NRC Advanced Reactor Construction Oversight Program (ARCOP)

Presentation ADAMS Accession #: ML25226A119

Welcome

Jonathan Greives, Director

Division of Advanced Reactors and Non-power Production and Utilization Facilities (DANU)

Office of Nuclear Reactor Regulation (NRR)

ARCOP Workshop #6

Advanced Reactor Construction Oversight DRAFT Guidance

DRAFT INSPECTION MANUAL CHAPTERS (IMCs)

ARCOP Workshop #6
NRC Staff

UNITED STATES NUCLEAR REGULATORY COMMISSION

Phil O'Bryan
Senior Reactor Operations Engineer
Division of Advanced Reactors and NPUFs (DANU)
Office of Nuclear Reactor Regulation (NRR)

Telephone: 301-415-0266
Email: phil.obryan@nrc.gov

UNITED STATES NUCLEAR REGULATORY COMMISSION

Lou McKown
Chief, Engineering Branch 3
Division of Operating Reactor Safety (DORS)
USNRC Region 2

Telephone: 404-997-4545
Email: louis.mckown@nrc.gov

UNITED STATES NUCLEAR REGULATORY COMMISSION

Chris Welch
Senior Reactor Operations Engineer
Division of Advanced Reactors and NPUFs (DANU)
Office of Nuclear Reactor Regulation (NRR)

Telephone: 301-415-0959
Email: christopher.welch@nrc.gov

Workshop #6 Agenda

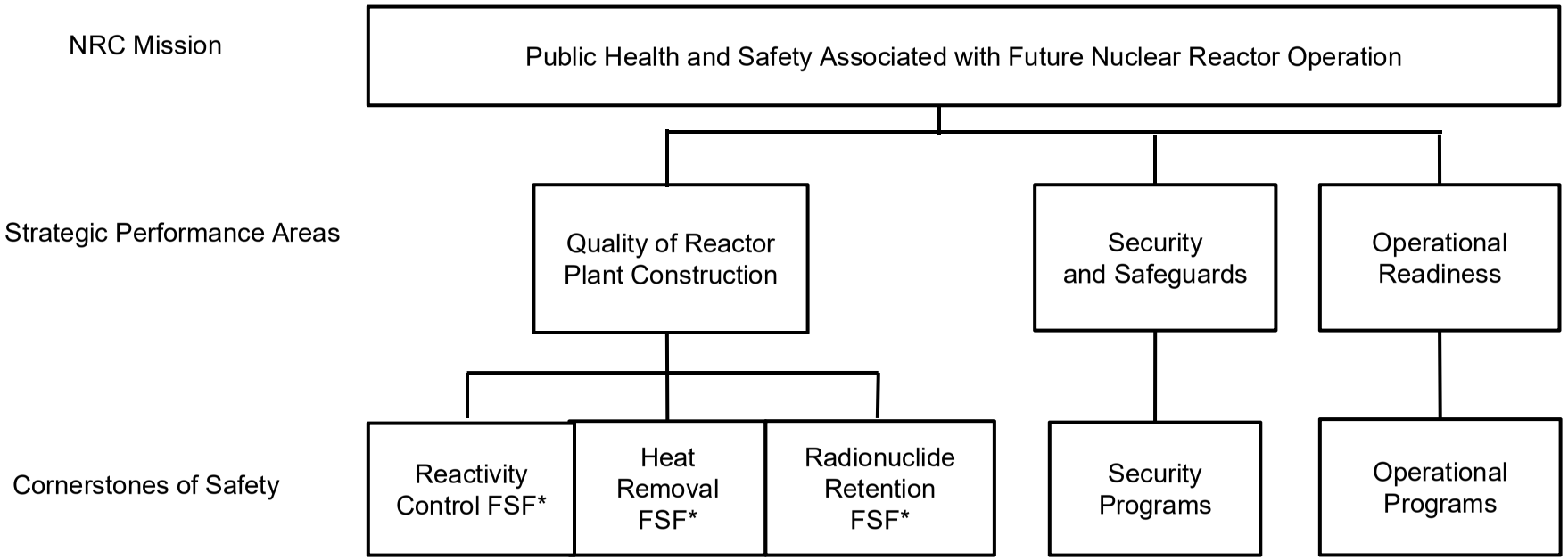
1. Recap of Previous Workshops

2. Draft Inspection Manual Chapter Content

Previous Workshops

- Session 1: Introduction to ARCOP, and the ARCOP Framework (2/28/24 & 3/20/24) (ML24078A063)
- Session 2: Inspection Scoping (4/3/24) (ML24123A214)
- Session 3: Enforcement and Significance Determination Process (SDP) (5/22/24) (ML24177A120)
- Session 4: Assessment (7/17/24) (ML24227B033)
- Session 5: Quality Assurance Program (QAP) Programmatic Inspections and Assessing Safety Culture (12/10/24) (ML25002A037)

ARCOP Framework



*Fundamental Safety Function (FSF)

Draft ARCOP IMCs

- IMC 2570, ARCOP Basis Document ML25210A583
- IMC 2571, DISPOSITIONING ADVANCED POWER REACTOR CONSTRUCTION NONCOMPLIANCES ML25210A579
- IMC 2572, ASSESSMENT PROGRAM FOR ADVANCED REACTOR CONSTRUCTION PROJECTS ML25210A580
- IMC 2573, INSPECTION OF THE ADVANCED POWER REACTOR QUALITY OF REACTOR PLANT CONSTRUCTION STRATEGIC PERFORMANCE AREA ML25210A581
- IMC 2574, INSPECTION OF THE ADVANCED POWER REACTOR OPERATIONAL READINESS STRATEGIC PERFORMANCE AREA ML25210A582

Draft ARCOP IMCs

- IMC 2570, ARCOP Basis Document
- IMC 2571, DISPOSITIONING ADVANCED POWER REACTOR CONSTRUCTION NONCOMPLIANCES
- IMC 2572, ASSESSMENT PROGRAM FOR ADVANCED REACTOR CONSTRUCTION PROJECTS
- IMC 2573, INSPECTION OF THE ADVANCED POWER REACTOR QUALITY OF REACTOR PLANT CONSTRUCTION STRATEGIC PERFORMANCE AREA
- IMC 2574, INSPECTION OF THE ADVANCED POWER REACTOR OPERATIONAL READINESS STRATEGIC PERFORMANCE AREA

IMC 2570 Contents

- Defines ARCOP terms
- Provides short history of NRC advanced reactor activities
- Describes the ARCOP framework
- Describes the elements of NRC Oversight (Performance Monitoring, Dispositioning Noncompliances, Performance Assessment)

IMC 2570 Contents

New NRC oversight terms used in ARCOP include:

1. Advanced Reactor – includes all microreactors, small module reactors, and large LWRs with advanced or inherent safety features (e.g., AP-1000).

2. Project Vendor – a non-licensed facility that fabricates nearly complete reactor plants, or significant parts of safety-significant system modules.

3. Audit – a program review (operational or security) prior to its implementation. Note: a program review after its implementation is an inspection.

4. Inspection Scoping Matrix – Defines the baseline inspection scope for each construction project.

IMC 2570 Contents

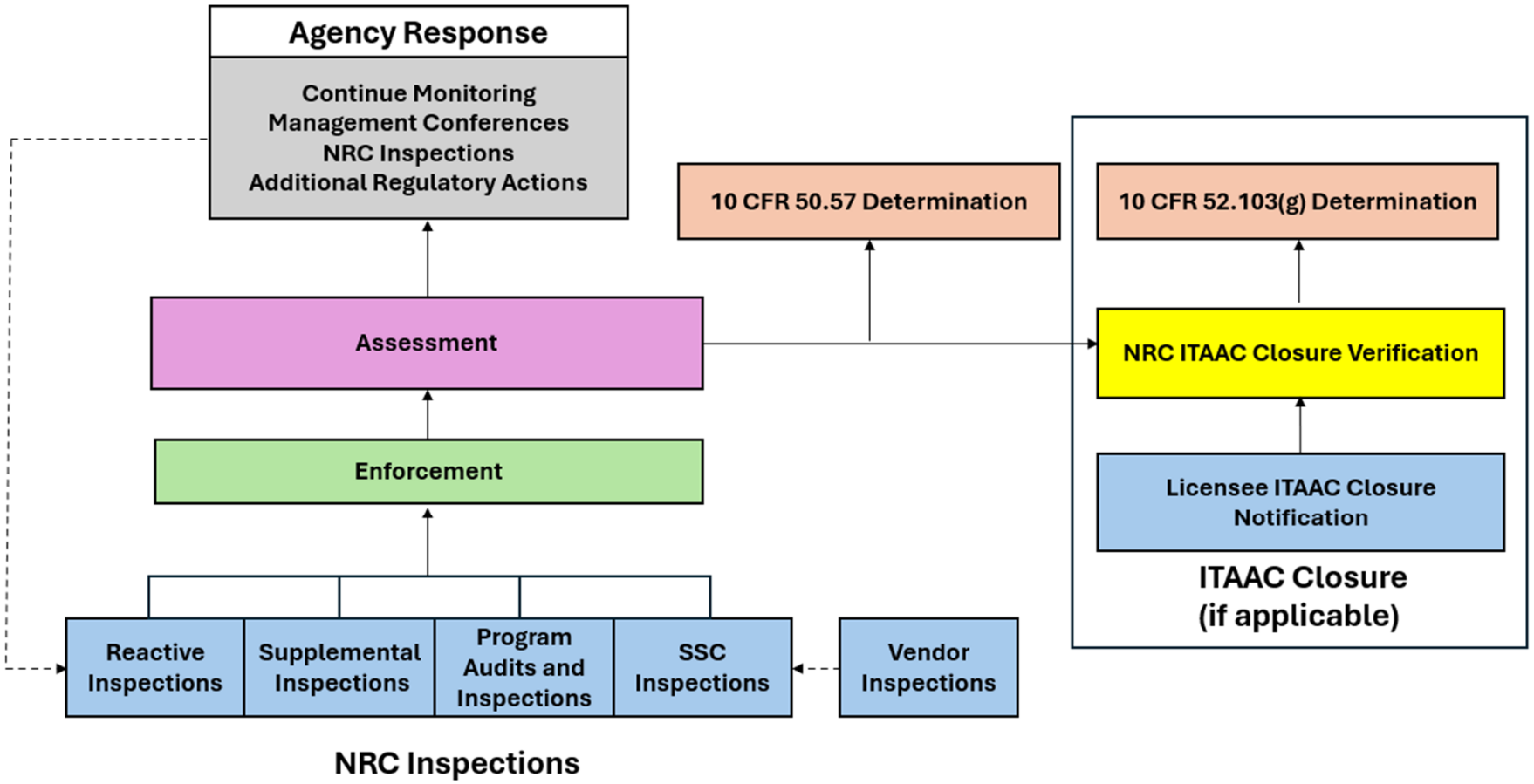
New ARCOP Definitions (con't):

5. QAP Backstop – a planned activity meant to detect deficiencies associated with a finding.

6. Self-identified Construction Noncompliance (SCN) – self-identified noncompliances that are corrected (or in process of correction) per the QAP procedures without NRC intervention.

7. Finding Response Table – a table that determines NRC actions and expected licensee actions for NRC enforcement actions.

IMC 2570 Contents – ARCOP Overview



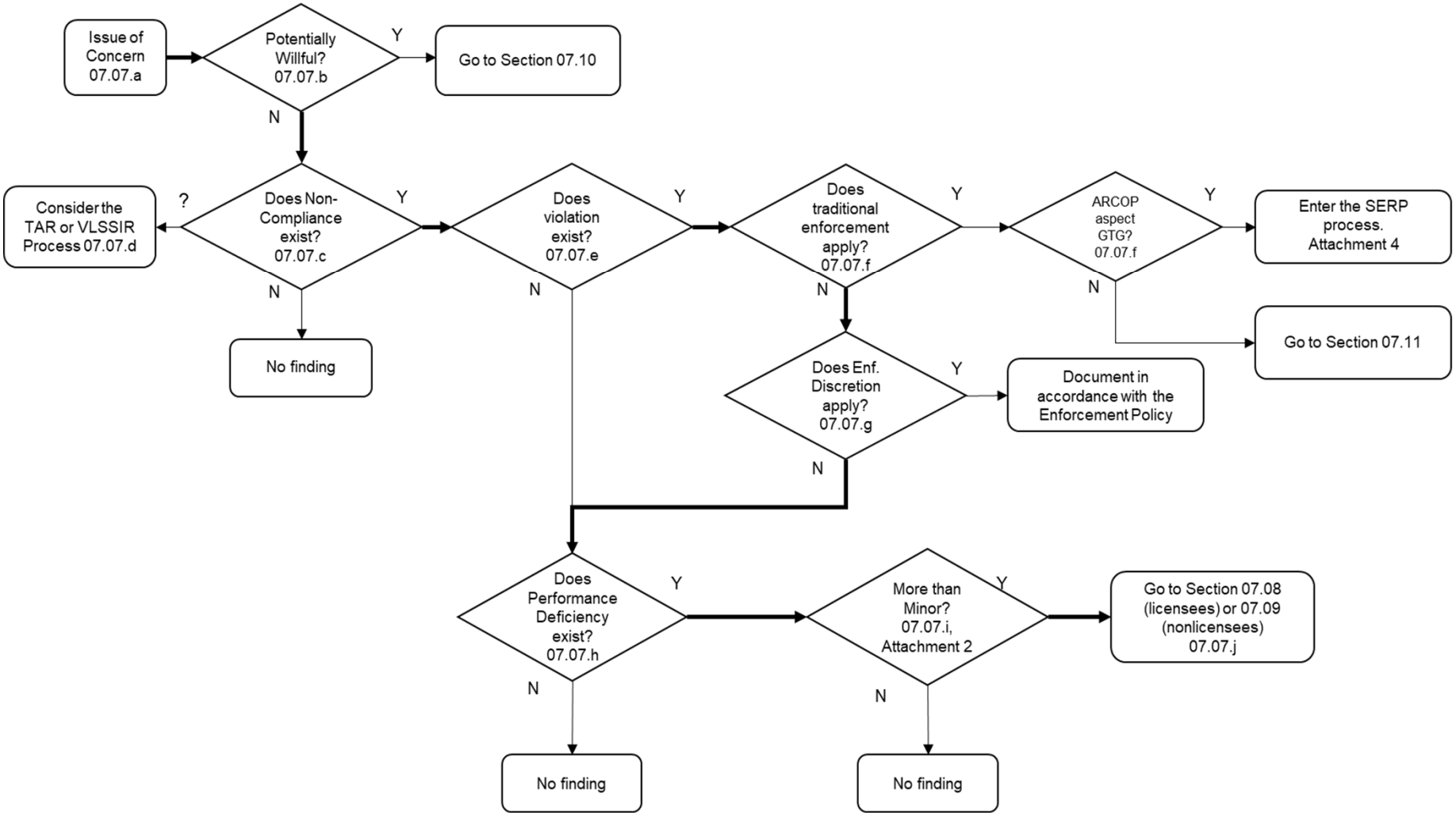
IMC Contents

- IMC 2570, ARCOP Basis Document
- IMC 2571, DISPOSITIONING ADVANCED POWER REACTOR CONSTRUCTION NONCOMPLIANCES
- IMC 2572, ASSESSMENT PROGRAM FOR ADVANCED REACTOR CONSTRUCTION PROJECTS
- IMC 2573, INSPECTION OF THE ADVANCED POWER REACTOR QUALITY OF REACTOR PLANT CONSTRUCTION STRATEGIC PERFORMANCE AREA
- IMC 2574, INSPECTION OF THE ADVANCED POWER REACTOR OPERATIONAL READINESS STRATEGIC PERFORMANCE AREA

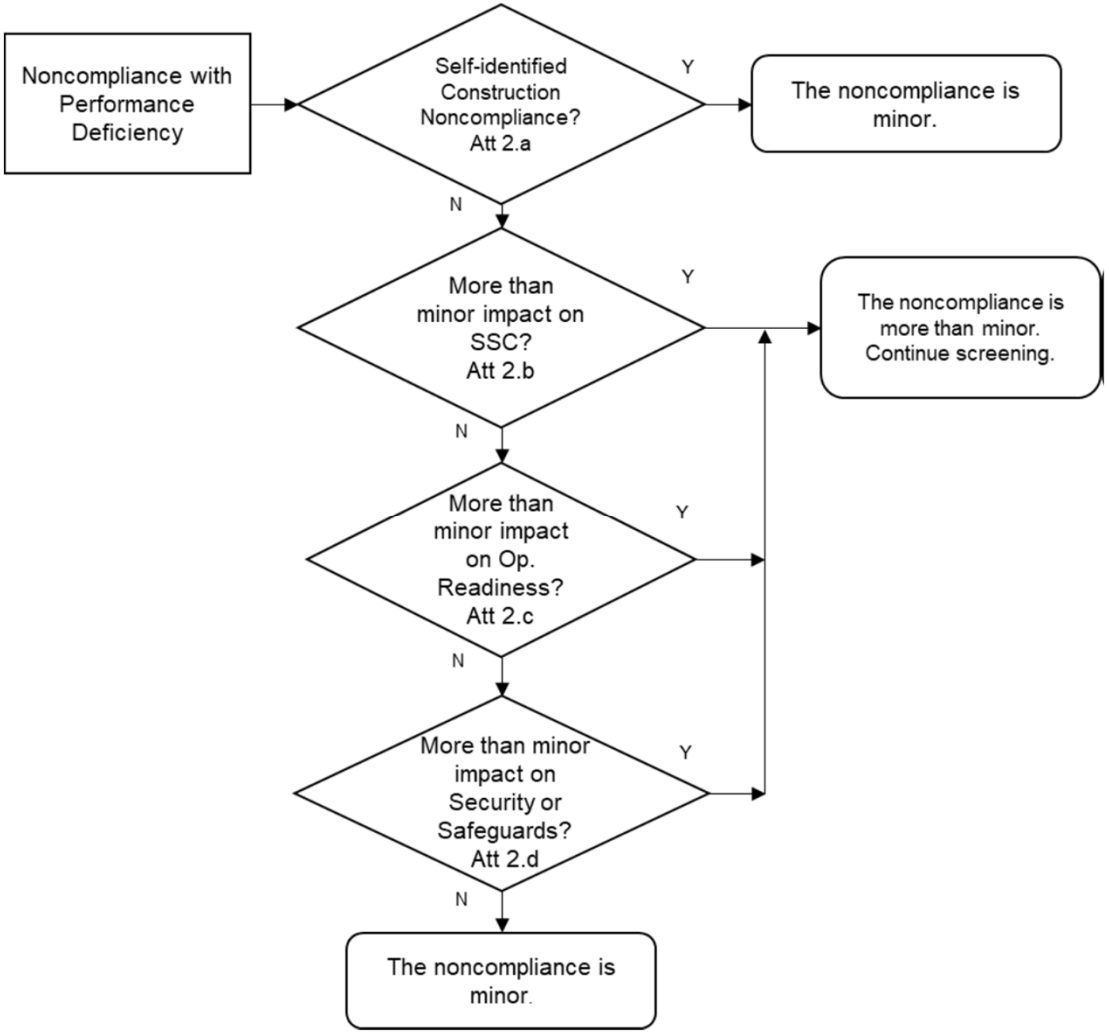
IMC 2571 Contents

- Initial screening of Noncompliances
- Minor/MTM Criteria
- Significance Determination Process
- Guidance for use of different enforcement mechanisms (i.e., finding dispositioning)
- Significance and Enforcement Review Panel (SERP) guidance

IMC 2571 – Initial Screening



IMC 2571 – Minor/MTM Criteria



IMC 2571 – Minor/MTM Criteria for SSCs

1. Does the noncompliance prevent a safety-significant SSC from performing its safety-significant function or make its functionality indeterminate?

2. Does the noncompliance prevent meeting an ITAAC acceptance criterion, and does the noncompliance prevent a safety-significant SSC from performing its safety-significant function, or make its functionality indeterminate?

3. Does the noncompliance invalidate the results of an Inspection, Test, or Analysis described in an ITAAC? (this applies to previously completed ITAAC)

IMC 2571 - ARCOP SSC Finding Significance Determination

Yellow	The finding, if left uncorrected, would result in the inability to fulfill multiple FSFs[1]. Or The finding's significance cannot be adequately screened using other criteria in this table and has screened as Yellow using Attachment 6[2].
White	The finding, if left uncorrected, would result in the inability to fulfill one FSF[1] Or The finding's significance cannot be adequately screened using other criteria in this table and has screened as White using Attachment 6[2].
Green	a. The finding, if left uncorrected, would result in the loss of safety-significant functions of one or more SSCs, but all FSFs are fulfilled; or b. the finding is associated with an issue where no manufacture, fabrication, placement, erection, installation, or modification of hardware associated with the SSC has begun; or c. There is a quality assurance program (QAP) backstop[3] for the deficiency associated with the finding; or d. the finding is associated with a hazard protection feature[4] only; or e. The finding's significance cannot be adequately screened using other criteria in this table and has screened as Green using Attachment 6[2]

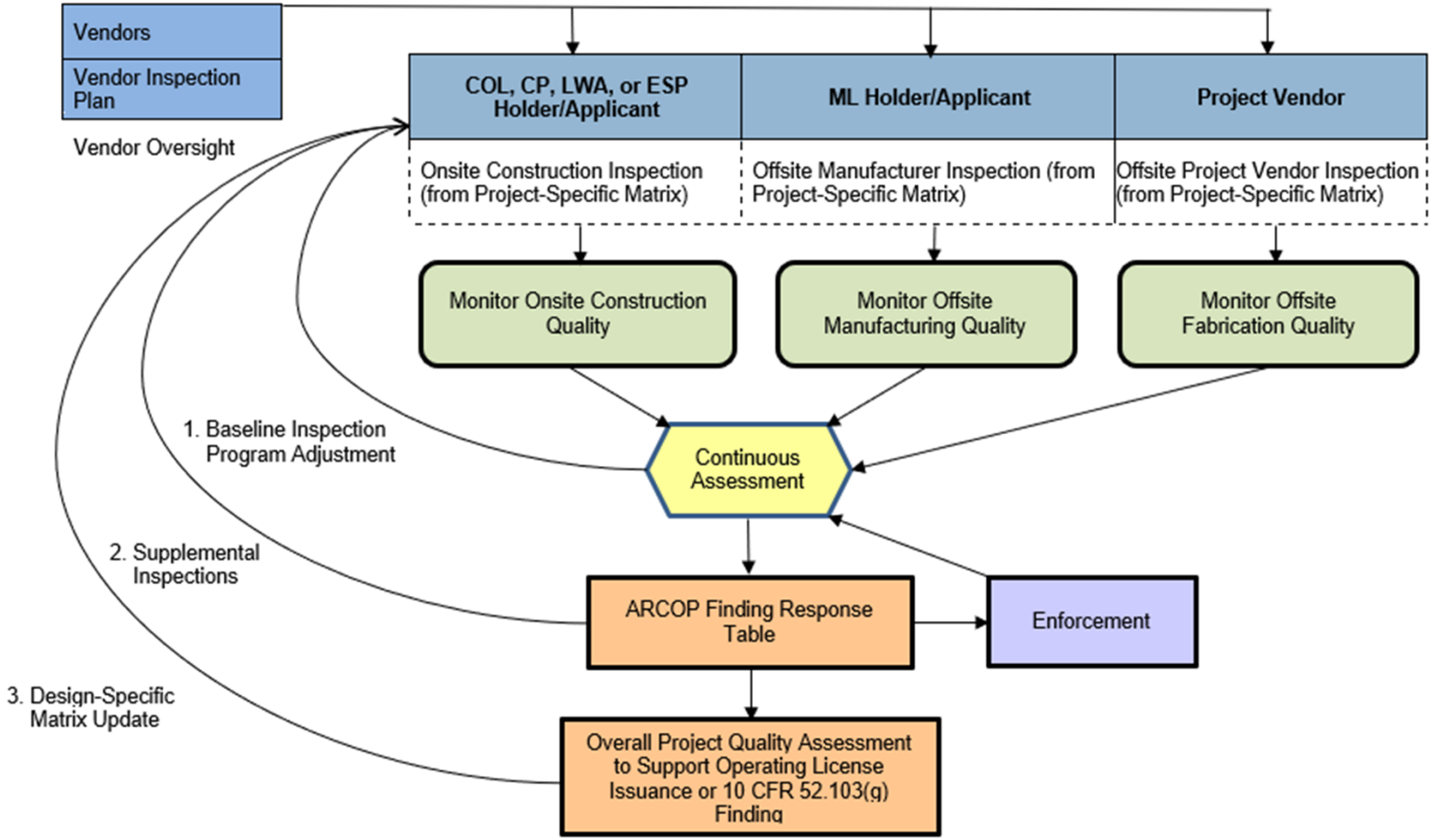
IMC Contents

- IMC 2570, ARCOP Basis Document
- IMC 2571, DISPOSITIONING ADVANCED POWER REACTOR CONSTRUCTION NONCOMPLIANCES
- IMC 2572, ASSESSMENT PROGRAM FOR ADVANCED REACTOR CONSTRUCTION PROJECTS
- IMC 2573, INSPECTION OF THE ADVANCED POWER REACTOR QUALITY OF REACTOR PLANT CONSTRUCTION STRATEGIC PERFORMANCE AREA
- IMC 2574, INSPECTION OF THE ADVANCED POWER REACTOR OPERATIONAL READINESS STRATEGIC PERFORMANCE AREA

IMC 2572 Contents

- 3 types of ARCOP assessments
  1. Continuous assessment
  2. Escalated enforcement finding assessment
  3. Final assessment prior to operations

ARCOP Assessment



Finding Response Table

RESULTS		GREEN INSPECTION FINDING	WHITE INSPECTION FINDING	YELLOW INSPECTION FINDING
RESPONSE APPLIED TO EACH FINDING	Regulatory Engagement Meeting	None	Branch chief or division director	Regional Administrator or designee meets with senior management
	Recipient Response	Corrective Action Program	Causal evaluation and corrective actions	
	NRC Response	Baseline Inspection	Supplemental Inspection Evaluation for additional baseline inspection(s) in area(s) of concern	
COMMUNICATIONS	Inspection Report Posted on Public Website	Branch Chief review and signature	Division Director review and signature	Regional Administrator review and signature

IMC Contents

- IMC 2570, ARCOP Basis Document
- IMC 2571, DISPOSITIONING ADVANCED POWER REACTOR CONSTRUCTION NONCOMPLIANCES
- IMC 2572, ASSESSMENT PROGRAM FOR ADVANCED REACTOR CONSTRUCTION PROJECTS
- IMC 2573, INSPECTION OF THE ADVANCED POWER REACTOR QUALITY OF REACTOR PLANT CONSTRUCTION STRATEGIC PERFORMANCE AREA
- IMC 2574, INSPECTION OF THE ADVANCED POWER REACTOR OPERATIONAL READINESS STRATEGIC PERFORMANCE AREA

IMC 2573 Contents

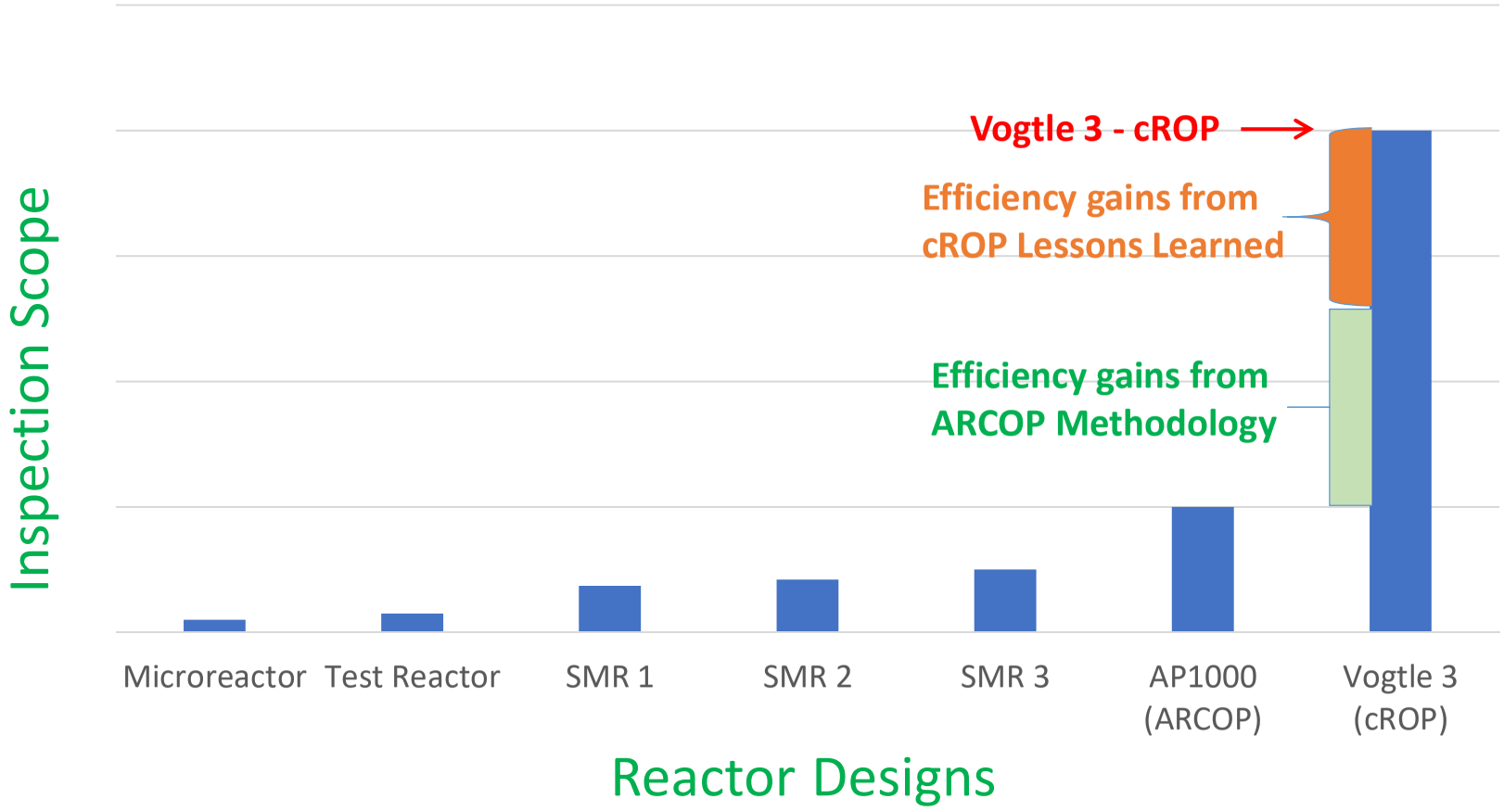
- Guidance for developing design-specific and project-specific scoping baseline inspections.
- Nth-of-a-kind (NOAK) vs. first-of-a-kind (FOAK) reactor inspection scoping

IMC 2573 Contents

Generic Design-Specific Matrix

SSC(s)	Fundamental Safety Function[1]	Design Risk Characterization (RI_D)		Construction Risk Characterization (RI_C)		Reactor Plant System	Safety Class[2]	Individual Columns for each Inspection Area applicable to the Adv. Reactor Design[3],						Location Factory (F) Site (S) Both (FS)
	(RC) (HR) (RR)	(H) (M) (L)	Basis	(H) (M) (L)	Basis									
INSPECTION PROCEDURES[4] 75001 and 75001.XX														
MINIMUM INSPECTION SAMPLES[5]														
MAXIMUM INSPECTION SAMPLES[5]														

ARCOP Inspection Scope Scalability



IMC 2573 Inspection Scope Scalability - NOAK

Onsite Construction Considerations (FOAK to NOAK)

- Unit specific baseline inspection program adjustments will be made based on oversight experience.

- Adjustments will be implemented via the project-specific scoping matrix.

Manufacturer Considerations (FOAK to NOAK)

- Project specific inspection scoping adjustments will be made via project-specific scoping matrix for first units.

- Time-based inspection baseline will be implemented when manufacturer demonstrates consistent quality.

Discussion

IMC Contents

- IMC 2570, ARCOP Basis Document
- IMC 2571, DISPOSITIONING ADVANCED POWER REACTOR CONSTRUCTION NONCOMPLIANCES
- IMC 2572, ASSESSMENT PROGRAM FOR ADVANCED REACTOR CONSTRUCTION PROJECTS
- IMC 2573, INSPECTION OF THE ADVANCED POWER REACTOR QUALITY OF REACTOR PLANT CONSTRUCTION STRATEGIC PERFORMANCE AREA
- IMC 2574, INSPECTION OF THE ADVANCED POWER REACTOR OPERATIONAL READINESS STRATEGIC PERFORMANCE AREA

IMC 2574 - Content

- Discusses Program Audits vs. Program Inspections under ARCOP
- Provides guidance for developing site-specific operational readiness inspection and audit plans.
- Describes RIPB program audit and inspection scoping.

IMC 2574 - Content

ARCOP Program Audits vs. Program Inspections

Audits:
- NRC reviews of programs prior to the program implementation.
- NRC enforcement does not apply to audits.
- Audit reports will contain observations.
- Failure to address significant weaknesses identified in audits may impact a project's transition to operations.

Inspections:
- NRC reviews of programs after program implementation.
- NRC enforcement applies.
- Inspection reports may contain violations.
- Significant violations may impact a project's transition to operations until they are resolved/closed.

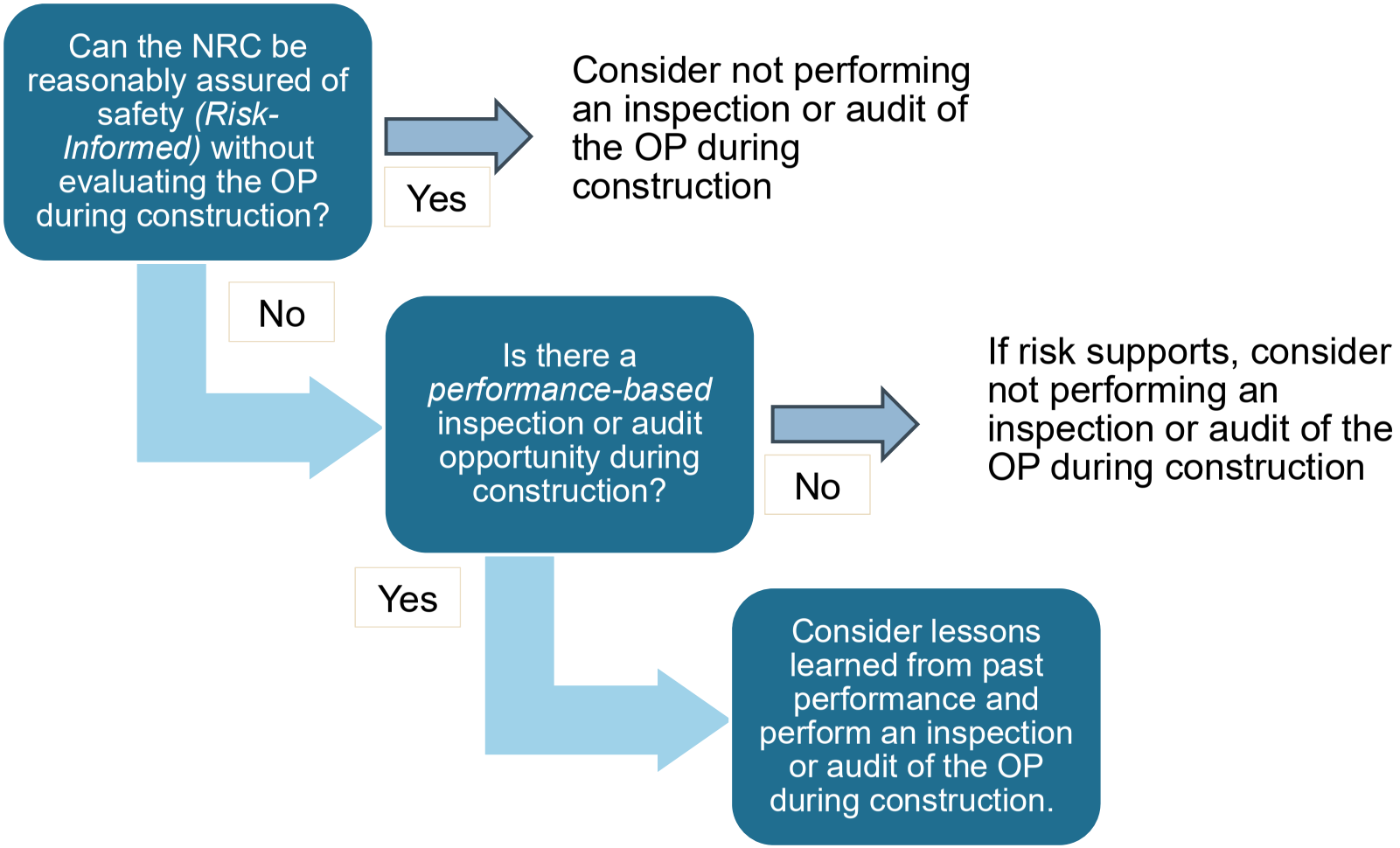
Operational Program Oversight Efficiency Gains

1. Elimination of redundant inspections – SSC qualification programs will be inspected as part of regular SSC "vertical slice" inspections.

   Examples: PSI/ISI, PST/IST, EQ, RV material surveillance, CLRT, MOV

2. RIPB scoping methodology for other programs.

Operational Program Inspection and Audit Scoping



Future IMC 2203 Advanced Reactor Security Program Oversight

Project-Specific Scoping

Licensing basis serves as the foundation for audits and inspections to ensure they align with regulatory requirements (Part 50, 52, or 53) and commitments established during the licensing process.

Risk-Informed

Audit and inspection samples are reviewed based on security significance to focus resources on areas that pose greatest potential risk to public health and safety, and to identify where additional resources may be warranted.

Performance-Based

Inspectors have flexibility to adjust sample size based on performance. Co-located units and fleetwide programs will have the opportunity to also receive credit for samples and flexibility to adjust audit size based on performance.

Path Forward

- Finalize IMCs 2570 thru 2574 and associated IPs.
- Finalize IMC 2203, “Security Inspection Program for Advanced Power Reactor Construction.”
- Develop ARCOP IMC for inspection report content (in progress in conjunction with AIMS development)
- Develop ARCOP inspection procedures (in progress).
- Continue to coordinate with current applicants to develop project-specific inspection scoping.

Discussion

End of Workshop

Points of Contact

Jon Greives, Director
Office of Nuclear Reactor Regulation (NRR)
Division of Advanced Reactors and Non-Power Production and Utilization Facilities (DANU)
Jonathan.Greives@NRC.GOV

Mike Wentzel, Chief
NRR/DANU/Advanced Reactor Policy Branch (UARP)
Michael.Wentzel@NRC.GOV

Phil O'Bryan, ARCOP Project Lead Engineer
NRR/DANU/UARP
Phil.OBryan@NRC.GOV