

NRC INSPECTION MANUAL

CIPBCCIB

MANUAL CHAPTER 2503

CONSTRUCTION INSPECTION PROGRAM:
INSPECTIONS OF INSPECTIONS, TESTS,
ANALYSES AND ACCEPTANCE CRITERIA (ITAAC)
RELATED WORK

TABLE OF CONTENTS

2503-01	PURPOSES.....	1
2503-02	OBJECTIVES.....	1
2503-03	DEFINITIONS	1
2503-04	RESPONSIBILITIES AND AUTHORITIES	3
2503-05	BACKGROUND	4
05.01	General.	4
05.02	ITAAC Inspection Overview	4
2503-06	PROGRAM REQUIREMENTS	5
06.01	Inspection Requirements.	5
2503-07	PROGRAM MANAGEMENT.....	5
07.01	Inspection Planning.....	5
07.02	Implementation.	6
07.03	Inspection Results.....	6
a.	Categories of ITAAC Inspection Results	6
1.	ITAAC Finding	6
2.	Construction Inspection Finding	6
3.	Minor Finding	7
b.	Assessment of Inspection Results	7
07.04	ITAAC Determinations	7
07.05	Enforcement.....	7
APPENDIX A: IMC-2503 INSPECTION PROCEDURES.....		A-1
APPENDIX B: The ITAAC Matrix.....		B-1
APPENDIX C: Revision History For IMC 2503		C-1

**CONSTRUCTION INSPECTION PROGRAM:
INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE CRITERIA
(ITAAC)**

2503-01 PURPOSES

01.01 To specify the policy used for the NRC's inspection of the Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) of a combined license or Limited Work Authorization (LWA).

01.02 To provide guidance for inspections intended to support the Commission's determination, in accordance with 10 CFR 52.103(g), that the acceptance criteria in the combined license have been met.

2503-02 OBJECTIVES

02.01 To provide guidance to inspectors on inspection of ITAAC-related work activities.

02.02 To provide a sufficient basis to support the Commission determination in accordance with 10 CFR 52.103(g) that the acceptance criteria in a combined license have been met.

2503-03 DEFINITIONS

03.01 Construction Activities. ~~Any activity~~Licensed Activities associated with the construction, fabrication, or testing of structures, components, subcomponents, subsystems, or systems either at the construction site or at remote fabrication or testing facilities. Construction activities also include related design and engineering activities including design changes for the structures, systems, and components.

03.02 Construction Inspection Finding. A hardware or programmatic finding that is not material to ITAAC closeout verification. A Construction Finding may result in enforcement actions in accordance with the Enforcement Policy.

03.03 Construction Inspection Program Information Management System (CIPIMS). The computer database that provides the means to document, report, and track all NRC inspection activities and their results.

03.04 Contractor. Any organization under contract for furnishing to furnish items or services to a licensee. It includes the terms consultant, vendor, supplier, fabricator, constructor, and subtier levels of these organizations.

03.05 Design Acceptance Criteria (DAC). A set of prescribed limits, parameters, procedures, and attributes upon which the NRC relies, in a limited number of technical areas, in making a final safety determination to support a design certification. DAC are

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| part of the ITAAC inventory for a given design.

| 03.065 Family of ITAAC. A grouping of ITAAC that are related through similar construction processes, resulting products, and general inspection attributes.

| 03.076 Inspection. (1) An NRC activity consisting of examination, observation or measurements to determine applicant/contractor conformance with requirements and/or standards. (2) Applicant/contractor quality control measures consisting of examination, observation or measurements to determine the conformance of materials, supplies, components, parts, systems, processes or structures to pre-determined quality requirements.

| 03.087 Inspection Assessment. Periodic reviews of inspection findings by NRC management to determine if the current level of inspection effort should change.

| 03.098 Inspection Sample. Items or groups selected for inspection of one or more inspection characteristics.

| 03.109 Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC). Those inspections, tests, analyses, and acceptance criteria identified in the combined license that if met are necessary and sufficient to provide reasonable assurance that the facility has been constructed and will operate in conformity with the license, the provisions of the Atomic Energy Act, and the Commission's rules and regulations. The ITAAC identified in a combined license referencing a certified design will include the ITAAC defined in the Tier 1 documentation. Site-specific ITAAC, which include emergency planning ITAAC and ITAAC that are not part of the certified design, will also be included in a combined license. ITAAC are conditions of the license and must be met prior to operation a 103.g finding can be made.

Comment [R1]: You can reword this, but the basics should say something about 103g and not operation.

| 03.110 ITAAC Attributes. A number of common, descriptive characteristics for each ITAAC that can be analyzed and weighted by a methodology that allows the ITAAC to be prioritized for inspection planning.

| 03.124 ITAAC Closeout. The process by which the licensee affirms that an ITAAC has been satisfactorily completed.

| 03.132 ITAAC Closeout Verification. The NRC process which evaluates the licensee's affirmation of satisfactory ITAAC completion.

| 03.143 ITAAC Finding. A finding of such significance that, if not corrected, would prevent the NRC from reaching a positive ITAAC determination. An ITAAC finding may be related to a single ITAAC or a family of ITAAC.

Comment [R2]: Should we say prevent the NRC from verifying that the ITAAC is closed?

| 03.154 ITAAC Matrix. An inspection planning tool that identifies groups (i.e., "families") of ITAAC, based upon common characteristics, which facilitate the ITAAC inspection sampling process and provide a consistent model for the inspection of ITAAC at plants of a similar design.

| 03.165 Minor Findings. Any inspection result that does not affect the successful

completion of an ITAAC or a licensee program. These results may include issues related to record keeping; insignificant dimensional, time, calculation, or drawing discrepancies characterized by minor discrepant values referred to in the licensee's Final Safety Analysis Report (FSAR) or design documents; or insignificant procedural errors that have no impact on the quality of design, fabrication, construction or testing.

03.176 Quality Assurance. Quality Assurance (QA) comprises all those planned and systematic actions necessary to provide adequate confidence that a structure, system or component will perform satisfactorily in service. Quality Assurance includes quality control.

03.187 Tier 1 Material. Tier 1 refers to the portion of the design related information contained in the design control document that is approved and certified by the NRC through the rulemaking process. Tier 1 information includes: Definitions and general provisions; design descriptions; ITAAC; significant site parameters; and significant interface requirements.

03.198 Tier 2 Material. Tier 2 refers to the portion of the design related information contained in the design control document that is approved but not certified by the NRC. Tier 2 information includes: Information required by 10 CFR 52.47 with the exception of technical specifications and conceptual design information; Information required for a final safety analysis report under 10 CFR 50.34; supporting information on ITAAC that will be performed to demonstrate that the acceptance criteria have been met; and Combined License (COL) information items which identify certain matters that are addressed by a COL applicant that references a certified design. Tier 1 material is derived from Tier 2 material. Compliance with Tier 2 is required and demonstrates a sufficient, but not the only, method for complying with Tier 1.

2503-04 RESPONSIBILITIES AND AUTHORITIES

04.01 Office of New Reactors (NRO). The Director, NRO, has responsibility for:

- a. Providing the overall direction of the construction inspection program and directing the development and implementation of policies, programs and procedures for the construction inspection program.
- b. Providing inspector resources to support and augment regional inspector resources assigned to construction projects.
- c. Publishing notices in the Federal Register of the successful completion of ITAAC in accordance with 10 CFR 52.99.
- d. Making the recommendation to the Commission regarding a determination pursuant to 10 CFR 52.103(g) that the acceptance criteria have been successfully completed.

04.02 Region II Office. The Deputy Regional Administrator for Construction has responsibility for:

- a. Supporting the Commission finding required by 10 CFR 52.103(g) by informing the Director, NRO, on the licensee's completion of the ITAAC, the plant's readiness to load fuel, and the overall readiness for operation.

04.03 Region II Construction Inspection Staff. The Region II Construction Inspection Staff (CIS) has responsibility for:

- a. Implementing the construction inspection program and documenting inspection findings.
- b. Providing NRO with the status of inspections related to specific ITAAC.
- c. Coordinating the development of the site inspection plan.
- d. Integrating all of the inspection findings to develop an overall assessment of licensee performance as described in IMC 2505.

04.04 Headquarters Construction Inspection Staff. The Headquarters Construction Inspection Staff (CIS) has responsibility for:

- a. Administering and monitoring the execution of the construction inspection program.
- b. Ensuring the requisite inspection procedures are maintained current and accurate.
- c. Ensuring that the necessary inspection record is maintained to support final NRC determination of satisfactory ITAAC completion.

Comment [R3]: What about assisting in the inspection process when requested by CCI

2503-05 BACKGROUND

05.01 General. When licensing a plant under 10 CFR Part 52, the Commission is required by § 52.97(b)(1) to identify "...within the combined license, the inspections, tests, and analyses; including those applicable to emergency planning that the licensee shall perform, and the acceptance criteria that, if met, are necessary and sufficient to provide reasonable assurance that the facility has been constructed and will be operated in conformity with the license, the provisions of the Atomic Energy Act, and the Commission's rules and regulations."

In addition, § 52.103(g) requires that "... the Commission shall find that the acceptance criteria in the combined license are met" prior to allowing the facility to operate. Successful completion of the ITAAC are the responsibility of the licensee. The NRC will use inspections of construction activities to independently verify that the licensee successfully carries out construction activities and identifies and corrects deficiencies which may have an impact on the ITAAC or other construction activities. The results of

the construction inspection program implemented through this manual chapter will form the basis of the staff's recommendation to the Commission's determination, in accordance with 10 CFR 52.103(g), of whether or not the acceptance criteria have been met.

05.02 ITAAC Inspection Overview. The NRC may begin ITAAC inspection ~~when an applicant begins procurement of long lead time components, such as reactor vessels~~ when a licensee is issued a COL or a LWA that contains ITAAC. Since many of the ITAAC are oriented towards system completion, they may not be completed until construction is nearly complete. Therefore, the staff intends to implement an ITAAC inspection approach which will require NRC inspectors to observe ITAAC-related construction activities as they are performed.

The NRC has developed a framework to prioritize the ITAAC and allow for more efficient inspections. This framework is structured to integrate complementary inspection activities that evaluate the licensee's control of the construction processes. Central to the NRC's inspection program for construction under 10 CFR Part 52 is the ITAAC Matrix which provides a means for ensuring adequate inspection coverage of ITAAC inspections. The matrix will be populated with the ITAAC applicable for each certified design as described in Appendix B to this manual chapter. Site specific ITAAC will be added to the matrix population once they have been identified.

The approach to ITAAC inspection will require inspectors to evaluate the acceptability of ITAAC-related processes. The NRC will perform sampling-type inspections of ITAAC-related activities to verify that the licensee is performing the activities successfully. The selection of the ITAAC for each design to receive direct inspection will be based on a prioritization process used to determine overall inspection value.

When the licensee notifies the NRC that an ITAAC is complete, they will also identify the bases for the ITAAC completion. NRC reviews of the licensee's ITAAC documentation as well as any NRC inspection history for that ITAAC will determine if the licensee's ITAAC completion letter and its associated bases are satisfactory.

The staff will use the Construction Inspection Program Information Management System (CIPIMS) to link inspection results to the docket, the inspection report, and the specific ITAAC.

2503-06 PROGRAM REQUIREMENTS

06.01 Inspection Requirements. The inspection procedures (IPs) applicable during construction are identified in Appendix A to this manual chapter. The listed IPs will be used by NRC inspectors when conducting inspections of ITAAC-related construction activities.

2503-07 PROGRAM MANAGEMENT

07.01 Inspection Planning. The staff shall develop an inspection plan to verify that ITAAC related construction activities are being successfully performed. This plan shall include as a minimum the baseline inspection requirements for the selected certified reactor design. The plan shall provide the level of detail necessary to determine the general time-frame in which each occurrence of an inspection procedure is to take place.

- a. The licensee's construction schedule shall be used to identify when key activities will be available for inspection.
- b. The overall schedule will incorporate all of the planned inspection activities for the planned period of construction. The Construction Inspection Scheduler (CIS) should review this schedule regularly to adjust it for changes to the licensee's construction schedule. The overall construction inspection schedule will be used for planning of inspection resources (i.e., ensuring the required inspection skills or engineering disciplines are available when required).

07.02 Implementation. The inspection program is intended to provide the framework for managing the inspection effort. When and how often each inspection procedure should be performed during the construction period, and when each inspection procedure occurrence should be performed will be determined during development of the site specific inspection plan.

Inspectors are encouraged to pursue any safety or risk significant concern. However, inspectors must identify the inspection procedure used to perform inspection activities and to accurately record this information and the inspection results so they can be incorporated into CIPIMS.

Regional managers responsible for the construction inspection program shall periodically review inspection results to monitor progress on the inspection plan. Changes to the inspection plan will occur as part of the assessment process as described in IMC 2505 "Periodic Assessment of Construction Inspection Program Results."

07.03 Inspection Results. NRC inspections of ITAAC related work are expected to result in the early identification and resolution of problems, their root causes, and generic implications. All inspection observations and inspection results will be documented in accordance with IMC 0613 "New Reactor Construction Inspection Reports."

- a. Categories of ITAAC Inspection Results. Because of their potential for affecting the NRC's verification of successful ITAAC completion, inspection findings will be categorized to reflect their impact on ITAAC. The documentation requirements for the different types of inspection results are described in IMC 0613, Construction Inspection Reports. Listed below are the categories into which inspection findings will be placed.

1. ITAAC Finding - A finding in which the NRC has determined that an

ITAAC has not or will not be met if the deficiency is not corrected. Resolution of an ITAAC finding will require the licensee to provide a determination of the extent to which the condition may exist. The issue will be assigned an NRC tracking number in CIPIMS that will be tied to the related ITAAC. Followup inspections and reviews will monitor and document licensee corrective actions until closure. Any followup follow-up reviews and the basis for closing an ITAAC finding must be documented in an inspection report to ensure a complete history of the issue in the public record. An ITAAC determination submitted by a licensee for a specific ITAAC will not be accepted by the NRC for closure if an ITAAC finding remains open against that ITAAC.

Comment [R4]: Wrong words. ICN and ICN verification.

2. Construction Inspection Finding - A hardware or programmatic finding that is not material to ITAAC closeout notification verification. A Construction Finding may result in enforcement actions in accordance with the Enforcement Policy.

3. Minor Finding - Findings that would not affect the licensee's ability to meet the ITAAC. These include minor record keeping issues, insignificant dimensional, time, calculation, or drawing discrepancies, or insignificant procedural errors that have no impact on the quality of design, fabrication, erecting or testing. Findings in this category are expected to be resolved successfully by the licensee through the corrective action program.

b. Assessment of Inspection Results. NRC will periodically review inspection results to determine if the current level of inspection effort should be changed. The review of inspection results will focus on two factors: (1) the implementation of specific construction activities as documented in the inspection history and (2) the implementation of the licensee's quality assurance program. This approach will assure that any deficiencies that have been identified by the licensee or NRC have been adequately addressed by the licensee's QA program and have resulted in effective corrective actions. The NRC's confidence in the licensee's construction activities is directly related to confidence in the quality assurance program. This process will be further defined in IMC 2505 or IMC2505P.

Comment [R5]: Check this number to make sure its correct

07.04 ITAAC Determinations. The licensee will notify the NRC when an ITAAC has been successfully completed. The NRC will review each ITAAC completion basis for adequacy and accuracy. The NRC's determination of successful ITAAC completion will be based on a combination of inspection results, technical staff reviews, and a review of the information submitted by the licensee. The inspection history may reflect any or all of the following: direct inspection related to the specific ITAAC; inspection results from direct inspection of similar ITAAC within an ITAAC family; and inspection results from direct inspection of processes related to that specific ITAAC. The NRC will publish in *Federal Register* notices the successful completion of inspections, tests, and analyses, as required by 10 CFR 52.99.

07.05 Enforcement. During the construction period, the agency will process identified violations of NRC regulations and conditions of the COL in accordance with the CIP

| process and the Commission's Enforcement Policy, NUREG-1600, "General Statement of Policy and Procedures for NRC Enforcement Actions."

END

| Appendix A: IMC-2503 Inspection Procedures

Appendix B: The ITAAC Matrix

| Appendix C: Revision History for IMC 2503

| INSPECTION PROCEDURES

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- IP 65001 - ITAAC Inspections
 - 65001.01 - Foundations and Buildings
 - 65001.02 - Structural Concrete
 - 65001.03 - Piping
 - 65001.04 - Pipe Supports & Restraints
 - 65001.05 - RPV & Internals
 - 65001.06 - Mechanical Components
 - 65001.07 - Valves
 - 65001.08 - Electrical Components & Systems
 - 65001.09 - Electrical Cable
 - 65001.10 - I&C Components & Systems
 - 65001.11 - Containment Integrity & Penetrations
 - 65001.12 - HVAC
 - 65001.13 - Equipment Handling & Fuel Racks
 - 65001.14 - Complex Systems with Multiple Components
 - 65001.15 - Fire Protection
 - 65001.16 - Engineering
 - 65001.17 - Security
 - 65001.18 - Emergency Planning
 - 65001.19 - Radiation Protection
 - 65001.20 - Piping Design (DAC)
 - 65001.21 - Pipe Rupture Hazards Analysis (DAC)
 - 65001.22 - Digital I&C System/Software (DAC)
 - 65001.23 - HFE Integrated System Validation (DAC)
 - 65001.24 - HFE Task Support Verification (DAC)
 - 65001.25 - HFE Design Verification (DAC)
 - 65001.26 - HFE Issue Resolution Verification (DAC)
 - 65001.A - As Built Inspection
 - 65001.B - Welding
 - 65001.C - Construction Testing
 - 65001.D - Operational Testing
 - 65001.E - Qualification Criteria
 - 65001.F - Design/ Fabrication Requirements

APPENDIX B: The ITAAC Matrix

BACKGROUND: The goal of inspections conducted under IMC-2503 is to verify licensee compliance with all 10 CFR Part 52 ITAAC requirements, as well as other relevant NRC regulations, using an integrated inspection and review strategy.

The ITAAC inspection philosophy contained in IMC-2503 recognizes that several ITAAC are expected to be closely related, thereby providing the NRC with the opportunity to evaluate a family of ITAAC based upon an examination of some representative ITAAC within the family. Such an inspection approach would allow for the efficient use of NRC inspection resources for evaluation of the construction processes that result in the ITAAC completion.

OBJECTIVE: A framework was developed by the NRC to manage ITAAC inspections, while recognizing the need for a sampling-inspection approach. This framework was structured to integrate inspection activities that evaluate the licensee's control of the construction processes into the NRC inspection program. Central to the NRC's CIP for construction under 10 CFR Part 52 is a tool that provides a coherent approach to the coverage and completion of the ITAAC related inspections. This tool is called the ITAAC Matrix and is shown in Figure 1.

OVERVIEW: The ITAAC Matrix provides a means for assigning each ITAAC into a matrix block referred to as an ITAAC family. Each family represents a combination of ITAAC characteristics related to the successful ITAAC completion.

The IPs for the 19 Matrix rows provide guidance on the inspection of specific technical disciplines, while the IPs for the six Matrix columns discuss those inspection criteria that crosscut disciplinary boundaries. The 25 IPs developed to address all Matrix categories provide a template for ITAAC inspections, as well as inspection of the licensee's control of the construction processes. This facilitates the process of inspecting the selected sample of ITAAC, but also ensures adequate coverage of all construction disciplines. For example, all ITAAC within a specific plant design that discuss instrumentation and control (I&C) components and systems and specific as-built inspection criteria would be binned in the matrix block formed at the intersection of row (10) and column (A).

POPULATING THE ITAAC MATRIX: Each ITAAC for a specific design is evaluated and assigned to the appropriate family by selecting the appropriate combination of row and column. Site specific ITAAC will also be added to the population once they have been identified.

- a. An NRC expert panel reviews all the ITAAC for each design. An expert panel will generally consist of a minimum of three NRC personnel with some combination of expertise in plant construction, reactor risk, and project licensing, including some relevant plant design and ITAAC experience.
- b. The expert panel will review each of the ITAAC and will place it in one of the

families of the ITAAC Matrix.

- c. Once the expert panel determines where in the Matrix each of the ITAAC for a particular design should be placed, all facilities constructed with that particular design will use that ITAAC Matrix.

This use of a single ITAAC Matrix format provides a consistent framework for developing the inspection programs for each of the different reactors that are licensed and built under 10 CFR Part 52. This also ensures consistency in the inspection program within any specific design.

DESIGN ACCEPTANCE CRITERIA (DAC): Inspection Procedures 65001.20 through 65001.26 are special purpose procedures for inspection of DAC-related ITAAC. There is no correlation between these procedures and the ITAAC Matrix.

Figure 1: THE ITAAC MATRIX

	A)As-Built Insp	B) Welding	C)Const Testing	D) Opn Testing	E)Qual Criteria	F)Design /Fab Req
01)Foundations & Buildings	A01	B01	C01	D01	E01	F01
02)Struc Conc	A02	B02	C02	D02	E02	F02
03)Piping	A03	B03	C03	D03	E03	F03
04)Pipe Spt & Restraints	A04	B04	C04	D04	E04	F04
05)RPV & Int'l's	A05	B05	C05	D05	E05	F05
06)Mech Comp	A06	B06	C06	D06	E06	F06
07)Valves	A07	B07	C07	D07	E07	F07
08)Elec Comp & Systems	A08	B08	C08	D08	E08	F08
09)Elec Cable	A09	B09	C09	D09	E09	F09
10)I&C Comp & Systems	A10	B10	C10	D10	E10	F10
11)Containment Integrity & Pen's	A11	B11	C11	D11	E11	F11
12)HVAC	A12	B12	C12	D12	E12	F12
13)Eqp Handle & Fuel Racks	A13	B13	C13	D13	E13	F13
14)Complex Sys w/ Multi-Comp	A14	B14	C14	D14	E14	F14
15)Fire Prot	A15	B15	C15	D15	E15	F15
16)Engineering	A16	B16	C16	D16	E16	F16
17)Security	A17	B17	C17	D17	E17	F17
18)EP	A18	B18	C18	D18	E18	F18
19) Rad Prot	A19	B19	C19	D19	E19	F19

- Column Categories [A thru F]: Interdisciplinary NRC inspection activities that represent common ITAAC attributes. An NRC inspection procedure (IP) will correspond to each column category.

- Row Categories [1 thru 19]: Construction processes & resulting products (e.g., SSC) that relate to a unique discipline, with an IP corresponding to each row category.

ITAAC MATRIX NOTES:

Column Classification

[A] "As-Built Inspection" comprises the functional/physical arrangement series of ITAAC, to include checks for location, alignment, dimensions, sizing, and measurements, and may include functional checks, unless related to testing (which would be covered by [C] or [D]) or a design report/analysis (which would be covered by [F]). Simple calculations (e.g., a screen area or tank volume) that can be made from field measurements or sizing estimates would be covered here based upon the dimensional checks; however, more complex calculations, even if field measurements are involved, would better be categorized in [F]. If a single ITAAC involves both as-built information, like a physical or dimensional check, and other criteria, like those for an operational test [D] or design analyses/calculations [F], the [D] or [F] categories, as applicable, would take preference over this as-built [A] category. Also, checking that a meter or display is located properly (e.g., is on the Main Control Board) would be categorized here [A], while reading the meter or retrieving data from the display as part of an operational test would better be categorized in [D].

[B] "Welding" comprises those ITAAC which address any welding process, whether code referenced (e.g., ASME piping) or oriented to other processes (e.g., structural steel or electrical supports). This category also includes those ITAAC which address or provide criteria for weld quality, e.g. the requirements for the nondestructive examination (NDE) of welds. Additionally, activities and programs related to the welding process (e.g., welder training, testing, and certification; weld procedure qualification; NDE personnel and procedure qualification; other weld testing activities) are all included in this welding [B] category.

[C] "Construction Testing" includes specific ITAAC tests that are associated with the quality of component fabrication and construction activities, to include quality acceptance tests (e.g., concrete testing or simulated signal testing to confirm Class 1E division boundaries), baseline data checks (e.g., PSI), and field-work completion testing (e.g., "hydro's") or any other similar construction testing activities. In-process field testing of individual pieces of equipment would be covered here, while the construction-complete, pre-operational test phases leading to integrated system testing would better be categorized in [D]. However, the testing (e.g., "type tests") of equipment for "qualification" in a harsh environment (EQ) or in analyzing seismic response, as well as for other like programmatic "qualification criteria", should be covered by [E], as described in note (E) below.

[D] "Operational Testing" involves testing activities that check component and system function by measuring operational parameters (e.g., flow requirements) and/or validating operational performance acceptance criteria (e.g., component actuation with signal inputs or similar "pre-op" testing). Such tests might be performed on a single component, an individual system, or a complex, integrated system. Similarly, as with "Construction Testing" above, "type tests" and equipment "qualification" should be covered by [E].

[E] "Qualification Criteria" includes seismic qualification, environmental qualification

(EQ) and other ITAAC qualification programs and any related program attributes that are oriented toward broad design criteria versus the specific test parameters of [C] or [D]. The characteristics of such programs as the Design Reliability Assurance Program (DRAP) might be considered here. ~~which would include any Design Acceptance Criteria (DAC) associated with a particular facility design.~~

[F] "Design/Fabrication Requirements" cover those ITAAC that refer to Code (e.g., ASME) requirements for the fabrication of material and components or discuss the adequacy of design by reference to analyses, calculations, bounding condition checks, functional assessments, engineering evaluations and other design reports. However, if "Welding" is the primary fabrication process, this is better categorized in [B]. If construction or operational "Testing" result in design parameters/measurements, this is better categorized in [C] or [D]. Also, if the design analyses involve programmatic "Qualification Criteria" (e.g., seismic), this would be better categorized in [E]. Where a report exists, or the functional capabilities of the system/components are analyzed, to confirm compliance with general Code requirements versus specific test results or programmatic qualification criteria, it should be covered here under [F].

Row Classification

(01) "Foundations & Buildings" include geo-technical (e.g., rock) investigation, civil surveying, elevation grading, pre-construction preparations (e.g., "mudmats") and site layout, including the arrangement of buildings and structures; except that the Containment, as a separate "Building", is covered by line (11) while its "Foundation" is covered here with all site foundations. This category also includes the building framework, like the structural steel and bolting materials. However, any ITAAC discussing the details of construction of the buildings that are more specifically defined by other Matrix rows will be classified by that process (i.e., "Structural Concrete" (02) for concrete buildings, "Mechanical Components" (06) for large metal tanks, or "Engineering" (16) for generic design criteria (e.g., seismic) of buildings, like the nuclear island).

(02) "Structural Concrete" includes all the materials (e.g., cement and rebar) and processes (e.g., concrete batch mixing and delivery) that result in a steel reinforced concrete placement, as well as embedded devices, elements, anchors, anchorages, water barriers that are installed before or after the concrete placement, and structural grout. Any items that are installed in the formwork (for example, anchor bolts that are embedded in the concrete when placed) are covered by this line item, while items that are subsequently attached to finished concrete are covered by other functional categories; for example, concrete expansion anchors, which are known to provide piping support or electrical raceway support, are covered under lines (04) and (09) respectively. For work on placed and finished concrete, where the ultimate function is unknown (e.g., expansion anchors for general supports), such activities are covered here under (02).

(03) "Piping" includes all piping, whether safety-related or not, and covers all ASME classes including the reactor coolant pressure boundary, as well as piping referenced in other codes (e.g., B31.1). ITAAC that describe systems that deliver fluid flow through piping as the major function, as well as the pressure boundary function (e.g., the

pressure rating verified by hydrostatic testing) of such systems, are best categorized here. However, if the system functions and test acceptance criteria are more complex, involving diverse component interactions, the ITAAC might ~~be a~~ better fit ~~(14)~~ for “Complex Systems w/ Multiple Components” (14).

(04) “Pipe Supports & Restraints” apply to all classes of piping and all types of supports (e.g., snubbers, struts, anchors, guides) and pipe whip restraints. The seismic adequacy of piping systems would likely be applied here in (04). However, if the ITAAC focuses on the seismic qualification of a unique component (e.g., a pump) instead of the piping system, “Mechanical Components” (06) would be most appropriate line for categorization.

(05) “Reactor Pressure Vessel (RPV) & Internals” While the RPV may be considered a mechanical component or part of a fluid-flow system, it is uniquely covered here, along with the reactor internals. However, any instrumentation internal to the RPV is best categorized on the I&C ~~rowline~~ (10).

(06) “Mechanical Components” include all classes (ASME or non-safety) of equipment (e.g., pumps, heat exchangers, strainers, etc.), but not “Valves” (07) and not “HVAC” (12). It also includes any mechanical equipment support that is unique (e.g., a steel pedestal) to the component, rather than part of the building structure [e.g., concrete pads with anchor bolts that are part of “Structural Concrete” (02)]. Storage tanks that are fabricated metal components would fit here (06), but concrete tanks with only a liner, may best fit under “Structural Concrete” (02).

(07) “Valves”, regardless of the type of operator (e.g., motor, hydraulic, air, squib, etc.), are considered here as a separate category of mechanical components because of the unique nature in the way they are described in the ITAAC. This category covers all valves, including check valves and any other valves of a similar self-actuating nature. Also, any valve functions related to containment isolation are covered in line (11), “Containment Integrity & Penetrations”.

(08) “Electrical Components & Systems” include all electrical equipment (e.g., diesel generators) and supporting distribution components (e.g., switchgear), except for the cables. Because of their unique nature, containment electrical penetration assemblies are included here instead of ~~rowline~~ (11).

(09) “Electrical Cable” involves all cable and includes the raceways (e.g., conduit, cable tray) in which ~~the cable is~~~~it is~~ run and the raceway supports (e.g., “unistrut”), unless they are part of the building structural steel (01) or pipe supports (04).

(10) “I&C Components & Systems” include sensing instrumentation and actuation control equipment, including the system hardware (e.g., signal process cabinets) and logic process devices, as well as the related signal initiation, control and annunciation checks, e.g., including those for the Main Control Board (MCB). Displays on the MCB and the retrieval of the information from the MCB windows or other panels and cabinets in the main control room (MCR) would be covered here. However, low-voltage instrument cable is covered under (09), “Electrical Cable”, with all other cable.

(11) "Containment Integrity & Penetrations" involve the Containment structure and boundary, including all aspects of the containment isolation function. Therefore, any containment isolation check (e.g., a valve closure) or integrity criteria (e.g., hatch leakage) are covered here, instead of line (07) for valves or line (06) for mechanical components. However, the containment concrete material and placement is covered by "Structural Concrete" (02) and the electrical penetration assemblies are considered "Electrical Components" (08).

(12) "Heating, Ventilating & Air Conditioning- (~~HVAC~~)" involves air distribution and environmental control systems from a functional standpoint, thereby including all mechanical, electrical, and I&C equipment that is directly related to the HVAC function or system performance.

(13) "Equipment Handling and Fuel Racks" includes the components involved with equipment handling and movement (e.g., polar crane), fuel movement (~~e.g. e.g.~~, fuel bridges) both inside and outside of containment, and the spent fuel storage racks and related equipment. The fuel itself is not covered here, but rather in line (05) as an "internal" component.

(14) "Complex Systems with Multiple-Components" is intended to cover categories that discuss attributes that cross disciplinary boundaries, for example electrical, I&C, and valve response are all connected to the same ITAAC. This would also cover any ITAAC that refer to Tables of equipment, that would fit multiple lines of the Matrix if the components were evaluated separately; for example, a Table that lists valves, mechanical components, and I&C components. This category should be used when the nature of the ITAAC does not lend itself to clear placement in one of the other categories. However, even for complex systems, where the ITAAC focus is specific (e.g., the pressure boundary function of an integrated piping system), the matrix category (in this example line (03) for piping) that best fits the focal point of the ITAAC should be selected.

(15) "Fire Protection" includes all related material, equipment, systems, processes, and programs.

(16) "Engineering" is a separate line to distinguish it as a "process" separate from the construction activities that result in the SSC and products on the other lines. If design criteria (e.g., flooding analyses) are the dominant focus of an ITAAC (e.g., building room boundaries) "engineering" would apply. Similarly, for design issues (e.g., seismic) and more subjective areas (e.g., human reliability analysis) that cross disciplinary boundaries, are "engineering" oriented, and difficult to categorize on any other line, the most applicable categorization may fit here under ~~rowline~~ (16).

(17) "Security" and (18) "Emergency Planning" (EP)" are separate lines to cover the systems, processes, and programs related to these activities.

(19) "Radiological Protection" includes not only all radiation protection (RP) components and RP system functions, but also those processes and programs related to RP, similar to the way fire protection and security systems and programs fit under lines (15) and (17) respectively. An ITAAC that refers generally to the EP function, which might

include radiological protection, is better categorized under line (18); while a more direct reference to RP equipment functionality and the programs that support the use of RP data would fit here under ~~rowline~~ (19).

APPENDIX C

Revision History For IMC 2503

Commitment Tracking Number	Issue Date	Description of Change	Training Needed	Training Completion Date	Comment Resolution Accession Number
N/A	04/25/06	Initial Issuance	None	N/A	N/A
N/A	10/03/07	Researched commitments for 4 years and found none. Revised to reflect program development and incorporate stakeholder feedback.	None	N/A	N/A
N/A		Incorporating language to address Design Acceptance Criteria (DAC)	None	N/A	