NRC INSPECTION MANUAL

INSPECTION MANUAL CHAPTER 1245 APPENDIX C9

SENIOR REACTOR ANALYST TRAINING AND
QUALIFICATION PROGRAM

Effective Date: 06/14/2023

CONTENTS

INTRODUCTION

The Senior Reactor Analyst (SRA) Training and Qualification Program is an advanced study leading to certification as SRA. Individuals must complete the formal training courses, the individual study activities (ISAs), the on-the-job activities (OJTs), and the required rotations prior to certification unless certain of these activities are exempted due to prior experience and or training. Upon completion of the required program elements, an SRA Qualification Board must be convened to verify that the qualifying individual has gained an acceptable level of knowledge and experience to be certified as SRA.

It is expected that individuals entering the SRA program will have extensive reactor inspection experience and be currently qualified or previously qualified reactor inspectors. If the individual is not a qualified reactor inspector, inspector qualification may be worked in parallel with SRA qualification activities, but emphasis should be placed on qualifying as an inspector initially. In all cases, SRAs must qualify, and remain qualified as an NRC Reactor Operations Inspector.

An individual who has been selected to a GG-15 SRA position will receive a temporary promotion to GG-15. They must complete the SRA training outlined in this attachment within 2 years of the GG-15 temporary promotion date. If an individual does not complete the rotational and training requirements set forth in this Appendix within 2 years, the temporary promotion may be revoked. Extension of the 2-year period is allowed, but the extension must be coordinated and approved by the individual's management. In addition, the Office of Human Resources must be notified of the extension.

PREREQUISITES

Individuals should complete either the PWR or BWR technology full series prior to taking the required PRA training courses. For individuals who are not qualified reactor inspectors, basic inspector qualification should be completed prior to taking any of the PRA related training courses.

To the extent possible, the following ISAs should be completed prior to beginning the PRA course work.

ISA-SRA-A	Building Your SRA Reference Library
ISA-SRA-B	Review of PRA Principles and Regulatory Guidance for SRAs
ISA-SRA-C	Review of Historical NRC Severe Accident Risk Evaluations and the Methodologies Used in the Analyses
ISA-SRA-D	Understanding How Full Scope PRA Models Were Developed

All ISAs associated with OJT activities must be completed before the OJT is performed.

REQUIRED TRAINING COURSES

The required course work listed below may be completed in parallel with ISA-SRA-1 through ISA-SRA-14. In the event an individual is entering the SRA training and qualification program but has already completed all or a portion of the courses listed below, an assessment should be performed by the individual and his or her management to determine if any previously completed courses need to be retaken or reviewed due to an excessive length of time (i.e., more than 3 years) since the courses were taken. This assessment should be documented and included within the individual's readiness for SRA certification. The required courses are listed below.

1. Bayesian Inference in Risk Assessment (P-102)
2. System Modeling Techniques Course for PRA (P-200)
3. Human Reliability Assessment Course (P-203)
4. Risk Assessment in Event Evaluation Course (P-302)
5. PRA Technology and Regulatory Perspective (P-111)
6. SAPHIRE Course (P-201)
7. Advanced SAPHIRE Course (P-202)
8. External Events (P-204)
9. Accident Progression Analysis (P-300) or Perspectives on Reactor Safety (R-800)

REQUIRED ROTATIONAL ASSIGNMENTS

The SRA training and qualification program requires two rotational assignments. The first is a 2-month rotation to the PRA Oversight Branch (APOB) of NRR with time spent in the corresponding branch in the Office of Nuclear Regulatory Research, as determined to be necessary. The second is a 2-month rotation to a Regional Office. The preferred, but not required, order is that the HQ rotation be done first and then the regional rotation. Regional and headquarters management should appropriately allocate the time spent in each organization based on current events and the needs of the qualifying employee. To the extent possible, these rotations should be accomplished over 8 consecutive weeks each with minimal interruption. The qualifying SRA should not normally schedule training classes during the HQ rotation. During the rotations, qualifying individuals are encouraged to work on issues specific to the needs of the rotational assignment. Individuals should not work on assignments that are not specific to meeting the objectives of the rotation. The regional rotation assignment may not be to the individual's home region, if applicable, and the selection of the particular region must be coordinated with regional management. When selecting which region for the rotation, consideration should be given to the overall needs of the NRC and as much as possible and the selection of the rotations should be evenly distributed among all regions between qualifying SRAs. At the conclusion of each rotation, performance appraisal feedback should be forwarded to the individual's supervision. The rotation to APOB does not apply to SRAs assigned to that branch.

EQUIVALENCY JUSTIFICATION

Equivalency justification for the regional rotation is not permitted. Other program requirements including the APOB rotation, individual study activities, formal course work, and on-the-job training activities are assessed on a case-by-case basis. When approving an equivalency justification, careful consideration should be given to the length of time that has passed since the individual has previously completed the training or the experience gained from previous work history.

REVIEW OF COMPLETED TRAINING

Individual study activities, on-the-job activities, and rotational assignments must be discussed with a qualified SRA designated by the individual's supervisor. It is recommended that the qualifying individual determine who will be the reviewer of completed work as early in the qualification process as possible.

DOCUMENTATION

Documentation of completed training is recorded on the Signature and Certification Card Form. Equivalency justification for formal training courses, individual study activities, and on-the-job activities is recorded on the Equivalency Justification Form.

Qualifying individuals are encouraged to maintain records of specific tasks (e.g., completion of a Phase 3 analysis) performed that are required by the ISAs or OJTs. This documentation may prove beneficial when the individual is preparing for the qualification board.

QUALIFICATION BOARD

The SRA Qualification Board will consist of a minimum of three members, two of which will be currently qualified and active SRAs. The board chair will be a Division Director or higher in the region and a Branch Chief or higher in NRR. The board chairman cannot be the individual's immediate supervisor. Whenever practical, the individual's immediate supervisor is encouraged to observe the board proceedings.

The qualifying individual should submit a package to the Qualification Board members documenting the work completed during the training and qualification program. Upon review of the completed work, the Qualification Board chairman may provide specific direction to the individual of any actions needed to prepare for the board appearance. It is the responsibility of the qualifying individual and his or her management to select board members and to schedule the board.

Board members will review significant work products completed during the training and developmental activities. The purpose of this review is to inform the board on the extent and depth of the analytical work the individual performed and to provide the board the opportunity to explore the benefits gained from those activities.

Since qualification boards are held in every region, as well as HQ, it is important to ensure the consistency and equity of the oral certification examination administered. To accomplish this goal, the following criteria should be examined:

1. understanding of the SRA's roles, responsibilities, and interfaces;
2. knowledge of probabilistic risk analysis principles and techniques;
3. ability to effectively communicate risk information; and
4. knowledge of agency processes for which risk insights are used.

Once the qualifying individual has completed the board review, the board chairman will initiate a memorandum to the individual's management informing them of the results. In the event an individual is determined by the board to lack knowledge in a particular area(s), the board should develop a remedial strategy to address the area(s) of concern.

SRA CERTIFICATE

At the successful completion of the SRA candidate's board, the Qualification Board chairman will submit a memorandum (see example) to the Director of NRR to notify senior management of the candidate's accomplishment. The Chief of the Reactor Assessment Branch (IRAB) in the Division of Reactor Oversight (DRO) will be notified in order to prepare a formal certificate for the qualifying SRA to be signed by the Director, NRR. The SRA certificate is obtained by submitting a graphics service request. In addition, the Office of Human Resources must be notified to make permanent the SRA's promotion to GG-15.

Sample Memorandum

Date, yyyy

MEMORANDUM TO: __________________, Director
Office of Nuclear Reactor Regulation

FROM: _______________, Division Director
Division of Reactor Oversight
Office of Nuclear Reactor Regulation

SUBJECT: SENIOR REACTOR ANALYST QUALIFICATION FOR _____________

On [Date], a Senior Reactor Analyst (SRA) qualification board, of which I was chairman, was conducted for [Name of Candidate]. The other board members were [Name of Board Member] from [Region or Office] and [Name of Board Member] from [Region or Office]. [Name of Candidate] had completed the SRA training required by IMC 1245, Appendix C-9, "Senior Reactor Analyst Training and Qualification Program" and based on the results of the qualification board, the board concluded that [Name of Candidate] demonstrated the required knowledge to successfully perform the duties of an SRA.

Please join me in congratulating [Name of Candidate] in this significant accomplishment.

cc:

TrainingSupport.Resource@nrc.gov
[SRA], DRO/IRAB

Sequence for SRA Qualification Program

Prerequisites

Complete the following ISAs:
ISA-SRA-A Building Your SRA Reference Library
ISA-SRA-B Review of PRA Principles and NRC Approach to Risk-Informed and Performance-Based Regulation
ISA-SRA-C Review of Historical NRC Severe Accident Risk Evaluations and the Methodologies used in the Analyses
ISA-SRA-D Understanding How Full Scope PRA Models Were Developed

Course work and ISAs can be completed concurrently provided all prerequisites have been met. On-the-job tasks must be completed during NRR/APOB or Regional Office Rotations.

Courses

Full Series - Both BWR and PWR
P-102 Bayesian Inference in Risk Assessment
P-200 Modeling Techniques
P-203 Human Reliability Analysis
P-302 Risk Assessment in Event Evaluation
P-111 PRA Technology and Regulatory Perspective
P-201 SAPHIRE
P-202 Advanced SAPHIRE
P-204 External Events
P-300 Accident Progression Analysis or R-800 Perspectives on Reactor Safety

Individual Study Activities

(ISA-SRA-1)	Significance Determination Process and Its Basis
(ISA-SRA-2)	Limitations of Licensee PRAs
(ISA-SRA-3)	PRA Quality Initiative
(ISA-SRA-4)	IPEEE Lessons Learned
(ISA-SRA-5)	Understanding How EPRI Documents are Used by Licensees
(ISA-SRA-6)	Overview of Shutdown Risk
(ISA-SRA-7)	Emergency Operating Procedure Guidance
(ISA-SRA-8)	Management Directive 8.3, "NRC Incident Investigation Program"
(ISA-SRA-9)	Understanding the Development of Accident Sequence Precursor (ASP) Results
(ISA-SRA-10)	The Role of the SRA in the NOED Process
(ISA-SRA-11)	Conducting a Phase 3 Analysis
(ISA-SRA-12)	The Role of the SRA in Inspection Planning
(ISA-SRA-13)	Large Early Release Frequency (LERF)

Rotations

ROT-SRA-1 Rotation to NRR/APOB
ROT-SRA-2 Rotation to Regional Office

On-the-Job Tasks

OJT-SRA-1 Perform an Independent Review of a SDP/Enforcement Review Panel (SERP) Package
OJT-SRA-2 Conduct a Phase 3 Analysis Rotational Assignment to Regional Office
OJT-SRA-3 MD 8.3, "NRC Incident Investigation Program"
OJT-SRA-4 Perform a NOED Risk Review

Qualification Board
Full SRA Qualification

Senior Reactor Analyst Individual Study Activities

(ISA-SRA-A) SRA Reference Library

PURPOSE:

An SRA is expected to have a general knowledge of the topics addressed in various references available for his/her use. Several internal web pages have been developed to provide easy access to these references and tools, such as NUREGs, Regulatory Guides, SDP Phase 2 Notebooks and Pre-solved Worksheets, and the Risk Assessment Standardization Project (RASP) Handbook and toolbox. The SRA should build a library of the documents most frequently used or referenced. The documents most frequently use are listed here and in the other individual study activities of this qualification manual.

COMPETENCY AREA: TECHNICAL AREA EXPERTISE

LEVEL OF EFFORT: 8 hours

REFERENCES:

1. See List at end of this activity

2. Internal Web Pages -
RASP Toolbox: https://drupal.nrc.gov/res/25866
PRA Related References: https://drupal.nrc.gov/res/25866
NRR Division of Risk Assessment PRA Oversight Branch SharePoint site:
https://usnrc.sharepoint.com/teams/NRR-PRA-Oversight-Branch

EVALUATION CRITERIA:

Application of the specific regulatory guidance references should be studied or reviewed to the extent required to satisfactorily address each of the ISAs contained in this training and qualification manual.

TASKS:

1. Review the references listed for this and the other activities.

2. Meet with a qualified SRA to discuss any questions that you have as a result of this activity and demonstrate that you can meet the evaluation criteria listed above.

DOCUMENTATION: SRA Proficiency Level Qualification Signature Card Item ISA-SRA-A

REFERENCES

CATEGORY A: Documents for which detailed knowledge is required

Regulatory Guides

RG-1.160 "Monitoring the Effectiveness of Maintenance in Nuclear Power Plants" (Current Revision)

RG-1.174 "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions of Plant-Specific Changes to the Licensing Basis" (Current Revision)

RG-1.200 "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities" (Current Revision)

NUREGS

NUREG-1449 "Shutdown and Low Power Operations at Commercial Power Plants"

NUREG-1605 "Risk Profile Methodology of Plant Configurations and Pilot Applications Lessons Learned"

NUREG-1765 "Basis Document for Large Early Release Frequency (LERF) and the Significance Determination Process (SDP)"

NUREG-1855, Vol. 1 "Guidance on the Treatment of Uncertainties Associated with PRAs in Risk-Informed Decision Making"

NUREG/CR-5485 "Guidelines on Modeling Common Cause Failures in Probabilistic Assessment"

NUREG/CR-6883 "The SPAR-H Human Reliability Analysis Method"

NUREG/CR-6928 "Industry-Average Performance for Components and Initiating Events at U.S. Commercial Nuclear Power Plants"

NRC Generic Letters

GL 88-20 & supplements "Individual Plant Examination for Severe Accident Vulnerabilities"

Federal Register Notices

Federal Register, 8/8/85, "Policy Statement on Severe Reactor Accidents regarding Future Designs and Existing Plants"

Federal Register, 8/21/86, "Safety Goals for the Operations of Nuclear Power Plants: Policy Statement"

Federal Register, 8/16/95	"Use of Probabilistic Risk Assessment Methods in Nuclear Regulatory Activities: Final Policy Statement"

Other Documents

Staff Requirements Memo for SECY 98-144, "White Paper on Risk-Informed and Performance-Based Regulation (Revised)"

Idaho National Engineering and Environmental Laboratory (INEEL/EXT-99-00041, January 1999) "Revision of the 1994 ASP HRA Methodology (Draft)"

CATEGORY B: Documents for which a general knowledge is required.

Regulatory Guides

RG-1.175	"An Approach for Plant-Specific, Risk-Informed Decision making: Inservice Testing" (Current Revision)
RG-1.176	"An Approach for Plant-Specific, Risk-Informed Decision making: Graded Quality Assurance" (Current Revision)
RG-1.177	"An Approach for Plant-Specific, Risk-Informed Decision making: Technical Specifications" (Current Revision)
RG-1.178	"An Approach for Plant-Specific, Risk-Informed Decision making: Inservice Inspection" (Current Revision)

NUREGS

NUREG-75/014	"Reactor Safety Study: An Assessment of Accident Risks in U.S. Commercial Nuclear Power Plants - Main Report (WASH 1400)"
NUREG-0492	"Fault Tree Handbook"
NUREG-1032	"Evaluation of Station Blackout Accidents at Nuclear Power Plants"
NUREG-1150	"U.S. Nuclear Regulatory Commission, Severe Accident Risks: An Assessment for Five U.S. Nuclear Power Plants" (Volumes 1 & 2)
NUREG 1407	"Procedural and Submittal Guidance for the Individual Plant Examination of External Events (IPEEE) for Severe Accident Vulnerabilities"
NUREG-1560	"IPE Program: Perspectives on Reactor Safety and Plant Performance" (3 Volumes)
NUREG-1570	"Risk Assessment of Severe Accident Induced Steam Generator Tube Rupture"
NUREG-1742	"Perspectives Gained from the IPEEE Program, Volumes 1 and 2"

NUREG/CR-4334 “An Approach to the Quantification of Seismic Margins in Nuclear Power Plants."

NUREG/CR-4482 "Recommendations to the Nuclear Regulatory Commission on Trial Guidelines for Seismic Margin Reviews of Nuclear Power Plants"

NUREG/CR-4550 “Analysis of Core Damage Frequency: Internal Events Methodology Vol 1

NUREG/CR-5500 “System Reliability Studies” in 11 volumes:
Vol 1 AFW; 1987 - 1995; INEEL/EXT-97-00740
Vol 2 Westinghouse RPS; 1984 - 1995 INEEL/EXT-97-00740
Vol 3 GE RPS; 1984 – 1995
Vol 4 HPCI; 1987 - 1993; INEEL 94/0158
Vol 5 EDG; 1987 -1993; INEEL 95/0035
Vol 6 Isolation Condenser; 1987 - 1993 INEEL 95/0478
Vol 7 RCIC; 1987 - 1993; INEEL 95/0196
Vol 8 HPCS; 1987 - 1993; INEEL 95/00133
Vol 9 HPSI; 1987 - 1997; INEEL 99/00373
Vol 10 CE RPS; 1984 - 1998; INEL/EXT 97-00740
Vol 11 B&W RPS; 1984 -1998; INEL/EXT-97-00740

NUREG/CR-5750 “Rates of Initiating Events at U.S. Nuclear Power Plants: 1987-1995"

NUREG/CR-6141 “Handbook of Methods for Risk Based Analyses of Technical Specifications”

NUREG-6265 “Multidisciplinary Framework for HRS with an Application of Errors of Commission and Dependencies”

NUREG/CR-6544 “A Methodology for Analyzing Precursors to Earthquake - Initiated and Fire-Initiated Accident Sequences”

NUREG/CR 6595 “An Approach for Estimating the Frequencies of Various Containment Failure Modes and Bypass Events”

NUREG/CR-6823 “Handbook of Parameter Estimation (HOPE) for Probabilistic Risk Assessment”

<u>NRC Information Notices</u>

IN 2000-13 “Review of Refueling Outage Risks”

<u>Other Documents</u>

EPRI TR-105396 “PSA Application Guide”

National Research Council - “Understanding Risk-Informing Decisions in a Democratic Society”

(ISA-SRA-B) Review of PRA Principles and NRC Approach to Risk-Informed and Performance-Based Regulation

PURPOSE:

SRAs must understand the risk terminologies and philosophies used by the NRC in the conduct of its regulatory activities. It is essential that an SRA be conversant with the common terms of risk communication and have a basic understanding of the NRC's approach to how risk should be integrated into the regulatory process.

COMPETENCY AREA: REGULATORY FRAMEWORK
TECHNICAL AREA EXPERTISE

LEVEL OF EFFORT: 40 hours

REFERENCES:

1. Inspection Manual Chapter (IMC) 0308 Attachment 3, Appendix K "Technical Basis for Maintenance Risk Assessment and Risk Management SDP"

2. IMC 0309, "Reactive Inspection Decision Basis for Reactors"

3. RG 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions of Plant-Specific Changes to the Licensing Basis"

4. Management Directive (MD) 8.3, "NRC Incident Investigation Program"

5. SRM for SECY 98-144, "White Paper on Risk-Informed and Performance-Based Regulation"

6. IMC 0326, "Operability Determinations"

7. EPRI TR-105396 "PSA Application Guide"
   Training Materials:

8. P-105 "PRA Basics for Regulatory Applications"

9. P-111 "PRA Technology and Regulatory Perspective"

EVALUATION CRITERIA:

You will demonstrate your understanding of the content of the Reference documents by successfully addressing each of the evaluation criteria.

1. Discuss the Quantitative Health Objectives (formerly known as probabilistic safety goals).

2. Discuss differences in deterministic and probabilistic approaches to regulation and nuclear safety.

3. Define terms that are used in both risk-informed and deterministic approaches to regulation.

4. Explain how risk-informed and defense-in-depth approaches can be integrated in a coherent manner.

5. Explain the difference between prescriptive and performance-based regulation.

6. Discuss the advantages of a risk-informed, performance-based approach to regulatory decision making.

7. Discuss the Commission Policy statement regarding expanding the use of PRA in regulatory matters in support of defense-in-depth and traditional engineering, to reduce unnecessary conservatism, support additional regulatory requirements, assist in regulatory decision making, and consider uncertainties in regulatory decisions.

8. Discuss the scope of Level 1, 2, 3 PRAs. Explain the purposes of IPEs and IPEEEs.

9. Discuss why PRA may not be used in determining operability of a Structure, System, or Component (SSC).

10. Discuss the principles of RG 1.174 and its application to risk-informed decision-making.

11. Discuss the risk metrics (e.g., CCDP, ICCDP, delta CDF, etc., as they relate to the various applications (e.g., maintenance rule, event assessment, SDP, etc.) of PRA in the Reactor Oversight Process.

TASKS:

1. Review the references listed for this activity.

2. Meet with a qualified SRA to discuss any questions that you have as a result of this activity and demonstrate that you can meet the evaluation criteria listed above.

DOCUMENTATION: SRA Proficiency Level Qualification Signature Card Item ISA-SRA-B

(ISA-SRA-C) Review of Historical NRC Severe Accident Risk Evaluations and the Methodologies Used in the Analyses

PURPOSE:

An SRA routinely conducts risk assessments using many different models and evaluation techniques. The purpose of this activity is to familiarize you with the methodologies and techniques used in developing NUREG-1150 and with the relative risks indicated for each of the reactor/containment types evaluated during the NUREG-1150 assessment.

COMPETENCY AREAS: TECHNICAL AREA EXPERTISE
INSPECTION

LEVEL OF EFFORT: 16 hours

REFERENCES:

1. NUREG-1150, Volumes 1 and 2, "Severe Accident Risks: An Assessment for Five U. S. Nuclear Power Plants"

2. NUREG/CR-4550, "Analysis of Core Damage Frequency: Internal Events Methodology"

EVALUATION CRITERIA:

1. Demonstrate a general knowledge of the Accident Sequence Evaluation Program methodology described in NUREG/CR-4550 by discussing the purpose and approach to completing each of the 12 tasks defined in the methodology.

2. Provide examples of risk insights provided by the NUREG-1150 assessment.

3. Distinguish between the reactor/containment types and the NUREG-1150 results for each type.

TASKS:

1. Review Figures A.1 through A.4 and associated text in NUREG-1150, Volume 2, Appendix A to gain a general overview of the methodology.

2. Read and understand the Executive Summary and Section 1.2 of NUREG/CR-4550.

3. Review and interpret each of the acronyms and initial-isms used in the Task 2 reading.

4. Read the executive summary of NUREG-1150.

5. Skim the analysis results for each of the plants (reactor/containment type). Pay attention to the risk insights gained and the differences between the types.

6. Meet with a qualified SRA to discuss any questions that you have as a result of this activity and demonstrate that you can meet the evaluation criteria listed above.

DOCUMENTATION: Senior Reactor Analyst Qualification Signature Card, Item ISA-SRA-C

(ISA-SRA-D) Understanding How Full Scope PRA Models Were Developed

PURPOSE:

This activity will introduce you to the licensee's full scope internal events PRA. As the licensee's risk evaluation program, it is important to understand the licensee's PRA and a how it was developed, and actions taken to maintain a "living" PRA. Although level 3 PRA studies are included within a full scope PRA, few level 3 PRA models exist. Therefore, this area of PRA should be familiar to SRAs but not emphasized.

This activity can be accomplished with ISA-SRA-2, Limitations of Licensee PRAs.

COMPETENCY AREAS: TECHNICAL AREA EXPERTISE
INSPECTION

LEVEL OF EFFORT: 16 hours

REFERENCES:

1. ASME RA-S-2002, April 5, 2002, "Standard for Probabilistic Risk Assessment for Nuclear Power Plant Applications"
2. RG 1.200, December 2003, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities"
3. Licensee-specific PRA for review.
4. NUMARC 93-01, Revision 4f, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants, April 2018"

EVALUATION CRITERIA:

At the completion of this activity, you should be able to:

1. Describe the basis of the PRA.
2. Describe the elements of a full scope PRA.
3. Be familiar with the content and format of a PRA.
4. Compare a PRA to Standardized Plant Analysis Risk (SPAR) model and associated documentation produced by Idaho National Laboratory (INL).

TASKS:

1. Review a full scope PRA and compare with a plant-specific SPAR model.

Select an appropriate full scope PRA and perform a review consistent with that described in Reference 1 and 2. The student should be familiar with all sections of the PRA, paying attention to the following areas:

- Overall results and insights
- Success criteria analysis
- System analysis
- Initiating event analysis
- Human reliability analysis
- Parameter estimation analysis
- Interpretation of results

2. Meet with a qualified SRA to discuss any questions that you have as a result of this activity and demonstrate that you can meet the evaluation criteria listed above.

DOCUMENTATION: Senior Reactor Analyst Qualification Signature Card, Item ISA-SRA-D

(ISA-SRA-1) Significance Determination Process and Its Basis

PURPOSE:

An SRA is expected to be an agency expert on the Significance Determination Process (SDP), particularly in the Reactor Safety Strategic Performance area. SRAs should also be familiar with SDPs for Radiation Safety and Security.

COMPENTENCY AREA: REGULATORY FRAMEWORK
TECHNICAL AREA EXPERTISE

LEVEL OF EFFORT: 80 hours in office review (additional time needed for specific tasks)

REFERENCES:

1. IMC 0609, “Significance Determination Process”
2. IMC 0308 Attachment 3, “Reactor Oversight Process (ROP) Basis Document”
3. IMC 0609 Attachment 01, “Significance Determination Process/Enforcement Review Panel Process”
4. IMC 0609 Attachment 03, “Senior Reactor Analyst and Risk Analyst Support Expectations”
5. IMC-609 Attachment 04, “SDP Phase 1–Initial Characterization of Findings”

EVALUATION CRITERIA:

At the completion of this activity, you should be able to:

1. Explain the role of the SRA in the SDP process, particularly in the development of inspection findings in Phases 1, 2, and 3 of the process. Explain the purpose of the SDP for achieving a “best estimate” of risk using best available information.
2. Explain the concept of concurrent inspection findings and be able to explain the basis for treatment of concurrent findings.
3. Describe the SERP process. Explain the role of the SRA in preliminary and final significance determinations.
4. Understand, explain and implement the risk-informed decision attributes that meet the minimum acceptable standards for the ROP (Refer to IMC 0609 Attachment 1, exhibit 2).
5. Compare and contrast the assessment of inspection findings versus the assessment of operational events or degraded conditions paying particular attention to the various risk metrics used (i.e., CCDP, CLERP, delta CDF, etc.).

6. Have a detailed working knowledge of IMC 0609 Attachment 04 and Appendices A, F, G, H, and M and be familiar with other Appendices (B, C, D, E, I, and J) that support the SDP process.

7. Understand the SDP workspace and Plant Risk Information eBook (PRIB) in sufficient depth to be able to use the guidance and explain to a non-risk analyst.

8. Discuss the limitations of current PRA technology regarding assessment of external event contribution to inspection findings.

9. Explain why a change in the core damage frequency versus conditional core damage probability was selected as a measure for evaluating the significance of an inspection finding.

TASKS:

Complete the following tasks:

1. Review the references for this activity. Thoroughly review IMC 0609, “Significance Determination Process,” including all attachments and appendices and IMC 0308, “Reactor Oversight Process (ROP) Basis Document,” Attachment 3.

2. Perform at least two SDP analyses using actual inspection findings. For each at-power finding, use the screening questions and SDP workspace in accordance with IMC 0609, Appendix A. In the event two assessments are not available, review previously completed findings independently of documented results.

3. Assist a qualified SRA in one training session of Phase 1 and 2 to inspectors or other qualifying individuals.

4. Assist inspectors during the planning phase of a team inspection by using a Plant Risk Information eBook (PRIB) from the site-specific SPAR model to identify potential inspection samples.

5. Meet with a qualified SRA to discuss any questions that you have as a result of this activity and demonstrate that you can meet the evaluation criteria listed above.

DOCUMENTATION: Senior Reactor Analyst Qualification Signature Checklist, Item ISA-SRA-1

(ISA-SRA-2) Limitations of Licensee PRAs

PURPOSE:

Significance Determination Process Phase 3 evaluations require an SRA to review licensee PRA information for applicability for consideration in the analysis. Also, at regulatory conferences the licensee routinely provides information derived from their PRA. To confirm the results of a SDP Phase 2 a licensee's PRA can be used. The risk input for all NOEDs that are reviewed by a SRA are from the licensee's PRA. Without an understanding of the licensee's PRA, it would be difficult for an SRA to make an informed judgment as to whether to include or reject the licensee's information.

COMPETENCY AREAS: TECHNICAL AREA EXPERTISE
INSPECTION

LEVEL OF EFFORT: 24 hours

REFERENCES:

1. Licensee's Event Trees from PRA
2. Licensee's Fault Trees from PRA
3. Licensee's Dominant Cut-sets (top 25 per initiating event and top 100 total)
4. Same information from SPAR model for that plant
5. Same information from another plant of similar design
6. Piping and Instrument Diagrams (P&IDs)
7. Licensee System Descriptions

EVALUATION CRITERIA:

At the completion of this activity, you should be able to:

1. Identify significant differences between PRAs of the same facility.

TASKS:

1. Select a particular system.
2. Read the system description

Compare the fault tree for that system to the P&ID to establish the logic is correct for the Top Gate, so that all common components between trains contain a common cause failure basic event and determine if any instrument failures can defeat a train and are included in the fault tree.

3. Compare Top Gate failure probability to that in SPAR and a companion facility. If off by a factor of 10, acquire cut-sets for the Top Gate and compare to understand why there are differences.

4. Review Initiating Event frequencies against SPAR for deviations of a magnitude.

5. Review the Event Trees against SPAR and the other plant for any logic differences.

6. Review cut-sets for selected accident sequences from the licensee's PRA, SPAR and the other plant. Understand what factor(s) make the results differ by an order magnitude, if any.

7. Understand how the licensee developed the RCP seal LOCA model (PWR) and the loss of all Service Water.

8. If possible, discuss identified differences with the licensee's PRA analyst.

9. Meet with a qualified SRA to discuss any questions that you have as a result of this activity and demonstrate that you can meet the evaluation criteria listed above.

DOCUMENTATION: Senior Reactor Analyst Qualification Signature Card, Item ISA-SRA-2

(ISA-SRA-3) PRA Quality Initiative

PURPOSE:

To familiarize the student with the industry standards for developing a quality PRA. Although each PRA is different, the PRA Quality Initiative will give the student an understanding of the basic structure of a PRA and the industry peer review process.

COMPETENCY AREAS: TECHNICAL AREA EXPERTISE
INSPECTION

LEVEL OF EFFORT: 16 hours

REFERENCES:

1. RG 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions of Plant-Specific Changes to the Licensing Basis"

2. ASME RA-S-2002, "Standard for Probabilistic Risk Assessment for Nuclear Power Plant Applications"

3. NEI 00-02, "Standard Peer Review Process for Internal Events PRAs"

4. RIS 2007-06, "Regulatory Guide 1.200 Implementation"

5. RG 1.200, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities"

6. USNRC, COMNJD-03-0002, "Stabilizing the PRA Quality Expectations and Requirements"

EVALUATION CRITERIA:

At the completion of this activity, you should be able to:

1. Summarize the NRC position on PRA Quality as described in RG 1.174, section 2.5.

2. Describe the structure of a PRA as described in the ASME standard.

3. Identify the major components of the industry peer review process.

4. Describe the Commission's "phased approach" to address PRA quality issues.

TASKS:

1. Review RG 1.174 with emphasis on PRA quality.

2. Review ASME RA-S-2002. Pay specific attention to the High-Level Requirements and scan the supporting requirements.

3. Review ASME RA-S-2002 and NEI 00-02 regarding the peer review process.

4. Review RG 1.200 to understand its relationship to other risk-informed guidance and the overall approach to improving PRA quality.

5. Meet with a qualified SRA to discuss any questions that you have as a result of this activity and demonstrate that you can meet the evaluation criteria listed above.

DOCUMENTATION: Senior Reactor Analyst Qualification Signature Card, Item ISA-SRA-3

(ISA-SRA-4) IPEEE Lessons Learned

PURPOSE:

Obtain a general knowledge of the methods used by licensees to produce each plant's IPEEE.

COMPETENCY AREAS: TECHNICAL AREA EXPERTISE
INSPECTION

LEVEL OF EFFORT: 8 hours

REFERENCES:

1. NUREG-1742, Volumes 1 and 2, "Perspectives Gained From the IPEEE Program"
2. NUREG-1407, “"Procedural and Submittal Guidance for the Individual Plant Examination of External Events (IPEEE) for Severe Accident Vulnerabilities"

NOTE: These activities should be performed prior to taking the External Events Course (P-204).

EVALUATION CRITERIA:

At the completion of this activity, you should be able to:

1. Discuss the methods used by the licensees in evaluating risk from fire, flood, high winds, and seismic events in the IPEEEs.
2. Discuss the potential problems with comparing risk numbers using the different approaches. Discuss how these problems can impact the Reactor Oversight Process and Management Directive 8.3 (IMC 0309) risk evaluations.

TASKS:

1. Read the main report of Reference 1 for a knowledge of the methods used and the limitations of the different approaches used by the licensees to produce the IPEEEs. Produce a table showing the different methods used for fire, flood, winds, and seismic events.
2. Be able to explain why adding the risk obtained from an external analysis to that obtained from an internal analysis may be appropriate within the ROP.
3. Meet with a qualified SRA to discuss any questions that you have as a result of this activity and demonstrate that you can meet the evaluation criteria listed above.

DOCUMENTATION: Senior Reactor Analyst Qualification Signature Card, Item ISA-SRA-4

(ISA-SRA-5) Understanding How EPRI Documents are Used by Licensees

PURPOSE:

Obtain a general knowledge of the programmatic guidance and specific software that EPRI provides to member utilities that is used to support risk related activities.

COMPETENCY AREAS: TECHNICAL AREA EXPERTISE
INSPECTION

LEVEL OF EFFORT: 24 hours (these activities may be easier to perform while on rotation to Headquarters)

REFERENCES:

1. EPRI TR-100370, “Fire Induced Vulnerability Evaluation (FIVE)”

2. EPRI TR-105928, “Fire PRA Implementation Guide”

3. EPRI TR-105396, “PSA Applications Guide”

4. NUREG/CR- 6850, “EPRI/NRC-REF Fire PRA Methodology for Nuclear Power Facilities”

EVALUATION CRITERIA:

At the completion of this activity, you should be able to:

1. Be able to summarize the uses for each of the following thermal hydraulic computer codes including:

   - RETRAN
   - MAAP
   - GOTHIC

2. Demonstrate a general knowledge of FIVE by describing the steps involved in performing a FIVE evaluation. Discuss how a licensee might use table 4.2 of Reference 2 in their fire study.

3. Explain, using figures 4-1 and 4-2 of Reference 3, how components and conditions can be considered not risk significant for certain applications.

TASKS:

1. Discuss with a knowledgeable individual in the Division of Risk Assessment of NRR the limitations of the computer codes (RETRAN, MAAP, GOTHIC). Discuss the purpose and limitations on the licensee's use of each code (i.e., MAAP codes may be of limited use

for analyzing conditions involving open systems or large leaks). Determine which code is used to support which type of analysis in support of the PSA.

2. Obtain a copy of references 1 and 2. Read sections 4 through 6 of reference 1. Read for a general understanding of the FIVE process. Review the table of contents for a general knowledge of the content of the rest of the document. In Reference 2, read sections 1, 2, and 3. Scan section 4, paying attention to the tables and figures. Review the table of contents for a general knowledge of the content of the rest of the document.

3. Obtain a copy of reference 3. Read sections ES, 1, 2, 3, and 4. Obtain an understanding of the screening criteria used in figures 4-1 and 4-2.

4. Meet with a qualified SRA to discuss any questions that you have as a result of this activity and demonstrate that you can meet the evaluation criteria listed above.

DOCUMENTATION: Senior Reactor Analyst Qualification Signature Card, Item ISA-SRA-5

<u>Additional References</u>

Other EPRI documents used by licensees for risk applications are:

1. EPRI TR-100443, “Methods of Quantitative Fire Hazard Analysis”

2. EPRI TR-100380, “Pipe Failures in U.S. Commercial Nuclear Power Plants”

(ISA-SRA-6) Overview of Shutdown Risk

PURPOSE:

The purpose of this activity is to introduce the SRA to shutdown risk concepts, definitions, and key insights.

In SECY 97-168, based on a quantitative regulatory analysis, using PRA techniques, the staff concluded that the existing level of safety at shutdown is largely dependent upon voluntary measures by licensees. These voluntary measures are not traceable to specific underlying regulations and could be withdrawn by licensees without prior staff approval. In the SRM to SECY 97-168, the Commission directed the staff to “continue to monitor licensee performance, through inspections, and other means, in the area of shutdown operations to ensure that the current level of safety is maintained.” In SECY 97-168, the annual risk of core damage from shutdown operations at PWRs and BWRs was reported to be comparable to at power risk.

COMPETENCY AREAS: TECHNICAL AREA EXPERTISE
INSPECTION

LEVEL OF EFFORT: 16 hours

REFERENCES:

1. IMC 0308 Attachment 3, Appendix G, “Reactor Oversight Process Basis Document,” for the PWR and BWR Phase 2 Shutdown SDP templates

2. IMC 0609, Appendix G, “Shutdown Operations Significance Determination Process,” Attachments 1, 2, and 3.

3. Executive Summary (ONLY) of NUREG/CR-6143 Vol. 2, Part 1A, “Evaluation of Potential Severe Accidents During Low Power and Shutdown Operations at Grand Gulf, Unit 1,” Main Report (sections 1-9).

4. Executive Summary (ONLY) of NUREG/CR-6144 Vol. 2, Part 1A, “Evaluation of Potential Severe Accidents During Low Power and Shutdown Operations at Surry, Unit 1,” Main Report (chapters 1-6).

5. NUMARC 91-06, “Guidelines for Industry Actions to Assess Shutdown Management”

6. GL 88-17, “Loss of Decay Heat Removal”

7. IMC 0609 Appendix H, “Containment Integrity SDP”

8. Resolution of Temporary Inspection 2515/167, “Assurance of Industry Implementation of Key Shutdown Initiatives” (ADAMS Accession No. ML071010477).

EVALUATION CRITERIA:

At the completion of this activity, you should be able to:

1. Understand the definition of plant operational states for BWRs and PWRs used in the Phase 2 Shutdown SDP templates.

2. Understand the definition of shutdown initiating events for BWRs and PWRs used in the Phase 2 Shutdown SDP templates.

3. Identify dominant contributors of PWR Shutdown Risk based on the Surry Shutdown PRA.

4. Identify dominant contributors of BWR Shutdown Risk based on the Grand Gulf Shutdown PRA.

5. Consider the impact of risk due when shutdown, the extent of the contribution to large early radiological release (LERF), the five key safety functions, and concerns of mid-loop operations.

TASKS:

1. Read the Basis Document for the BWR and PWR SDP shutdown templates to:

   - understand how the BWR and PWR Shutdown SDP templates are constructed.
   - understand key shutdown definitions necessary to use the templates and discuss shutdown risk concepts.

2. Review IMC 0609, Appendix G and Attachments 1, 2, and 3 to familiarize yourself with the SDP for shutdown operations.

3. Read the Executive Summary (ONLY) of NUREG/CR-6144 Vol. 2, Part 1A, “Evaluation of Potential Severe Accidents During Low Power and Shutdown Operations at Surry, Unit 1,” Main Report (chapters 1-6). Scan sections S.1, S.2, and S.3. Read sections S.4, S.5, and S.6 (pages xxxi - xxxvii) in detail to understand the dominant contributors to PWR Shutdown Risk.

4. Read the Executive Summary (only) of NUREG/CR-6143 Vol. 2, Part 1A, “Evaluation of Potential Severe Accidents During Low Power and Shutdown Operations at Grand Gulf, Unit 1,” Main Report (sections 1-9). Scan section 1.1 and 1.2. Read sections 1.3 and 1.4 (pages 1-2 - 1-7) in detail to understand the dominant contributors to BWR Shutdown Risk.

5. Discuss shutdown risk concepts with the NRR PRA technical experts in APOB to gain an appreciation/understanding of shutdown risk and its application the SDP.

6. Meet with a qualified SRA to discuss any questions that you have as a result of this activity and demonstrate that you can meet the evaluation criteria listed above.

DOCUMENTATION: Senior Reactor Analyst Qualification Signature Card, Item ISA-SRA-6

(ISA-SRA-7) Emergency Operating Procedure Guidance

PURPOSE:

It is paramount that SRAs understand the dominant accident sequences for a given initiating event. To fully understand the accident sequence, SRAs must understand the expected operator response(s) to an accident. That expected response is contained within the licensee's Emergency Operating Procedure network. Understanding the expected response will be used by an SRA when providing guidance to inspectors for inspection planning and when independently developing or reviewing licensee derived human failure probabilities for a detailed risk evaluation (e.g., Phase 3).

COMPETENCY AREAS: TECHNICAL AREA EXPERTISE
INSPECTION

LEVEL OF EFFORT: 24 hours

REFERENCES:

1. Current owner's group Technical Basis Document (TBD)

2. Licensee's deviation document from the owner's group Document

3. Licensee's Current EOPs

4. Licensee's current abnormal operating procedures for loss of service water, component cooling water, DC & key AC electrical buses

5. Site specific SPAR Model (SDP Workspace and/or Plant Risk Information eBook (PRIB))

EVALUATION CRITERIA:

At the completion of this activity, you should be able to:

1. Identify the general plant and operator response to a Loss of Offsite Power.

2. Identify the general plant and operator response to a Loss of Reactor Coolant.

3. Identify the general plant and operator response to a Steam Generator Tube Rupture (PWR).

4. Identify the general plant and operator response to a total Loss Secondary Side Heat Removal (PWR).

5. Identify the general plant and operator response to a Loss of Service Water.

6. Identify the general plant and operator response to a Loss of Component Cooling Water.

7. Identify the general plant and operator response to a loss of DC power.

8. Identify the general plant and operator response to a loss of an Emergency Diesel powered bus.

9. Understand what operator actions (inside and outside the control room) are necessary to accomplish the below listed tasks and what indications would be used to determine the need to perform the actions for each of the following:

   - High Pressure Recirculation
   - Low Pressure Recirculation
   - Depressurizing the Reactor Coolant System given a failure of High-Pressure Injection systems
   - Feed & Bleed Cooling (PWR)
   - Placing the Station Blackout Electrical Power Source (if any) into service
   - Refilling the Condensate Storage Tank
   - Refilling the Refueling Water Storage Tank (PWR)
   - Restoring Reactor Coolant Pump Seal Cooling (PWR)
   - Providing alternate cooling to High Head Cooling Water Pumps
   - Resetting a turbine driven pump that has tripped on overspeed

TASKS:

1. Select a plant

2. Review the applicable Owner's Group Guideline (TBD) for an accident sequence of interest.

3. Review the licensee's deviation document for that section of the TBD.

4. Review the licensee's EOPs and Abnormal Operating Procedures (AOPs) for the applicable accident sequence.

5. Compare the licensee's assessment of operator actions to those in the SDP Workspace and/or PRIB noting any significant differences in human error probabilities.

6. Meet with a qualified SRA to discuss any questions that you have as a result of this activity and demonstrate that you can meet the evaluation criteria listed above.

DOCUMENTATION: Senior Reactor Analyst Qualification Signature Card, Item ISA-SRA-7

(ISA-SRA-8) Management Directive 8.3, “NRC Incident Investigation Program”

PURPOSE:

This activity will familiarize you with the NRC’s process for responding to significant operational events involving reactor and materials facilities. This process is designed to ensure that significant operational events are investigated in a timely, objective, systematic, and technically sound manner; that the factual information concerning each event is documented; and that the causes of each event are determined. The NRC’s response to these events varies according to the significance of the event. Consequently, the risk insights provided by the SRA are integral to determining the appropriate level of event response, if any.

COMPETENCY AREA: TECHNICAL AREA EXPERTISE
INSPECTION

LEVEL OF EFFORT: 16 hours

REFERENCES:

1. MD 8.3, “NRC Incident Investigation Program”
2. IMC 0309, “Reactive Inspection Decision Basis for Reactors”
3. Inspection Procedure (IP) 71153, “Follow-up of Events and Notices of Enforcement Discretion”
4. IP 93800, “Augmented Inspection Team”
5. IP 93812, “Special Inspections”
6. NUREG-1303, “Incident Investigation Manual”
7. “Integrated Risk-Informed Decision-Making Process for Emergent Issues”

NOTE: This activity must be completed before beginning the OJT on MD 8.3 Requirements.

EVALUATION CRITERIA:

At the completion of this activity, you should be able to:

1. Locate the current guidance on the NRC’s Incident Investigation Program.
2. Describe what constitutes a significant operational event.
3. Discuss the deterministic criteria that significant operational events are evaluated against.

4. Discuss the risk metrics used in the evaluation of significant operational events, including significant unplanned degraded conditions.

5. Discuss how plant configuration is accounted for during the evaluation of significant operational events, including significant unplanned degraded conditions.

6. Describe the levels of investigatory response and discuss the circumstances under which each is appropriate.

TASKS:

1. Review the references and develop a sufficient understanding of the Incident Investigation Process to fulfill the evaluation criteria.

2. Meet with a qualified SRA to discuss any questions that you have as a result of this activity and demonstrate that you can meet the evaluation criteria listed above.

DOCUMENTATION: Senior Reactor Analyst Qualification Signature Card, Item ISA-SRA-8

(ISA-SRA-9) Understanding the Development of Accident Sequence Precursor (ASP) Results

PURPOSE:

Understanding and explaining the differences in risk assessments of the same event by different programs is one of the challenges you will face as an SRA. This activity will introduce you to the ASP program, one of the primary risk evaluation programs in the NRC.

COMPETENCY AREAS: TECHNICAL AREA EXPERTISE
INSPECTION

LEVEL OF EFFORT: 8 hours

REFERENCES:

1. Accident Sequence Precursor Program Summary Description, revision 1 dated February 2020 (ML20049G020).

2. H.B. Robinson 2010 event available at http://www.nrc.gov/docs/ML1124/ML112411359.pdf

3. Response to SRM - M020319, dated 4/1/2002, Briefing on Office of Nuclear Regulatory Research Programs, Performance, and Plans. (ML022050474)

EVALUATION CRITERIA:

At the completion of this activity, you should be able to:

1. Describe the purpose of the ASP program and explain how it differs from the SDP.

2. Describe the content and format of an ASP report.

3. State the primary differences between ASP and SDP.

TASKS:

1. Review reference one above and compare the ASP process to the SDP process.

2. Select an appropriate ASP report and perform the review process described in reference one. The student should be familiar with all sections of the ASP report. A recommended event is the event listed in reference two.

3. Meet with an ASP analyst in the Performance and Reliability Branch/RES to discuss the ASP Program. Focus the discussion on how ASP analyses are performed and their purpose.

4. Meet with a qualified SRA to discuss any questions that you have as a result of this activity and demonstrate that you can meet the evaluation criteria listed above.

DOCUMENTATION: Senior Reactor Analyst Qualification Signature Card, Item ISA-SRA-9

(ISA-SRA-10) The Role of the SRA in the NOED Process

PURPOSE:

This activity will introduce you to the role of the SRA in the NOED process. Integral to the NOED is a requirement for the licensee to provide at least a qualitative risk assessment that demonstrates that the NOED does not involve any net increase in radiological risk.

COMPETENCY AREAS: TECHNICAL AREA EXPERTISE
INSPECTION

LEVEL OF EFFORT: 16 hours

REFERENCES:

1. NRC Enforcement Manual Appendix F, Notices of Enforcement Discretion

2. Regulatory Information Summary 2005-01, “Changes to Notice of Enforcement Discretion (NOED) Process and Staff Guidance”

3. RG 1.174, “An Approach for Using Probabilistic Risk Assessment in Risk-informed Decisions on Plant-Specific Changes to the Licensing Basis”

4. RG 1.177, “An Approach for Plant-Specific, Risk-Informed Decision Making: Technical Specifications”

5. NUMARC 93-01, Revision 4f, “Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants, April 2018”

6. Memorandum to Hubert Berkow, dated 7/18/2005, “Independent Assessment of Brunswick NOED 05-2-001 (ML051800286).

NOTE: You must complete this activity before beginning the OJT on NOEDs.

EVALUATION CRITERIA:

At the completion of this activity, you should be able to:

1. Be familiar with the content and format of an NOED, especially in the area of the risk assessment required from the licensee to support the NOED request.

2. Understand the basis of “no net increase” in radiological risk and the methodologies a licensee may use for a qualitative or quantitative assessment.

3. Understand why there is no adequate basis for licensees who claim that the “scram risk CCDP” is a surrogate for transition and shutdown risk.

4. Understand how a SPAR model can be used to determine the risk involved with the extended TS LCO time requested in the NOED.

5. Understand the importance of compensatory actions used by the licensee during the extended TS LCO time period.

6. Be able to explain how a PRA model should be adjusted to account for NOED request and use of the appropriate risk measure (e.g., ICCDP vs. ICCDF and ICLERP vs. ICLERF).

TASKS:

1. Review a recent NOED that was granted. The student should focus on the following areas:

   - the licensee's qualitative or quantitative risk assessment
   - compensatory actions taken by the licensee during the extended TS LCO duration
   - extent of condition and potential common cause failures
   - any external weather factors that may have impacted the NOED duration

2. Review a SPAR model condition assessment for the extended TS LCO duration requested in the NOED and compare those results to the risk assessment used by the licensee.

3. Review the risk related items identified in Appendix F of the Enforcement Manual that should be addressed by the licensee in the NOED request.

4. Meet with a qualified SRA to discuss any questions that you have as a result of this activity and demonstrate that you can meet the evaluation criteria listed above.

5. Review the memorandum to Hubert Berkow, dated 7/18/2005, "Independent Assessment of Brunswick NOED 05-2-001 (ML051800286). Discuss the findings with a qualified SRA.

DOCUMENTATION: Senior Reactor Analyst Qualification Signature Card,
Item ISA-SRA-10

(ISA-SRA-11) Conducting an SDP Phase 3 Analysis

PURPOSE:

SRAs are the regional focal point for inspection findings that need further review beyond the SDP Phase 1 and 2 processes. As such, it is essential that SRAs effectively evaluate inspection findings using the best available to determine the NRC's appropriate response.

COMPETENCY AREA: TECHNICAL AREA EXPERTISE
INSPECTION

LEVEL OF EFFORT: 40 Hours

REFERENCES:

1. IMC 0609, Attachment 1, Significance and Enforcement Review Process

2. IMC 0609, Appendix A, Significance Determination of Reactor Inspection Findings for At-Power Situations

3. Risk Assessment of Operational Events (RASP) Handbook

EVALUATION CRITERIA:

At the completion of this activity, you should be able to:

1. Understand when a Phase 3 analysis is needed to refine an SDP Phase 2 result.

2. Be able to explain the importance of using the best available information when conducting a Phase 3 analysis and how that relates to the SDP timeliness goals.

3. Describe the essential attributes of a Phase 3 analysis. In particular, the importance of the influential assumptions used for the safety significance of the inspection finding.

4. Describe the need for effective verbal and written communication skills (for the SERP and Inspection Finding Review Board (IFRB) Processes) as they relate to helping non-risk analyst understand the significance of the finding.

5. Describe the importance of interacting with other SRAs and risk analysts, as needed, to ensure a proper peer check of the results has been achieved.

TASKS:

1. Review at least two completed SERP packages for technical content and format. Assess the understandability of the information presented.

2. Observe at least two presentations of greater than Green reactor safety inspection findings at a SERP panel and IFRB.

3. Observe at least one regulatory conference.

4. Meet with a qualified SRA to discuss any questions that you have as a result of this activity and demonstrate that you can meet the evaluation criteria listed above.

DOCUMENTATION: Senior Reactor Analyst Qualification Signature Card, Item ISA-SRA-11

(ISA-SRA-12) The Role of the SRA in Inspection Planning

PURPOSE:

On occasion SRAs assist the inspection staff with inspection planning. Using importance measures and other risk tools, the SRA provides risk insights for selecting inspection samples that are of high-risk significance. The SRA is also a member of the Fire Protection Team Inspection (FPTI) and the Comprehensive Engineering Team Inspections (CETI))s.

NOTE: You may complete this activity while performing ROT-SRA-2 at a Regional Office.

COMPETENCY AREA: TECHNICAL AREA EXPERTISE
INSPECTION

LEVEL OF EFFORT: 16 Hours

REFERENCES:

1. IP 71111.21N.05, “Fire Protection Team Inspection (FPTI)”
2. IP 71111.21M, “Comprehensive Engineering Team Inspection (CETI)”
3. IP 71111.21N, “Design Bases Engineering Inspections (Programs)”
4. Plant-Specific Phase 2 Notebooks

EVALUATION CRITERIA:

At the completion of this activity, you should be able to:

1. Describe the various Importance Measures and explain how they can be used in inspection planning.
2. Describe the risk insights that can be obtained from the Plant-Specific Phase 2 Notebooks.
3. Describe how the SPAR models can be used to identify risk significant SSCs.
4. Describe how the SRA assists the Comprehensive Engineering Team and Program Inspections in sample selection.
5. Explain what is meant by the terms “risk significant” and “low margin” when selecting components for a Comprehensive Engineering Team Inspection. Describe what component could be “risk-significant and low margin.”

TASKS:

1. Assist a qualified SRA assigned to a Comprehensive Team or Program inspection.

2. Meet with a qualified SRA to discuss any questions that you have as a result of this activity and demonstrate that you can meet the evaluation criteria listed above.

DOCUMENTATION: Senior Reactor Analyst Qualification Signature Card, Item ISA-SRA-12

(ISA-SRA-13) Large Early Release Frequency (LERF)

PURPOSE:

SRAs need to identify which core damage scenarios (Level 1 PRA) contribute to a potential loss of containment (Level 2 PRA) and when LERF should be considered in a Phase 3 SDP evaluation. As such, it is essential that SRAs have skills to apply Type A scenarios which contribute to delta LERF and to evaluate Type B findings that impact only the containment function without affected core damage sequences.

COMPETENCY AREA: TECHNICAL AREA EXPERTISE
INSPECTION

LEVEL OF EFFORT: 16 Hours

REFERENCES:

1. IMC 0609, Appendix H, "Containment Integrity Significance Determination Process"
2. IMC 0308 Attachment 3, Appendix H, Basis Document for IMC 0609 Appendix H
3. NUREG 1765, "Basis Document for LERF SDP"
4. Qualitative Safety Goals for the Operation of Nuclear Power Plants; Policy Statement Publication

EVALUATION CRITERIA:

At the completion of this activity, you should be able to:

1. Explain for which Safety Goal the LERF metric is a risk surrogate and describe how it differs from the core damage frequency (CDF) metric.
2. Describe the difference between Type A and Type B findings.
3. Describe the risk significance between CDF and LERF and why.
4. Explain when a finding is screened using LERF Screening criteria.
5. Explain when after shutdown LERF is no longer of concern.
6. Describe which containment-related systems, structures, and components have LERF implications.

TASKS:

1. Review at least two completed SERP packages where LERF was the dominant metric for technical content and format. Assess the understandability of the information presented.

2. Meet with a qualified SRA to discuss any questions that you have as a result of this activity and demonstrate that you can meet the evaluation criteria listed above.

DOCUMENTATION: Senior Reactor Analyst Qualification Signature Card, Item ISA-SRA-13

Senior Reactor Analyst Rotational Assignments

(ROT-SRA-1) Rotational Assignment to APOB/NRR

PURPOSE:

The purpose of this assignment is to help the SRA to become thoroughly familiar with the operation and risk analysis tools and techniques used by the PRA Oversight Branch (APOB) at NRC Headquarters. Those permanently assigned to APOB are not required to complete this rotation.

COMPETENCY AREA: TECHNICAL AREA EXPERTISE

LEVEL OF EFFORT: Length of rotation is 2 months.

REFERENCES:

None

EVALUATION CRITERIA:

Upon completion of the tasks, you should be able to:

1. Demonstrate proficiency in using SAPHIRE/GEM to assess the risk of events and conditions.

2. Be able to identify lead technical experts in NRR and Research, who can provide information on structure, system and component performance to be used in risk assessments.

3. Demonstrate an understanding of risk application to licensee program change submittals and technical specification amendments.

TASKS:

1. Run ASP/SPAR model analyses using SAPHIRE/GEM and/or interpret existing PRA results for event/condition evaluation or for inspection planning/focus.

2. Assist with resolution of Maintenance Rule PRA issues or discuss how risk insights are used in the maintenance rule with lead technical experts in APOB/NRR.

3. Discuss current risk issues with insights and applications with lead technical experts in APOB/NRR in the following areas:

    a. Containment Performance
    b. Event Analysis and Response
    c. SDP phase 2 worksheet development
    d. External Event Analysis (includes fire risk and shutdown risk)

4. Discuss the use of risk insights for event/condition response using MD 8.3 with IRO, NRR event assessment, and APOB personnel.

5. Understand computer-based simplified PRA (SPAR) models:

   a. Perform sensitivity studies and generate and interpret various importance measures.
   b. Identify and understand modeling and data limitations.
   c. Perform analysis of at least three selected events from NUREG/CR-4674 (Precursors to Potential Severe Core Damage Accidents) using the appropriate model and compare your results with ASP results. Discuss any differences with an SRA or HQ risk analyst.

6. Discuss risk application with SRA or HQ risk analyst regarding:

   a. Decision criteria for PRA use (e.g., risk-informed licensee amendments)
   b. ISI/IST Graded QA
   c. Technical Specifications
   d. Use in SDP phase 1 and phase 2 Worksheets
   e. Limitations of on-line risk monitoring software (e.g., re-qualification vs. re-solving)

7. Make an oral presentation to an audience, including risk analysts, on a risk subject of interest chosen by the SRA trainee or on an analysis/event assessment performed during the rotation.

8. Meet with a qualified SRA or risk analyst to discuss any questions that you have as a result of this activity and demonstrate that you can meet the evaluation criteria listed above.

DOCUMENTATION: SRA Proficiency Level Qualification Signature Card Item ROT-SRA-1

(ROT-SRA-2) Rotational Assignment to Regional Office

PURPOSE:

The purpose of this assignment is to help the SRA to become thoroughly familiar with the application of operation and risk analysis tools and techniques to emerging plant events and inspection findings.

COMPETENCY AREA: TECHNICAL AREA EXPERTISE

LEVEL OF EFFORT: Length of rotation is two months.

> Note: Rotation may not be to your home region. For headquarters personnel, the selection of the region at which you will do your rotation must be agreed upon by management. Also, equivalency justification for this rotational assignment is not permitted.

REFERENCES:

None

EVALUATION CRITERIA:

Upon completion of the tasks, you should be able to:

1. Understand the SRA role in evaluating the risk associated with inspection findings.
2. Understand the SRA role in evaluating the significance of operational events.
3. Understand the SRA role in inspection planning.
4. Understand the SRA role in evaluating licensee NOED requests.
5. Understand the SRA role as a regional lead for effective internal and external risk communications.

TASKS:

1. Evaluate the potential risk significance of plant events and inspection findings using known risk insights, the SDP, and quantitative assessment techniques. Integrate these risk insights with other regulatory insights and develop recommendations to NRC management for appropriate regulatory responses (including enforcement) based on these insights.
2. Evaluate licensee PRA practices and specific analyses for adequacy (e.g., Maintenance Rule, the 10 CR 50.69 safety classification process, the Risk-Informed Surveillance Frequency Reduction program).

3. Discuss awareness of the risk assessment capabilities, limitations of licensee-generated risk insights, and NRC-generated risk insights for those licensees specifically assigned. Integrate these risk insights with other regulatory insights (e.g., defense-in-depth, licensing basis, performance history). Based on the above, develop risk-informed insights for use in inspection planning.

4. Participate with other NRC offices (e.g., RES, NRR) performing PRA or SDP related functions.

5. Brief/advise regional management on significant PRA or SDP issues and changes.

6. Provide an oral presentation on important risk insights to inspectors and other staff. Provide specific SDP and other risk assessment assistance to inspectors.

7. Participate in the inspection planning phase by reviewing plant PRA information and providing risk insights to the inspectors.

8. Attend regulatory or enforcement panel briefing and participate in the evaluation of inspection findings.

NOTE: If the assignments cannot be completed while on rotational assignment to headquarters or assigned regional office, they may be completed in the candidate's home office/region under the supervision of a qualified SRA. The qualified SRA is required to sign the qualification card for the completed assignments.

9. Meet with a qualified SRA to discuss any questions that you have as a result of this activity and demonstrate that you can meet the evaluation criteria listed above.

DOCUMENTATION: SRA Proficiency Level Qualification Signature Card Item ROT-SRA-2.

Senior Reactor Analyst On-the-Job Activities

(OJT-SRA-1) Performing an Independent Review of a Significance Determination Process and Enforcement Review Panel (SERP) Package

NOTE: You should complete this activity during the rotational assignment to Regional Office or NRR/APOB.

PURPOSE:

An SRA must be able to communicate risk insights and information to senior management in a manner that it can be understood and used to make regulatory decisions. The SERP package is one of the major products prepared for this purpose. Additionally, the SRA will be asked to peer review the packages prepared by their counterparts.

COMPETENCY AREAS: TECHNICAL AREA EXPERTISE
INSPECTION

LEVEL OF EFFORT: 8 hours

REFERENCES:

1. IMC 0609, Attachment 01, "Significance and Enforcement Review Process"
2. IMC 0612, "Issue Screening," Appendices B and E
3. IMC 0609, Attachment 04, "Phase 1 Initial Screening and Characterization of Findings"
4. IMC 0609, Appendix A, "The Significance Determination Process for Findings for At-Power"

EVALUATION CRITERIA:

1. Evaluate selected SERP package to determine that key considerations and components have been incorporated.
2. Ensure that the finding is well documented and meets program requirements.
3. Assess the quality and completeness of the risk evaluation.

TASKS:

1. Read and understand in detail Attachment 01 to IMC 0609.
2. Select a completed risk-informed SERP package for review. Read through the package to determine that the criteria in exhibit 4 are documented.
3. Determine that the performance deficiency is concise and was within the ability of the licensee to control.

4. Independently make the minor finding determination using IMC 0612 and compare your results with the determination made by the inspectors.

5. Independently conduct a Phase 1 screening and compare the result with the screening documented in the SERP package.

6. Review the Phase 3 assessment. Ensure that assumptions are precise and defensible. Verify that the analysis is only evaluating the performance deficiency and not collateral issues.

DOCUMENTATION: Senior Reactor Analyst Qualification Signature Card, Item OJT-SRA-1

(OJT-SRA-2) Perform a Phase 3 Significance Determination Process Evaluation

NOTE: You should complete this activity during the rotational assignment to the Regional Office or NRR/APOB.

PURPOSE:

An SRA must be able to evaluate inspection findings and communicate risk insights and information to senior management in a manner that it can be understood and used to make regulatory decisions. The Phase 3 package is one of the major products prepared for this purpose.

COMPETENCY AREAS: TECHNICAL AREA EXPERTISE
INSPECTION

LEVEL OF EFFORT: 40 hours

REFERENCES:

1. IMC 0609, Attachment 01, “Significance and Enforcement Review Panel (SERP) Process”
2. IMC 0612, Appendices B and E
3. IMC 0609, Attachment 04, “Initial Characterization of Findings”
4. IMC 0609, Appendix A, “The Significance Determination Process for Findings At-Power ”
5. Other IMC 0609 Appendices as applicable.

EVALUATION CRITERIA:

1. Perform a Phase 3 SDP evaluation. This evaluation is intended to be a significant effort and should involve the use of multiple risk assessment tools. The evaluation must include an evaluation of external events and LERF.
2. Ensure that the evaluation is well documented and meets program requirements.

TASKS:

1. Work with the regional SRA to identify a suitable performance deficiency for this task. The issue should be significant enough to demonstrate the ability to perform complex evaluations.
2. Determine that the performance deficiency is concise and was within the ability of the licensee to control.

3. Independently make the minor finding determination using IMC 0612 and compare your results with the determination made by the inspectors.

4. Independently conduct a Phase 1 screening and compare the result with the screening documented by the inspectors.

5. Independently conduct a Phase 2 evaluation and compare the result with the evaluation documented by the inspectors.

6. Perform the Phase 3 assessment. Ensure that assumptions are precise and defensible. Verify that the analysis is only evaluating the performance deficiency and not collateral issues.

7. Present the finding to the SERP for their review. Participate, as needed, in any follow-up discussions at the regulatory conference and caucus. Provide documentation for the analysis section of the inspection report or letter to the licensee describing the inspection finding.

8. Meet with a qualified SRA to discuss any questions that you have as a result of this activity and demonstrate that you can meet the evaluation criteria listed above.

DOCUMENTATION: Senior Reactor Analyst Qualification Signature Card, Item OJT-SRA-2

(OJT-SRA-3) Management Directive 8.3, “NRC Incident Investigation Program”

NOTE: You should complete this activity during the rotational assignment to the Regional Office or NRR/APOB.

PURPOSE:

The purpose of this activity is to familiarize you with the conduct of risk assessments of reactor events and significant unplanned degraded conditions in support of the NRC’s Incident Investigation Program.

COMPETENCY AREA: TECHNICAL AREA EXPERTISE
INSPECTION

LEVEL OF EFFORT: 16 hours

REFERENCES:

1. MD 8.3, “NRC Incident Investigation Program”

2. IMC 0309, “Reactive Inspection Decision Basis for Reactors”

3. IP 71153, “Follow-up of Events and Notices of Enforcement Discretion”

4. NRR Office Instruction 504, “Integrated Risk-Informed Decision-Making”

NOTE: You must complete the Individual Study Activity on MD 8.3 before beginning this OJT Activity.

EVALUATION CRITERIA:

Complete the tasks assigned in this OJT guide and meet with a qualified Senior Reactor Analyst to discuss any questions that you may have as a result of this activity. Upon completion of the tasks, you should be able to:

1. Discuss what information is needed to conduct risk assessments of significant operational reactor events and significant unplanned degraded conditions.

2. Discuss how to conduct a risk assessment of a significant operational reactor event using the NRC’s SPAR models.

3. Discuss how to conduct a risk assessment of a significant unplanned degraded condition using the NRC’s SPAR models.

4. Discuss how to modify a SPAR model to account for the plant configuration at the time of the event or condition.

TASKS:

1. Review at least one completed risk assessment for both a significant operational reactor event and a significant unplanned degraded condition.

2. Perform a risk assessment of a significant operational reactor event using the appropriate NRC SPAR model and document the results.

3. Perform a risk assessment of a significant unplanned degraded condition using the appropriate NRC SPAR model and document the results.

4. Meet with a qualified SRA to discuss any questions that you have as a result of this activity and demonstrate that you can meet the evaluation criteria listed above.

DOCUMENTATION: Senior Reactor Analyst Qualification Signature Card, Item OJT-SRA-3

(OJT-SRA-4) Performing an NOED Risk Review

NOTE: You should complete this activity during the rotational assignment to the Regional Office.

PURPOSE:

This activity will introduce you to the SRA's responsibility in reviewing the licensee's risk assessment for an NOED request. Integral to the NOED is a requirement for the licensee to provide at least a qualitative risk assessment that demonstrates that the NOED does not involve any net increase in radiological risk.

COMPETENCY AREAS: TECHNICAL AREA EXPERTISE
INSPECTION

LEVEL OF EFFORT: 16 hours

REFERENCES:

1. NRC Enforcement Manual Appendix F, Notices of Enforcement Discretion

2. RIS 2005-01, "Changes to Notice of Enforcement Discretion (NOED) Process and Staff Guidance"

3. RG 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-informed Decisions on Plant-Specific Changes to the Licensing Basis"

4. RG 1.177, "An Approach for Plant-Specific, Risk -Informed Decision Making: Technical Specifications"

5. NUMARC 93-01, Revision 4f, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants, April 2018"

NOTE: You must complete the Individual Study Activity on NOEDs before beginning this OJT.

EVALUATION CRITERIA:

At the completion of this activity, you should be able to:

1. Understand the risk assessment methodologies used by licensees to meet the requirement that a risk assessment supporting an NOED request must address the risk of shutting down versus the risk of continued operation with the degraded equipment.

2. Understand the basis of "no net increase" in radiological risk and the methodologies a licensee may utilize to qualitatively or qualitatively demonstrate this.

3. Understand how SPAR can be used to determine the risk involved with the extended TS LCO time requested in the NOED.

4. Understand the importance of compensatory measures used by the licensee during the extended TS LCO time period.

5. Be able to explain how a PRA model should be adjusted to account for NOED request and use of the appropriate risk measure (e.g., ICCDP, vs. ICCDF and ICLERP vs. ICLERF).

TASKS:

1. Review at least three NOEDs that were granted (preferably from different regions). When reviewing the NOEDs, look for the following areas:

   - the licensee's qualitative or qualitative risk assessment addressing the risk of shutting down versus the risk of remaining at power with the degraded equipment,

   - compensatory measures taken by the licensee during the extended TS LCO duration such as a hold on any maintenance and testing of other risk significant equipment, protection of opposite train equipment, or the prohibition of switchyard work.

   - any external weather factors that may impact the NOED duration.

   - operator action credited.

2. Run a SPAR model condition assessment for the extended TS LCO duration for the degraded equipment as requested in the NOED. Compare those results to the risk assessment results reported by the licensee.

3. If possible, perform the review of an actual NOED request with the supervision of a qualified SRA. Interact with the licensee on the NOED call and present the results of the review to the appropriate regional manager.

4. Meet with a qualified SRA to discuss any questions that you have as a result of this activity and demonstrate that you can meet the evaluation criteria listed above.

DOCUMENTATION: Senior Reactor Analyst Qualification Signature Card, Item OJT-SRA-4

Senior Reactor Analyst
Signature Card and Certification Form

Name: ______________________________	Employee Initials/Date	Evaluator/Supervisor Signature/Date
A. Training Courses		
BWR technology full series		
PWR technology full series		
Probability and Statistics for PRA Course (P-102)		
System Modeling Techniques Course for PRA (P-200)		
Human Reliability Assessment Course (P-203)		
Risk Assessment in Event Evaluation Course (P-302)		
PRA Technology and Regulatory Perspective (P-111)		
SAPHIRE Course (P-201)		
Advanced SAPHIRE Course (P-202)		
External Events (P-204)		
Accident Progression Analysis (P-300) or Perspectives Reactor Safety (R-800)		
B. Individual Study Activities		
ISA-SRA-A Building your SRA Reference Library		
ISA-SRA-B Review of PRA Principles and NRC Approach to Risk-Informed and Performance-Based Regulation		
ISA-SRA-C Review of Historical NRC Severe Accident Risk Evaluations and the Methodologies Used in the Analysis		
ISA-SRA-D Understanding How Full Scope PRA Models Were Developed		
ISA-SRA-1 Significance Determination Process and Its Basis		
ISA-SRA-2 Limitations of Licensee PRAs		
ISA-SRA-3 PRA Quality Initiative		
ISA-SRA-4 IPEEE Lessons Learned		
ISA-SRA-5 Understanding How EPRI Documents are Used by Licensees		
ISA-SRA-6 Overview of Shutdown Risk		
ISA-SRA-7 Emergency Operating Procedure Guidance		
ISA-SRA-8 Management Directive 8.3, “NRC Incident Investigation Program”		

ISA-SRA-9 Understanding the Development of ASP Results		
ISA-SRA-10 The Role of the SRA in the NOED Process		
ISA-SRA-11 Conducting a SDP Phase 3 Analysis		
ISA-SRA-12 The Role of the SRA in Inspection Planning		
ISA-SRA-13 LERF		
C. Rotational Assignments		
ROT-SRA-1 Rotation to APOB (Concurrence by APOB management required)		
ROT-SRA-2 Rotation to Regional Office		
D. On-the-Job Training Activities		
OJT-SRA-1 Performing an independent Review of a Significance Determination Process/ Enforcement Review Panel (SERP) Package		
OJT-SRA-2 Perform a Phase 3 Significance Determination Process Evaluation		
OJT-SRA-3 Management Directive 8.3, "NRC Incident Investigation Program"		
OJT-SRA-4 Performing a NOED Risk Review		

The individual's supervisor signature below indicates successful completion of all required courses and activities listed in this Appendix and readiness to appear before the Qualification Board.

Supervisor's Signature: ______________________________ Date:____________

The Qualification Board Chairman's signature below indicates that the individual has successfully passed the qualification board and is a fully certified SRA. The board chairman must send a memorandum to the individual's management and to the applicable Office of Human Resources indicating successful completion of the SRA Certification Program. This completed signature and certification Form should be attached to the memorandum.

Qualification Board Chairman:____________________________ Date:___________

This signature card and certification must be accompanied by the appropriate Form 1, Reactor Engineering Technical Proficiency Level Equivalency Justification if applicable. (The electronic signature card, which is located on the Digital City SharePoint website is also acceptable.) Additionally, SRAs should consult IMC 1245 Appendix D-1 "Maintaining Qualifications" as applicable, for post qualification and refresher training requirements.

Record completion in TMS by sending a request to TrainingSupportResource@nrc.gov.

Copies to: Inspector
Supervisor

Senior Reactor Analyst
Equivalency Justification Form

Name:	Identify equivalent training and experience for which the individual is to be given credit. Attach additional sheets as necessary
A. Training Courses	
BWR technology full series	
PWR technology full series	
Probability and Statistics for PRA Course (P-102)	
System Modeling Techniques Course for PRA (P-200)	
Human Reliability Assessment Course (P-203)	
Risk Assessment in Event Evaluation Course (P-302)	
PRA Technology and Regulatory Perspective (P-111)	
SAPHIRE Course (P-201)	
Advanced SAPHIRE Course (P-202)	
External Events (P-204)	
Accident Progression Analysis (P-300) or Perspectives on Reactor Safety (R-800)	
B. Individual Study Activities	
ISA-SRA-A Building your SRA Reference Library	
ISA-SRA-B Review of PRA Principles and NRC Approach to Risk-Informed and Performance-Based Regulation	
ISA-SRA-C Review of Historical NRC Severe Accident Risk Evaluations and the Methodologies Used in the Analyses	
ISA-SRA-D Understanding How Full Scope PRA Models Were Developed	
ISA-SRA-1 Significance Determination Process and Its Basis	
ISA-SRA-2 Limitations of Licensee PRAs	
ISA-SRA-3 PRA Quality Initiative	
ISA-SRA-4 IPEEE Lessons Learned	
ISA-SRA-5 Understanding How EPRI Documents are Used by Licensees	
ISA-SRA-6 Overview of Shutdown Risk	
ISA-SRA-7 Emergency Operating Procedure Guidance	
ISA-SRA-8 Management Directive 8.3, “NRC Incident Investigation Program”	
ISA-SRA-9 Understanding the Development of Accident Sequence Precursor (ASP) Results	
ISA-SRA-10 The Role of the SRA in the NOED Process	

ISA-SRA-11 Conducting an SDP Phase 3 Analysis	
ISA-SRA-12 The Role of the SRA in Inspection Planning	
ISA-SRA-13 Large Early Release Frequency (LERF)	
C. Rotational Assignment	
ROT-SRA-1 Rotation to APOB	
ROT-SRA-2 Rotation to Regional Office	
D. On-the-Job Training Activities	
OJT-SRA-1 Performing an Independent Review of a Significance Determination Process/Enforcement Review Panel (SERP) Package	
OJT-SRA-2 Perform a Phase 3 Significance Determination Process Evaluation	
OJT-SRA-3 Management Directive 8.3, “NRC Incident Investigation Program”	
OJT-SRA-4 Performing a NOED Risk Review	

Supervisor’s Recommendation: Signature / Date:______________________________

Division Director’s Approval: Signature / Date:______________________________

Attachment 1: Revision History for IMC 1245 App C9

Commitment Tracking Number	Accession Number Issue Date Change Notice	Description of Change	Description of Training Required and Completion Date	Comment Resolution and Closed Feedback Form Accession Number (Pre-Decisional, Non-Public Information)
N/A	ML062400503 10/31/06 CN 06-032	Issued as IMC 1245 Appendix D-1. To add the Advanced Risk Assessment Topics course as refresher training, update organizational titles, updated reference lists, and incorporate minor editorial changes. Completed 4-year historical CN search	N/A	N/A
N/A	ML080730038 07/08/09 CN 09-017	To move the SRA training journal to Appendix C where qualification programs should reside. This revision updates references, tasks, and evaluation criteria; and clarifies expectations for the qualification board (in response to feedback form 1245-1050). Also, updates ISA-SRA-A, deletes ISA-SRA-11, and adds two new ISAs, Inspection Planning and LERF.	N/A	ML091590710
N/A	ML12251A062 12/19/12 CN 12-029	This revision updates required training courses and references, and updates guidance associated with the SDP to reflect recent changes to IMC 0609. Specifically, references to the At-Power SDP (0609, Appendix A) Phase 1, 2, and 3 were replaced.	N/A	N/A
N/A	ML15177A322 11/24/15 CN 15-026	This revision moves two courses (P-301 and P-502) to post qualification, adds guidance to interact with Research based on the needs of the qualifying employee during the rotation to headquarters, expands a task in OJT-1 to learn all aspects of SERP, updates the APOB acronym and IMC format.	N/A	ML15195A185 Closed FF: 1245C9-2028 ML15020A542

Commitment Tracking Number	Accession Number Issue Date Change Notice	Description of Change	Description of Training Required and Completion Date	Comment Resolution and Closed Feedback Form Accession Number (Pre-Decisional, Non-Public Information)
N/A	ML18047A200 07/30/18 CN 18-023	This revision updates the title of IMC 0612 from “Power Reactor Inspection Reports” to “Issue Screening”.	N/A	ML18065A658 Closed FF: 1245C9-2267 ML18134A022
	ML20094K299 06/26/20 CN 20-026	This revision updated references to SharePoint sites and the names of several office titles that were renamed as part of the NRR reorganization. Several format items were corrected.	N/A	ML20094K297
	ML23074A170 06/14/23 CN 23-016	This revision updated references to SharePoint sites, and the titles of procedures and courses.	n/a	n/a