

APPENDIX F Construction Cross-Cutting ~~Components~~-Areas and Aspects

As part of the construction reactor oversight process (cROP), performance is monitored in three broad strategic performance areas: construction reactor safety; safeguards programs; and operational readiness. To measure construction performance, the cROP focuses on six specific cornerstones: design/engineering; procurement/fabrication; construction/installation; inspection/testing; operational programs; and security programs for construction inspection and operations.

In addition to the cornerstones, the cROP features ~~two-three~~ cross-cutting areas. Cross-cutting areas contain fundamental performance attributes that extend across all of the cROP cornerstones of safety. These ~~cross-cutting~~ areas are named Human Performance (H), Problem Identification and Resolution (P), ~~Baseline Inspection Program (A) and~~ Safety Conscious Work Environment (BS).

~~Within the cross-cutting areas are cross-cutting components that are directly related to one of the cross-cutting areas. The cross-cutting components are: Decision Making (A.1), Resources (A.2), Work Control (A.3), Work Practices (A.4), Corrective Action Program (A.5), Construction Experience (A.6), Self and Independent Assessments (A.7), Accountability (A.8), Environment for Raising Concerns (B.1), and Preventing, Detecting, and Mitigating Perceptions of Retaliation (B.2).~~

Within the cross-cutting ~~components~~-areas are cross-cutting aspects, which are ~~a set of aspects of performance related to that cross-cutting area and characteristics that~~ can be a causal factor of a finding. ~~The cross-cutting aspects are listed below. The NRC assigns cross-cutting aspects to inspection findings in accordance with Section 08.03c and Appendix B of this Inspection Manual Chapter.~~ Usually, there is only one principal cause of a finding. Inspectors are not expected to perform independent causal evaluation of findings beyond what would be appropriate for the significance of the issue. Inspectors are required to evaluate each finding to determine if the principal cause of the finding can be associated with one of the cross-cutting aspects. When the principal cause of a finding is similar to a cross-cutting aspect, that cross-cutting aspect should be assigned to the finding. Inspectors are not expected to document a cross-cutting aspect for each and every inspection finding. Most, but not all, findings should be assigned a cross-cutting aspect.

~~The NRC reviews cross-cutting aspects for cross-cutting themes and potential substantive cross-cutting issues in accordance with IMC 2505, "Periodic Assessment of Construction Inspection Program Results," to provide licensees the opportunity to address performance issues before they result in more significant safety concerns. Although the presence of cross-cutting aspects or the assignment of a substantive cross-cutting issue may be indicative of a potentially degraded safety culture, the NRC draws conclusions about safety culture based on the results of licensee and NRC safety culture assessments conducted by qualified staff, not based on the presence of cross-cutting aspects or substantive cross-cutting issues.~~

~~The "Supplemental Cross-Cutting Aspects" listed in the tables below are not applied to inspection findings under the baseline inspection program. However, these aspects are indicators of a healthy safety culture and should be considered for safety culture assessments~~

performed or reviewed during supplemental inspections. While they are important characteristics of safety culture, some attributes from NUREG 2165 are not included as cross-cutting aspects and are considered to be outside the scope of the construction inspection program.

Cross-cutting areas, ~~components~~, and aspects are listed in the tables below. When an inspector determines that a cross-cutting aspect applies to a finding, the alpha-numeric identifier associated with the selected cross-cutting aspect listed below shall be included in the inspection report (e.g., Human Performance, Resources would be identified as H.1.) ~~Baseline Inspection, Decision Making, Systematic Process would be identified as A.1.(a)).~~

NUREG 2165 describes the essential traits of a healthy nuclear safety culture. NUREG 2165 is based on the common language that was agreed to during a January 2013 public workshop and was documented in the enclosure to the meeting summary (ADAMS Accession No. ML13031A343). Selected attributes have been incorporated into this IMC to establish common terms for both the NRC and the nuclear industry. The cross-cutting aspects listed below are defined consistent with the attributes in the common language document. In deciding which aspect is most appropriate to assign to a performance deficiency, inspectors may refer to the attribute examples provided in the NUREG and/or meeting summary.

Exhibit 1 provides a cross-reference from the original cross-cutting aspects to the new cross-cutting aspects resulting from the common language initiative. The common language attributes are subsets of the following traits:

- Leadership Safety Values and Actions (LA)
- Problem Identification and Resolution (PI)
- Personal Accountability (PA)
- Work Processes (WP)
- Continuous Learning (CL)
- Environment for Raising Concerns (RC)
- Effective Safety Communication (CO)
- Respectful Work Environment (WE)
- Questioning Attitude (QA)
- Decision Making (DM)

Human Performance

H.1	Resources: Leaders ensure that personnel, equipment, procedures, and other resources are available and adequate to ensure the plant is constructed using a quality process in accordance with the design.
H.2	Field Presence: The organization ensures supervisory and management oversight of work activities, including contractors, such that construction quality is supported. Deviations from standards and expectations are corrected promptly. Senior managers ensure supervisory and management oversight of work activities, including contractors and supplemental personnel.
H.3	Change Management: Leaders use a systematic process for planning, coordinating, and evaluating major changes in the construction environment. When deviations from design or specifications are needed or recognized, the condition is promptly brought to the attention of the design authority. The condition is then carefully evaluated and is addressed through a formal design-change process before personnel proceed, thereby minimizing the potential for rework or nonconformance with the COL.
H.4	Teamwork: Communication and coordination is maintained among on-site vendors, contractors, licensee personnel, and site support staff including transitory personnel, within and across organizational boundaries. The impact of the work on different job activities and the need for work groups to maintain interfaces with offsite organizations is assessed to assure quality construction.
H.5	Work Management: The organization implements a process of planning, controlling, and executing construction activities such that quality construction is supported. Considerations include: <ul style="list-style-type: none"> • The potential to impact quality (CAQ/SCAQ); • Job site conditions, including environmental conditions which may impact human performance; previously/concurrently built structures, systems, and components; human-system interface; or radiological safety; • Abort criteria to prevent inadvertent equipment damage, either to equipment being operated or connected systems; • The impact of changes to the work scope or other planned construction activities and work environment conditions (lighting, energy sources, etc.) that may affect work activities; and • The need to keep personnel apprised of construction work status that may affect work activities.
H.6	Design Margins: Design margins of as-built systems, structures, and components are carefully guarded and changed only through a systematic and rigorous process.
H.7	Documentation: The organization creates and maintains complete, accurate and up-to-date design documentation (including field drawings), procedures, and work packages, and correct labeling of components.
H.8	Procedure Adherence: The organization defines and effectively communicates expectations regarding procedural compliance. Individuals follow processes, procedures and work instructions.
H.9	Training: The organization provides training and ensures knowledge transfer to ensure technical competency and reinforces that nuclear safety and construction quality is of the highest priority.

	The organization ensures that contractor and licensee personnel have the necessary training and qualifications. Management ensures individuals maintain their professional and technical knowledge, skills, and abilities. The organization ensures adequate knowledge transfer from contract personnel to licensee personnel ensuring technical competency once the contract work is completed.
H.10	Bases for Decisions: The organization communicates decisions and the basis for decisions, in a timely manner, to personnel who have a need to know the information in order to perform work properly.
H.11	Challenge the Unknown: Individuals stop when faced with uncertain conditions. Risks are evaluated and managed before proceeding.
H.12	Avoid Complacency: Individuals recognize and plan for the possibility of mistakes, latent issues and inherent risk, even while expecting successful outcomes. Individuals implement appropriate error reduction tools, such as holding pre-job briefings, self and peer checking, and proper documentation of activities. These techniques are used commensurate with the potential to impact construction quality for the assigned task, such that work activities are performed in a quality manner with appropriate attention to detail. Personnel are fit for duty.
H.13	Consistent Process: Individuals use a consistent, systematic approach to make decisions. The organization makes decisions related to construction quality that reflect the potential to impact ITAAC closure or impact already closed ITAAC using a systematic process to ensure construction quality is maintained. Authority and roles for evaluating these decisions are formally defined and communicated to applicable personnel including contractors and subcontractors. Interdisciplinary input and review are attained on decisions that relate to more than one discipline.
H.14	Conservative Bias: Individuals use decision-making practices that emphasize prudent choices over those that are simply allowable. The organization uses conservative assumptions in decision-making and adopts a requirement to demonstrate that the proposed construction activity does not adversely impact construction quality or ITAAC closure.

Problem Identification and Resolution

<u>P.1</u>	Identification: The organization implements a corrective action program with a low threshold for identifying issues. Individuals identify issues completely, accurately, and in a timely manner in accordance with the program.
P.2	Evaluation: The organization thoroughly evaluates issues to ensure that resolutions address causes and extent of conditions commensurate with their impact on construction quality. Classifying of events should include review for impact to ITAAC conclusions or reliability assumptions used in the plant-specific Design Reliability Assurance Program (DRAP).
P.3	Resolution: The organization takes effective corrective actions to address issues in a timely manner commensurate with their impact on construction quality.
P.4	Trending: The organization periodically analyzes information from the corrective action program and other assessments in the aggregate to identify programmatic and common cause issues. The organization communicates the results of the trending to applicable personnel (licensee personnel, contractors, subcontractors, and vendors).

P.5	Construction Experience: The organization systematically and effectively collects, evaluates, and implements relevant internal and external construction experience in a timely manner.
P.6	Self-Assessment: The organization routinely conducts self-critical and objective assessments of its programs and practices.

Safety Conscious Work Environment

S.1	SCWE Policy: The organization effectively implements a policy that supports individuals rights and responsibilities to raise safety concerns or concerns about construction quality, and does not tolerate harassment, intimidation, retaliation, or discrimination for doing so.
S.2	Alternate Process for Raising Concerns: The organization effectively implements a process for raising and resolving concerns that is independent of line management influence. Safety or construction quality issues may be raised in confidence and are resolved in a timely and effective manner.
S.3	Free Flow of Information: Individuals communicate openly and candidly, up, down, and across the organization and with oversight, audit, and regulatory organizations.

Supplemental Cross-Cutting Aspects

Supplemental cross-cutting aspects are not applied to inspection findings under the baseline inspection program. However, these aspects are indicators of a healthy safety culture and should be considered for safety culture assessments performed or reviewed during supplemental inspections.

X.1	Incentives, Sanctions, and Rewards: Leaders ensure incentives, sanctions, and rewards are aligned with nuclear safety and construction quality policies and reinforce behaviors and outcomes that reflect safety as the overriding priority.
X.2	Strategic Commitment to Safety: Leaders ensure plant priorities are aligned to reflect nuclear safety and construction quality as the overriding priorities.
X.3	Roles, Responsibilities, and Authorities: Leaders clearly define roles, responsibilities, and authorities to ensure nuclear safety and construction quality.
X.4	Constant Examination: Leaders ensure that nuclear safety and construction quality are constantly scrutinized through a variety of monitoring techniques, including assessments of nuclear safety culture.
X.5	Leader Behaviors: Leaders exhibit behaviors that set the standard for safety and construction quality.
X.6	Standards: Individuals understand the importance of adherence to nuclear safety and construction quality standards. All levels of the organization exercise accountability for shortfalls in meeting standards.
X.7	Job Ownership: Individuals understand and demonstrate personal responsibility for the behaviors and work practices that support nuclear safety and construction quality.
X.8	Benchmarking: The organization learns from other organizations to continuously improve knowledge, skills, and safety performance.
X.9	Work Process Communications: Individuals incorporate safety and construction

	quality communications in work activities.
X.10	Expectations: Leaders frequently communicate and reinforce the expectation that nuclear safety and construction quality are the organization's overriding priorities.
X.11	Challenge Assumptions: Individuals challenge assumptions and offer opposing views when they think something is not correct.
X.12	Accountability for Decisions: Single-point accountability is maintained for nuclear safety and construction quality decisions.

~~A. Baseline Inspection~~

~~1. Decision Making—Licensee decisions demonstrate that construction quality is an overriding priority. Specifically (as applicable):~~

- ~~(a) The licensee makes decisions related to construction quality that reflect the potential to impact ITAAC (closure or affect on already closed ITAAC) using a systematic process to ensure construction quality is maintained. Authority and roles for evaluating these decisions are formally defined and communicated to applicable personnel including contractors and subcontractors.~~

~~Interdisciplinary input and review are attained on decisions that relate to more than one discipline.~~

~~Management uses a systematic process for planning, coordinating, and evaluating major changes in the construction environment. When deviations from design or specifications are needed or recognized, the condition is promptly brought to the attention of the design authority. The condition is then carefully evaluated and is addressed through a formal design change process before personnel proceed, thereby minimizing the potential for rework or nonconformance with the COL.~~

- ~~(b) The licensee uses conservative assumptions in decision making and adopts a requirement to demonstrate that the proposed construction activity does not adversely impact construction quality or ITAAC closure. The licensee conducts effectiveness reviews (e.g. self assessments or audits) of these decisions to verify the validity of the underlying assumptions, identify possible unintended consequences, and determine how to improve future decisions.~~

~~For example, when making decisions related to testing, individuals ensure that they are on the correct unit and question the validity of their underlying assumptions, identify possible unintended consequences, and obtain appropriate management involvement and/or interdisciplinary input and reviews.~~

- ~~(c) The licensee communicates decisions and the basis for decisions, in a timely manner, to personnel who have a need to know the information in~~

order to perform work properly.

~~2. Resources—The licensee ensures that personnel, equipment, procedures, and other resources are available and adequate to assure construction quality. Specifically, those necessary for:~~

~~(a) Sufficient number of qualified personnel available to ensure the plant is constructed using a quality process in accordance with the design.~~

~~Training is developed and implemented to ensure technical competency and reinforces that safety significant construction quality is of the highest priority. The licensee ensures that contractor and licensee staffs have the necessary training and qualifications. Management ensures individuals maintain their professional and technical knowledge, skills, and abilities. The licensee ensures adequate knowledge transfer from contract personnel to licensee personnel ensuring technical competency once the contract work is completed.~~

~~(b) Complete, accurate and up-to-date design documentation (field drawings), procedures, and work packages, and correct labeling of components.~~

~~(c) Adequate and available facilities and equipment, including temporary construction structures.~~

~~3. Work Control—The licensee plans and coordinates work activities, consistent with ensuring construction quality. Specifically (as applicable):~~

~~(a) The licensee appropriately plans construction activities by addressing:~~

- ~~• The potential to impact quality (CAQ/SCAQ)~~
- ~~• Job site conditions, including environmental conditions which may impact human performance; previously/concurrently built structures, systems, and components; human-system interface; or radiological safety; and~~
- ~~• Abort criteria to prevent inadvertent equipment damage, either to equipment being operated or connected systems~~

~~(b) The licensee appropriately coordinates work activities by incorporating actions to address:~~

- ~~• The impact of changes to the work scope or other planned construction activities and work environment conditions (lighting, energy sources, etc.) that may affect work activities,~~

- ~~The impact of the work on different job activities, and the need for work groups to maintain interfaces with offsite organizations, and communicate, coordinate, and cooperate with each other during activities in which interdepartmental or multiple vendor coordination is necessary to assure quality construction,~~
 - ~~Communication and coordination is maintained among on-site vendors, contractors, licensee personnel, and site support staff including transitory personnel.~~
 - ~~The need to keep personnel apprised of construction work status that may affect work activities.~~
4. ~~Work Practices—Personnel work practices support human performance. Specifically (as applicable): (a) The licensee communicates human error prevention techniques, such as holding pre job briefings, self and peer checking, and proper documentation of activities. These techniques are used commensurate with the potential to impact construction quality for the assigned task, such that work activities are performed in a quality manner with appropriate attention to detail.~~
- ~~Personnel are fit for duty. In addition, personnel do not proceed in the face of uncertainty or unexpected circumstances (maintain a questioning attitude).~~
- (b) ~~The licensee defines and effectively communicates expectations regarding procedural compliance and personnel follow procedures and work instructions.~~
- (c) ~~The licensee ensures supervisory and management oversight of work activities, including contractors, such that construction quality is supported.~~
5. ~~Corrective Action Program—The licensee ensures that issues potentially impacting construction quality are promptly identified, fully evaluated, and that actions are taken to address construction quality concerns in a timely manner, commensurate with their significance. Specifically (as applicable):~~
- (a) ~~The licensee implements a corrective action program with a defined threshold for identifying issues. The licensee identifies such issues completely, accurately, and in a timely manner commensurate with their impact on construction quality.~~
- (b) ~~The licensee periodically trends and assesses information from the CAP and other assessments in the aggregate to identify programmatic and common cause problems. The licensee communicates the results of the trending to applicable personnel (licensee personnel, contractors, subcontractors, and vendors).~~
- (c) ~~The licensee thoroughly evaluates problems such that the resolutions~~

~~address causes and extent of conditions, as necessary including properly classifying conditions adverse to quality. This also includes, for significant problems, conducting effectiveness reviews of corrective actions to ensure that the problems are resolved. Classifying of events should include review for impact to ITAAC conclusions or reliability assumptions used in the plant specific Design Reliability Assurance Program (DRAP).~~

~~(d) The licensee takes appropriate corrective actions to address construction quality issues and adverse trends in a timely manner, commensurate with their significance (CAQ/SCAQ), complexity, and ability to impact ongoing construction activities.~~

~~(e) If an alternative process (i.e., a process for raising concerns that is an alternate to the licensee's corrective action program or line management) for raising construction quality concerns exists, then it results in appropriate and timely resolutions of identified problems.~~

~~6. Construction Experience – The licensee uses construction experience (Con E) information, including vendor recommendations and internally generated lessons learned, to ensure construction quality. Specifically (as applicable):~~

~~(a) The licensee systematically collects, evaluates, and communicates to affected internal stakeholders in a timely manner relevant internal and external Con E.~~

~~(b) The licensee implements and institutionalizes Con E through changes to construction processes, procedures, materials, and training programs.~~

~~7. Self and Independent Assessments – The licensee conducts self and independent assessments of their activities and practices, as appropriate, to assess performance and identify areas for improvement. Specifically (as applicable):~~

~~(a) The licensee conducts self assessments at an appropriate frequency; such assessments are of sufficient depth, are comprehensive, are appropriately objective, and are self-critical. The licensee periodically assesses the effectiveness of oversight groups and programs such as GAP and policies.~~

~~(b) The licensee tracks and trends safety and construction quality indicators (performance goals), which provide an accurate representation of performance.~~

~~(c) The licensee coordinates and communicates results from assessments to affected personnel, and takes corrective actions to address issues commensurate with their significance.~~

~~8. Accountability – Management defines the line of authority and responsibility for construction quality. Specifically (as applicable):~~

- ~~(a) — Accountability is maintained for significant quality assurance decisions in that the system of rewards and sanctions is aligned with construction quality and reinforces behaviors and outcomes, which reflect construction quality as an overriding priority.~~
- ~~(b) — Management communicates and reinforces quality assurance standards and displays behaviors that reflect construction quality as an overriding priority.~~
- ~~(c) — The workforce demonstrates a proper construction quality focus and reinforces quality assurance principles among their peers.~~

~~B. — Safety Conscious Work Environment~~

- ~~1. — Environment for Raising Concerns — An environment exists in which employees feel free to raise concerns both to their management and/or the NRC without fear of retaliation and employees are encouraged to raise such concerns. Specifically (as applicable):~~
 - ~~(a) — Behaviors and interactions of licensee personnel, contractors, subcontractors, and vendors encourage free flow of information related to raising construction quality concerns, differing professional opinions, and identifying issues in the CAP and through self-assessments. Such behaviors include supervisors responding to employee safety concerns in an open, honest, and non-defensive manner and providing complete, accurate, and forthright information to oversight, audit, and regulatory organizations. Past behaviors, actions, or interactions that may reasonably discourage the raising of such issues are actively mitigated. As a result, personnel freely and openly communicate in a clear manner conditions or behaviors, such as fitness for duty issues that may impact quality and personnel raise construction quality issues without fear of retaliation.~~
 - ~~(b) — If an alternative processes (i.e., a process for raising concerns or resolving differing professional opinions that are alternates to the licensee's corrective action program or line management) for raising concerns or resolving differing professional opinions exists, then they are communicated, accessible, have an option to raise issues in confidence, and are independent, in the sense that the program does not report to line management (i.e., those who would in the normal course of activities be responsible for addressing the issue raised).~~
- ~~2. — Preventing, Detecting, and Mitigating Perceptions of Retaliation — A policy for prohibiting harassment and retaliation for raising safety significant construction quality concerns exists and is consistently enforced in that:~~
 - ~~(a) — All personnel are effectively trained that harassment and retaliation for raising safety significant construction quality (i.e. nuclear safety related) concerns is a violation of law and policy and will not be tolerated.~~

- ~~(b) — Claims of discrimination are investigated consistent with the content of the regulations regarding employee protection and any necessary corrective actions are taken in a timely manner, including actions to mitigate any potential chilling effect on others due to the personnel action under investigation.~~
- ~~(c) — The potential chilling effects of disciplinary actions and other potentially adverse personnel actions (e.g., reductions, outsourcing, and reorganizations) are considered and compensatory actions are taken when appropriate.~~

Exhibit 1 – Cross Reference from Original Cross-Cutting Aspects to New Cross-Cutting Aspects

Old Aspect	New Aspect
A.1.a	H.3 or H.13*
A.1.b	H.14
A.1.c	H.10
A.2.a	H.1 or H.9*
A.2.b	H.7
A.2.c	H.1
A.3.a	H.5
A.3.b	H.4 or H.5*
A.4.a	H.11 or H.12*
A.4.b	H.8
A.4.c	H.2
A.5.a	P.1
A.5.b	P.4
A.5.c	P.2
A.5.d	P.3
A.5.e	S.2
A.6.a	P.5
A.6.b	P.5
A.7.a	P.6
A.7.b	P.6
A.7.c	P.3
A.8.a	X.1
A.8.b	X.10
A.8.c	X.6
B.1.a	S.1 or S.3*
B.1.b	S.2
B.2.a	S.1
B.2.b	S.1
B.2.c	S.1

* If reassigning an old cross-cutting aspect that has two potential new cross-cutting aspect designations, chose the new cross-cutting aspect that most accurately represents the principal cause of the finding.

END

ATTACHMENT 1 - Revision History for IMC 0613

Field Code

Commitment Tracking Number	Accession Number Issue Date Change Notice	Description of Change	Description of Training Required and Completion Date	Comment and Feedback Resolution Accession Number
N/A	ML112991558 12/21/2011 CN 11-042	Issued to support cROP Pilot	N/A	
N/A	ML12292A062 12/19/12 CN 12-029	Complete rewrite of IMC 0613 and to incorporate feedback received through IMC/IP change process	N/A	ML12292A064
N/A	ML13150A150 07/15/13 CN 13-015	Complete rewrite of IMC 0613 to support full implementation of cROP enforcement and assessment programs	N/A	ML13168A539
		Revised Appendix F to incorporate new cross-cutting aspects as part of the common safety culture language initiative. Also changed wording in the body of the IMC to be consistent with the new Appendix F, and corrected typographical errors.		

Field Code