



Functional Arrangement ITAAC

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Alignment/Progress

- SNC's last completion letter for the PCS functional arrangement ITAAC – SAT
 - ✓ Detailed inspection plan
 - ✓ Detailed drawings
 - ✓ Visual observations
 - ✓ Comparison to as-built
 - ✓ Design Description focus

ICL Captures Purpose

- To verify, based on physical inspection of the as-built system, that:
 - ✓ all components necessary to provide the intended service(s) are properly installed,
 - ✓ components are located in their correct location,
 - ✓ the as-built physical arrangement is correct to provide the intended system function(s).

(Taken from the functional arrangement definition and the ITAAC)

Observations

- The Functional Arrangement definition is virtually identical in all DCDs (except ABWR).

Functional Arrangement (for a system) means the physical arrangement of systems and components **to provide the service for which the system is intended,** and which is described in the system design description.

- All require inspection of the as-built system
- I&C and electrical ITAAC differ (e.g. EPR for I&C systems only verifies location per a table)

Observations

- Differences in the design commitment and acceptance criteria exist, most reference the design description, some add a figure or table or both, and some only reference a figure
- Other unique situations exist
- The amount of information provided in Tier 1 varies amongst design centers

Tier 1 Definitions

AP-1000: Functional Arrangement (for a system) means the physical arrangement of systems and components to provide the service for which the system is intended, and which is described in the system design description.

US-APWR: Functional arrangement (for a system) means the physical arrangement of systems and components to provide the function for which the system is intended as described in the ITAAC design description and shown in the specified figures.

EPR: Functional Arrangement (for a system) - the as-built physical arrangement of components to provide the service for which the system is intended and which is described in the system design description.

ESBWR: Functional Arrangement (for a System) means the physical arrangement of systems and components to provide the service for which the system is intended, and which is described in the system Design Description.

ABWR: Basic Configuration (for a System)---- means the functional arrangement of structures, systems, and components specified in the Design Description; and verifications for that system as specified in Section 1.2.

AP1000 Rev 18

- **Generic Functional Arrangement ITAAC**

The as-built XXX conforms with the functional arrangement as described in the Design Description of this Section XXX.

- **Typical statement in the Design Description**

The CNS is as shown in Figure 2.2.1-1 and the component locations of the CNS are as shown in Table 2.2.1-4.

1. The functional arrangement of the CNS and associated systems is as described in the Design Description of this Section 2.2.1.

- **Not all FA ITAAC follow the standard format**

US-APWR Rev 2

- **Generic Functional Arrangement ITAAC**
The as-built XXX conforms to the functional arrangement as described in the Design Description of *this Subsection XXX and as shown in Figure XXX*. (*figure not always given*)
- **Design Description - Location and Functional Arrangement section** (*not used for I&C*)
- **Number of unique acceptance criteria for I&C**

EPR Rev 2

- Generic Functional Arrangement ITAAC (2 Parts)
 - a.) The as-built XXX conforms with the functional arrangement as shown on Figure XXX.
 - b.) The equipment listed in Table XX is located as listed in Table XX.
- Design Description - Section 2.0 Arrangement
 - 2.1 - XXX equipment is located as listed in Table XXX — “Title.”
- No functional arrangement ITAAC for I&C
 - c.) The XX equipment listed in Table XX is located as listed in Table XX.
- Design Descriptions appear to contain a lot of info

ESBWR Rev 8

- **Generic Functional Arrangement ITAAC**

The XXX system conforms to the functional arrangement as described in Subsection XXX and Table XXX and as shown in Figure XXX.

(figure not always given)

The as-built ARM system **locations conform** to Subsection 2.3.2 and Table 2.3.2-1. *(Modified version)*

- Design Descriptions appear to contain a lot of info
- Verification of the Functional Arrangement of a system, as used in an ITAAC, means verifying that the system is constructed as depicted in the Tier 1 design description **and** figures, including equipment and instrument locations, if applicable.

ABWR Rev 0

- **Generic Functional Arrangement ITAAC (2)**
 - 1.) **The as-built XXX conforms with the description in Section XXX.** (electrical/I&C/control systems)
 - 2.) **The as-built XXX System conforms with the basic configuration shown on Figure 2.11.12.** (traditional mechanical systems)
- **Basic Configuration** (for a System)---- means the functional arrangement of structures, systems, and components specified in the Design Description; and verifications for that system as specified in Section 1.2.
- In particular, the as-built attributes of structures, systems, and components may vary from the attributes depicted on these figures, ----

Purpose of ITAAC

§ 52.47 Contents of applications; technical information.

- (b) The application must also contain:
 - (1) The proposed inspections, tests, analyses, and acceptance criteria 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 be operated in conformity with the design certification, the provisions of the Act, and the Commission's rules and regulations;

➤ Proposed guidance - Comments

The purpose of the system functional arrangement ITAAC, and the associated ITAAC Closure Letter, is to verify and document that the as-built system components conform to the Tier 1 Design Description, that is, that components are physically arranged **as shown in any referenced figure, and located as identified in any referenced table.**

Performance of required system safety functions described in the Tier 1 Design Description is verified by other ITAAC, which are the subject of separate ITAAC Closure Letters.

NEI 08-01

- Some system functional arrangement ITAAC do not refer to simplified figures or tables. These systems are generally less safety significant and/or complex, and simplified figures/tables were not considered necessary. For these functional arrangement ITAAC, **it is sufficient for ITAAC Closure Letters to state that inspections were performed and confirmed that the system is present in the as-built plant.** As with other systems, performance of required system safety functions described in the Tier 1 Design Description is verified by other ITAAC.

Conclusion

- The licensee should ensure detailed drawings and other documentation reflect the final as-built configuration of the facility so that they can be used as part of the bases, where appropriate, for demonstrating conformance with the COL ITAAC.
- It is therefore expected that system inspections performed to satisfy the functional arrangement ITAAC will be completed using the detailed, plant specific design drawings and the successful conduct of such inspection will be documented in the functional arrangement ITAAC completion letter.

Conclusion

- SNC's functional arrangement completion letter is acceptable, as well as the ELS example provided by NEI. However, the proposed guidance is not in alignment with either.
- It is well understood the Tier 1 drawings are incomplete. This could lead to problems and delays in the ITAAC closure verification process.
- Options going forward?