITA, and AC in Subsection 2.4.7.1 of APR1400 DCD Tier 1 as indicated in Attachment 8.

15. For consistency, “as-built containment sump level” will be followed by “monitors” in ITAAC 1.c of Subsection 2.4.7.1 of APR1400 DCD Tier 1 as indicated in Attachment 8.

16. The containment sump level monitors, airborne particulate radioactivity monitors, and containment atmosphere humidity monitors are used to detect unidentified reactor coolant leakage into the containment. The containment sump level monitors and containment airborne particulate radioactivity monitors have the capability for detecting a leakage rate of 1.89 L/min (0.5 gpm) or greater within one hour. However the containment atmosphere humidity monitors are intended only to detect a significant increase of humidity level resulting from an unidentified source of RCS leakage by providing an MCR alarm when such a leak occurs. The containment atmosphere humidity monitors qualitatively detect unidentified coolant leakage and do not quantify the unidentified coolant leakage. This is in

accordance with Regulator position 2.3 of Regulatory Guide 1.45, even if it does not have the capabilities specified in Regulatory position 2.2.

The above clarification has been provided through the response to RAI 80-8040 for Question 05.02.05-1 and RAI 369-8486 for Question 05.02.05-3.

17. For consistency, the word “Containment sump level monitors” will be used in relevant DC, ITA, and AC in Subsection 2.4.7.1 of APR1400 DCD Tier 1 as indicated in Attachment 8.

18. DCD Tier I Table 2.6.2-3, ITAAC 14 will be revised to describe the following sufficient detail about the design features to ensure the EDG function which prevents the degradation of the EDG power output due to the recirculation of the exhaust gases.

    Design Commitment:

    The air intakes for EDG combustion are separated from the EDG exhaust ducts to prevent the degradation of the EDG power output due to the recirculation of the exhaust gases.

    Acceptance Criteria:

    The air intake for each as-built EDG is located at a lower elevation than the exhaust for each as-built EDG and the intake is from the downward direction while the exhaust is discharged in an upward direction.

    DCD Tier I Subsection 2.6.2.1 will also be revised for the consensus with DCD Tier I Table 2.6.2-3, ITAAC 14 as indicated in Attachment 9.

19. Agree on which Table 2.7.1.1-1, ITAAC 7 should be deleted because it is a programmatic ITAAC that the Commission generally does not find necessary (SECY-05-0197). Because COL applicant has the responsibility for it and will fully describes the program, the ITAAC 7 in Table 2.7.1.1-1 will be deleted as indicated in the Attachment 10. By deleting ITAAC 7 in Table 2.7.1.1-1, Subsection 3.5.1.3.2 will also be revised as indicated in Attachment 10.

20. ITAAC 1 in Table 2.8-2 will be revised to clarify the acceptance criteria as indicated in Attachment 11.

21. Acceptance Criteria will be revised as indicated in Attachment 12.

22. Acceptance Criteria will be revised as indicated in Attachment 13.

23. ITAAC 2 will be revised to incorporate the ITAAC requiring the type testing, analysis, or a combination of type testing and analyses of the seismic category I components including supports and anchorages as indicated in Attachment 14.

With respect to the red-line changes that staff provided in the attachment to this RAI, most of the suggested ITAAC clarifications or changes were deemed reasonable and incorporated in this RAI response. Specifically, the APR1400 DCD Tier 1 ITAAC Tables will be revised as indicated in the markups provided in Attachment 15 (including 8.c and 8.d in Table 2.7.1.2-4 to correct a subsequently found inconsistency). For the convenience of NRC review, markups from the responses to RAI related to Tier 1 submitted after January 1, 2018, were reflected in Attachments 15 and 16 (RAI 557-9199 for Question 03.08.05-20, RAI 357-8344 for Question 06.02.04-11 Rev.2 & 3, RAI 33-7880 for Question 07.08-1 (Supplemental Response), RAI 553-9084 for Question 18-134 Rev.1 & 2, and RAI 555-9163 for Question 07.02-19 Rev.2). Conforming Tier 1 and Tier 2 section text changes reflecting the revised ITAAC Tables are in the markups provided in Attachment 16, with the exception of Tier1 and Tier2 markups for RAI 557-9199 for Question 03.08.05-20 which are provided with that response, including descriptions for "external events" in the Tier 1, Section 2.2, shall be consistent across the NI structure, EDG, ESW and CCW Hx Buildings, i.e. that “External events (including rain, snow, wind, flood, tornado or hurricane, tornado or hurricane generated missiles, and earthquake)”.

Additional Changes

During the EOC, KHNP noticed there are some discrepancies of design information between Table 2.7.6.4-1 in DCD Tier 1 and Table 11.5-1 in DCD Tier 2. Therefore, KHNP updates the design information in Table 2.7.6.4-1 in DCD Tier 1 to ensure consistency.

For consistency with DCD Tier 2, Table 11.5-1, the measuring range of the high-energy line break area exhaust ACU inlet radiation monitor (PR-RE-007) in DCD Tier 1, Table 2.7.6.4-1 will be corrected as marked up in Attachment 17.
For consistency with DCD Tier 2, Table 11.5-1, the description and Tag No in the DCD Tier 1, Table 2.7.6.4-1 will be corrected as marked up in Attachment 17.

For consistency with DCD Tier 2, Table 11.5-1, the electrical classification for containment air radiation monitor (PR-RE-039A) in DCD Tier 1, Table 2.7.6.4-1 will be corrected as marked up in Attachment 17.

The radiation monitor location (PR-RE-190) “Collective sewage treatment sump” was changed to “fire pump and water/wastewater treatment building” at DCD Tier 2, Table 11.5-2 with RAI 132-8088 for Question 11.05-2 Rev.1. For consistency with DCD Tier 2, Table 11.5-2, the radiation monitor description (PR-RE-190) “Collective sewage treatment sump” in the DCD Tier 1, Table 2.7.6.4-1 will be changed to as marked up in Attachment 17.

Impact on DCD

DCD Tier 1 and Tier 2 will be revised as presented in Attachments.
DCD Tier 2 Subsection 3.5.1.3.2 will be revised as indicated in Attachment 10. The other Attachments have no changes by this revised response, and are not included.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

There is no impact on the Technical Specifications.

Impact on Technical/Topical/Environmental Reports

There is no impact on any Technical, Topical or Environmental Reports.

1.a The arrangement of the T/G system is as described in the Design Description of Subsection 2.7.1.1.1.

1.b The T/G has a favorable orientation to minimize the potential effects of turbine missiles on essential (as defined in Regulatory Guide 1.115, Rev. 2, Appendix A) SSCs.

2.a The mechanical overspeed trip system initiates the T/G trip upon reaching the overspeed setpoint.

2.b The electrical overspeed trip system, which is independent of the normal speed control system and mechanical overspeed trip system, initiates a T/G trip by an electrical signal at a speed slightly higher than for the mechanical overspeed trip.

3. The control system generates the electrical signals in the main control room (MCR) for T/G trip.

4. The MSVs, CVs, ISVs, and IVs close reacting to a T/G trip signal.

5. The non-return check valves on extraction lines close reacting to T/G trip signal.

6. The reactor trip signal from the plant control system initiates a T/G trip.

~~7. The turbine and turbine valve in-service test and inspection program includes scope, frequency, methods, acceptance, disposition of reportable indications, corrective actions, and technical basis for inspection frequency.~~

7 ~~8.~~ The probability of a strike by a turbine missile is sufficiently low to prevent equipment damage to essential SSCs.

8 ~~9.~~ The as-built turbine material properties, turbine rotor and blade designs, pre-service inspection and testing results and in-service testing and inspection requirements meet the requirements defined in the Turbine Missile Probability Analysis performed by the COL applicant.

2.7.1.1.2 Inspection, Tests, Analyses, and Acceptance Criteria

Table 2.7.1.1-1 describes the ITAAC for the T/G.

Table 2.7.1.1-1 (2 of 3)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
5. The non-return check valves on the extraction lines close reacting to a T/G trip signal.	5. Tests will be conducted on the as-built extraction non-return check valves by an actual or simulated T/G trip signal	5. A report of testing exists documenting that The non-return check valve closes within ~~about~~ 1.0 second of an actual or simulated to T/G trip signal.
6. The reactor trip signal from plant control system the initiates a T/G trip.	6. A test of the as-built system will be conducted by a simulated reactor trip signal.	6. A report of testing exists documenting that the as-built control logic generates a T/G trip by a simulated reactor trip signal.
~~7. The turbine and turbine valve in-service test and inspection program includes scope, frequency, methods, acceptance, disposition of reportable indications, corrective actions, and technical basis for inspection frequency.~~	~~7. In-service inspection and testing will be performed at a frequency and in accordance with operating procedures consistent with turbine manufacturer's recommendations and assumptions/input of Probability Analysis of Turbine Missiles Report.~~	~~7. The turbine and turbine valve in-service test and inspection program includes scope, frequency, methods, acceptance, disposition of reportable indications, corrective actions, and technical basis for inspection frequency. In-service test, inspection and operating procedures are in accordance with industry practice and ensure assumptions/input of Probability Analysis of Turbine Missiles Report performed by the COL applicant are valid.~~
~~8~~ 7. The probability of a strike by a turbine missile is sufficiently low to prevent equipment damage to essential SSCs.	~~8~~ 7. A turbine missile probability analysis will be performed to demonstrate the probability of turbine failure resulting in the ejection of turbine rotor (or internal structure) fragments through the turbine casing is less than the regulatory limiting acceptance criteria.	~~8~~ 7. Turbine Missile Probability Analysis Report(s) performed by the COL applicant for the as-built T/G exist and conclude that the probability of turbine failure resulting in the ejection of turbine rotor (or internal structure) fragments through the turbine casing is less than $1x10^{-5}$ per year.

Table 2.7.1.1-1 (3 of 3)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
~~9.~~ 8 The as-built turbine material properties, turbine rotor and blade designs, pre-service inspection and testing results and in-service testing and inspection requirements meet the requirements defined in the Turbine Missile Probability Analysis performed by the COL applicant.	~~9.~~ 8 An inspection of the as-built turbine material properties, turbine rotor and blade designs, pre-service inspection and testing results, and in-service testing and inspection requirements will be conducted.	~~9.~~ 8 A report exists documenting that the as-built turbine material properties, turbine rotor and blade designs, pre-service inspection and testing results and in-service testing and inspection requirements meet the requirements defined in the Turbine Missile Probability Analysis.

b. Turbine shaft bearings are designed to withstand a turbine trip after a loss of a complete last stage blade together with its root. For this reason, the bearings are able to withstand any combination of normal operating loads and anticipated transients.

c. The multitude of natural critical frequencies of the turbine shaft assemblies existing between zero speed and 20 percent overspeed are controlled in the design to prevent distress to the unit during operation.

d. The turbine rotor assembly is designed and tested to withstand the stresses corresponding to an overspeed level of 120 percent of the rated speed. This speed is 5 percent above the maximum expected speed resulting from loss of load. The final overspeed basis and setpoints are included with the turbine missile probability analysis.

e. The turbine rotor design facilitates inservice inspection of high-stress regions.

f. The turbine missile probability analysis described in Subsection 10.2.3.6 contains additional descriptions of the design features of the turbine, rotor, shaft, couplings, and blades, including the number of stages, blade design, how the blades are attached to the rotor, how the turbine rotor is forged, and pertinent fabrication methods. Informational drawings are included as required to illustrate important design features.

g. The turbine missile probability analysis described in Subsection 10.2.3.6 includes an analysis of turbine component loading. The analysis includes rotor and blade loading combinations. The analysis shows that the rotor and blades have adequate margin to withstand loadings imposed during postulated overspeed events up to 120 percent of rated speed without detrimental effects.

10.2.3.5 Inservice Inspection

The turbine and turbine valve inservice test and inspection program includes scope, frequency, methods, acceptance, disposition of reportable indications, corrective actions, and technical basis for inspection frequency. ~~In-service test, inspection, and operating procedures shall be verified by ITAAC to be in accordance with industry practice and to ensure the validity assumptions/input of turbine missile probability analysis report.~~

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An estimate of 10^{-3} per year for a favorable orientation is conservatively assumed.

Favorable turbine generator placement and orientation, combined with the design and fabrication processes, the redundant and fail-safe turbine control system, maintenance and inspection programs as described in Section 10.2, and overspeed protection systems, provide an acceptably small probability of turbine missiles causing damage to essential SSCs, P_4.

The probability of turbine missile generation P_1 shall be verified by ITAAC to be less than 1×10^{-5} per year for a favorable orientation to demonstrate that the probability of failure of essential SSCs from turbine missile P_4 is less than 1×10^{-7} per year.

In addition, ITAAC shall provide verification that~~:~~

~~a. The turbine and turbine valve in-service test and inspection program includes scope, frequency, methods, acceptance, disposition of reportable indications, corrective actions, and technical basis for inspection frequency. In-service test, inspection, and operating procedures are in accordance with industry practice and provide reasonable assurance that assumptions/input of turbine missile probability analysis are valid.~~

~~b.~~ ~~The~~ the as-built turbine material properties, turbine rotor and blade designs, pre-service inspection and testing results and in-service testing and inspection requirements meet the requirements defined in the turbine missile probability analysis.

The COL applicant is to perform an assessment of the orientation of the turbine generator of this and other unit(s) at multi-unit sites for the probability of missile generation using the evaluation of Subsection 3.5.1.3.2 to verify that essential SSCs are outside the low-trajectory turbine missile strike zone (COL 3.5(3)).

3.5.1.4 Missiles Generated by Tornadoes and Extreme Winds

Safety-related SSCs of the APR1400 are protected against the impact generated by tornado or hurricane missiles. The protection measures consist of seismic Category I structures, shields, and barriers to withstand the effects of missile impact generated by a tornado or hurricane. The protection provides reasonable assurance of conformance with 10 CFR Part 50, Appendix A, GDC 2 and 4 and 10 CFR 52.47(b)(1) (Reference 7).