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MEMORANDUM TO: Russell N. Felts, Director
Division of Reactor Oversight
Office of Nuclear Reactor Regulation

FROM: Brian D. Green, Human Factors Team Lead
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Division of Reactor Oversight
Office of Nuclear Reactor Regulation

A handwritten signature in blue ink, appearing to read "B. Green".

Signed by Green, Brian
on 11/09/23

SUBJECT: BRANCH SPECIFIC HUMAN FACTORS TEAM TRAINING PLAN

The Operator Licensing and Human Factors Branch has developed a draft branch-specific training plan for staff on the Human Factors Team. This draft plan was developed to build upon the interim training plan described the September 2, 2022, memorandum to Christopher Miller Agencywide Documents Access and Management System Accession Number (ML22244A068). The draft training plan will be used to train the first two new hires to the Human Factors team. Feedback from the staff will be used to refine the program before it is finalized in ADM-504.

Enclosure: Human Factors Team Training Plan

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SUBJECT: BRANCH SPECIFIC HUMAN FACTORS TEAM TRAINING PLAN
DATE: November 9, 2023

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RFelts, NRR

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Operator Licensing and Human Factors Branch (IOLB)
Draft Human Factors Team Training Plan

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Introduction

The IOLB Human Factors Team Training Plan requires that you complete a variety of activities, each of which is designed to help you learn information or practice a skill that will be important to performing human factors activities. When you have completed the entire training plan, you will have demonstrated each of the competencies listed below for a Human Factors Engineer/Specialist.

Required Competencies for Human Factors Staff:

This qualification card has been designed to align with the four human factors core competencies described in the [NRR Position Models](#).

- DEMONSTRATES TECHNICAL KNOWLEDGE
- ORGANIZATIONAL AWARENESS
- COMMUNICATION
- ANALYSIS AND REASONING

The primary competencies consider various knowledge requirements (K) as well as specific tasks (ST) and primary tasks (PT) as well. The activities in this program were selected to help you gain experience in the areas and provide you with an opportunity to display your competence completing routine HFT job tasks.

Program Organization

The Human Factors Team Training Plan has three types of activities to be completed: training courses, individual study activities, and on-the-job training activities. These activities are designed to develop and enhance your expertise reviewing human performance-related items. IOLB required activities may be performed concurrently with each other and with the qualification plan. The scope of the assigned activities will be determined by your immediate supervisor. Typically, the supervisor and assigned senior staff member/subject matter expert will review work in detail at specified points during the course of the qualification training activities. The emphasis in the training plan is on competencies. Tasks may be performed multiple times to demonstrate sufficient proficiency to meet the evaluation criteria. The time needed to complete all of the requirements in this training plan will vary based on previous education, training, and experience.

The Human Factors Team Training Plan identifies the classroom training requirements and provides the individual study activities and on-the-job training activities you must complete. You will use Form 1, Branch-Level Signature Card, and Form 2, Branch-Level Equivalency Justification, to document your progress as you move through the training plan activity requirements. Form 1 is used to document that an activity has been completed while Form 2 is used to document the justification for using equivalent training or experience as a means of meeting a requirement. These forms will become the permanent record of your completion of the qualification program and will be placed in your official file. Once all training plan requirements have been completed, your immediate supervisor will determine how you demonstrate completion of the training plan (e.g., mini oral board, interview).

Training Courses & Seminars

Human performance courses and seminars are designed to provide structured classroom training to develop the required knowledge and skills necessary for conducting human performance reviews.

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Individual Study Activities (ISA)

The study activities are designed to direct and focus your efforts when reviewing documents that are critical in performing human performance reviews effectively. Each study activity begins with a purpose statement detailing the importance of the activity and the relation to the branch or employee's responsibilities. The levels of effort are provided as estimates to gauge how much effort should be expended in completing the activity. The evaluation criteria provide the key elements to understand in performing the activity. The tasks outline activities that will assist the individual in meeting the evaluation criteria.

On-the-Job Training (OJT)

A training method that uses direct involvement in specific work activities to develop the required knowledge and skills to perform human performance reviews.

OJTs may overlap with activities on the ADM-504 Appendix A Technical Reviewer qualification. Reviewers can conduct similar activities simultaneously if approved by the supervisor. The purpose of the activities in this program is to ensure that staff have experience dealing with human factors issues, therefore, experience as a technical reviewer in other groups may not necessarily meet the needs of this program. Staff who have previously qualified as a Technical Reviewer, but who have not conducted human factors reviews, can be grandfathered out of those activities at the Supervisor's discretion, however, care should be taken to ensure mastery of human factors concepts and principles.

Senior Staff Member/Subject Matter Experts

Senior Staff Members/Subject Matter Experts are staff that may have a particular expertise in various regulatory and agency requirements associated with human performance. The role of the Senior Staff Member/Subject Matter Expert is to provide guidance regarding specific ISAs and OJT activities to transfer knowledge of the process and provide guidance to new IOLB employees.

General Guidance

1. Complete all parts of each activity.
2. Your supervisor will act as a resource as you complete each activity. Your supervisor may also designate senior staff members/subject matter experts to work with you as you complete the various activities. Discuss any questions you may have about the content of anything you read with your supervisor or designated resource.
3. You are responsible for keeping track of the tasks you have completed. Be sure to complete all the tasks in each activity before meeting with your supervisor for evaluation.

Training Activities

T-1: “Part 1: Introduction to Human Factors Engineering” in the NRC Human Factors Engineering Training Curriculum in TMS

TOPIC: T-1: “Part 1: Introduction to Human Factors Engineering” in the NRC Human Factors Engineering Training Curriculum in TMS

PURPOSE: The purpose of this activity is to familiarize staff with basic human factors knowledge.

COMPETENCY AREAS: PC: DEMONSTRATES TECHNICAL KNOWLEDGE

- Basic human factors knowledge
- NRC history with human factors
- Knowledge of standards and guidance

LEVEL OF EFFORT: 5 Hours

REFERENCES: “NRC Human Factors Engineering Training Part 1: Introduction to Human Factors Engineering” in TMS

EVALUATION CRITERIA: By the end of this activity, you should be able to have a conversation about the basis for human factors at the NRC and describe some of the basic human factors principles.

TASKS:

1. View Modules 1-5 of NRC Human Factors Engineering in Training in TMS.
2. Discuss the following topics with your supervisor:
 - a. Introductory human factors principles
 - b. Human error and safety
 - c. Three-Mile Island and human factors
 - d. Human factors guidance and standards
 - e. Human factors at the NRC

T-2: “Part 2: Human Psychology and Information Processing” in the NRC Human Factors Engineering Training Curriculum in TMS

TOPIC:	T-2: “Part 2: Human Psychology and Information Processing” in the NRC Human Factors Engineering Training Curriculum in TMS
PURPOSE:	Familiarize staff with basic psychological principles that are central to the field of human factors.
COMPETENCY AREAS:	PC: DEMONSTRATES TECHNICAL KNOWLEDGE <ul style="list-style-type: none">• Basic human factors knowledge
LEVEL OF EFFORT:	5 Hours
REFERENCES:	“NRC Human Factors Engineering Training Part 2: Human Psychology and Information Processing” in TMS
EVALUATION CRITERIA:	By the end of this activity, you should be able to describe the basic psychological principles that form the foundation for human factors.
TASKS:	<ol style="list-style-type: none">1. Watch Modules 6-10 of NRC Human Factors Engineering in Training in TMS.2. Discuss the following topics with your supervisor:<ol style="list-style-type: none">a. Information processingb. Sensation and perceptionc. Attention, working memory, and long-term memory.d. Decision makinge. Social and organizational considerations

T-3: “Part 3: Human Factors Engineering Program Review Model” in the NRC Human Factors Engineering Training Curriculum in TMS

TOPIC:	T-3: “Part 3: Human Factors Engineering Program Review Model” in the NRC Human Factors Engineering Training Curriculum in TMS
PURPOSE:	The purpose of this activity is to familiarize staff with Chapter 18 of the Standard Review Plan and NUREG-0711.
COMPETENCY AREAS:	PC: DEMONSTRATES TECHNICAL KNOWLEDGE <ul style="list-style-type: none">• Basic human factors knowledge• Human factors engineering• Knowledge of standards and guidance
LEVEL OF EFFORT:	10 Hours
REFERENCES:	<ol style="list-style-type: none">1. “NRC Human Factors Engineering Training Part 3: Human Factors Engineering Program Review Model,” in TMS2. NUREG-0800, Chapter 18, “Human Factors Engineering”3. NUREG-0711, “Human Factors Engineering Program Review Model”4. “Evolution of the Information Processing Model Used in NRC HFE Guidance Development,” John O’Hara, June 17, 20135. HFE Review Guide: “When is a Human Factors Review Appropriate?”6. Ask your supervisor for examples of human factors safety evaluation inputs that your group has recently completed.
EVALUATION CRITERIA:	By the end of this activity, you should be able to have a conversation about the various NUREG-0711 review elements.
TASKS:	<ol style="list-style-type: none">1. Watch Modules 11-17 of NRC Human Factors Engineering in Training in TMS.2. Review NUREG-0800 Chapter 18, NUREG-0711 and the HFE Review Guide.3. Review “Evolution of the Information Processing Model Used in NRC HFE Guidance Development” regarding the technical bases for NUREG-0711.4. Review at least two safety evaluations that were written using NUREG-0711. Be sure to find one that is for Part 50 licensees and one that is for Part 52 applicants.5. Discuss the following topics with your supervisor:<ol style="list-style-type: none">a. Describe the 12 review elements of NUREG-0711.b. Describe the difference between an implementation plan and a results summary report and when each can be used.

- c. Explain how the information processing model and the systems approach to design are related to NUREG-0711.
- d. Describe how the Safety Evaluations you reviewed applied NUREG-0711. How were they treated similarly, how were they treated differently and why might this have been the case?

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T-4: “Part 4: Advanced Topics in Human Factors Engineering” in the NRC Human Factors Engineering Training Curriculum in TMS

TOPIC:	T-4: “Part 4: Advanced Topics in Human Factors Engineering” in the NRC Human Factors Engineering Training Curriculum in TMS
PURPOSE:	The purpose of this activity is to connect the basic human factors and psychological principles described in modules 1 and 2, to the guidance described in NUREG-0711 (module 3) and show how they are applied to various technologies in nuclear power plants.
COMPETENCY AREAS:	PC: DEMONSTRATES TECHNICAL KNOWLEDGE <ul style="list-style-type: none">• Basic human factors knowledge• Human factors engineering
LEVEL OF EFFORT:	5 Hours
REFERENCES:	1. “NRC Human Factors Engineering Training Part 4: Advanced Topics in Human Factors Engineering,” in TMS
EVALUATION CRITERIA:	By the end of this activity, you should be able to describe how the topics discussed in modules 1-3 are applied in nuclear power plant contexts.
TASKS:	<ol style="list-style-type: none">1. Watch Modules 18-21 of NRC Human Factors Engineering in Training in TMS.2. Discuss the following topics with your supervisor:<ol style="list-style-type: none">a. What are some of the human factors concerns with automation?b. How are human factors principles applied in advanced control rooms?c. Describe some of the concerns with computer-based procedures.d. Describe human factors issues associated with control room modernization.

T-5: Complete a Reactor Series at the TTC

TOPIC:	T-5: Complete a Reactor Series at the TTC
PURPOSE:	Familiarize staff with nuclear power plant operations and systems.
COMPETENCY AREAS:	PC: DEMONSTRATES TECHNICAL KNOWLEDGE <ul style="list-style-type: none">• Reactor Plant Operations
LEVEL OF EFFORT:	7 weeks
REFERENCES:	<ol style="list-style-type: none">1. Course material is provided by the TTC.
EVALUATION CRITERIA:	Staff should successfully complete all three courses of at least one reactor series with a passing grade. In addition, staff should have a discussion with their supervisor discussion the topics below.
TASKS:	<ol style="list-style-type: none">1. Register for one reactor series (PWR or BWR) at the TTC as well as any prerequisite classes that are needed. (Search for 304-P, 504-P, and 624-P or 304-B, 504-B, and 624-B in TMS for more information).2. Complete the reactor series.3. Discuss your observations about the simulator design and how it influenced your perception of plant events. Describe any errors that you or your classmates made that were influenced by the design or environment. Consider how your experience might be similar to licensed operators as well as how it is different.

T-6: Human Reliability Assessment (P-203)

TOPIC:	T-6 Human Reliability Assessment (P-203)
PURPOSE:	The purpose of this course is to provide an introduction to Human Reliability Assessment (HRA) including the methods used in modeling of human errors and various methods of estimating their probabilities. This course is designed to teach introductory level skills in HRA and includes a broad introduction to HRA and its applications. Human factors staff should be educated consumers of HRA and PRA insights and be capable of providing useful input to those processes.
COMPETENCY AREAS:	PC: DEMONSTRATES TECHNICAL KNOWLEDGE <ul style="list-style-type: none">• Human factors engineering• Reactor systems PC: ORGANIZATIONAL AWARENESS PC: ANALYSIS AND REASONING
LEVEL OF EFFORT:	3.5 Days
REFERENCES:	1. NUREG-1764, Chapter 2, "Guidance for the Review of Changes to Human Actions" 2. Required reading material provided during the course
EVALUATION CRITERIA:	At the completion of this course, you should be able to: <ol style="list-style-type: none">1. Describe how human errors are accounted for in risk-informed license amendment requests.2. Describe the mathematical tools used to compute human errors in probability space.
TASKS:	The activities listed below shall be performed under the guidance of a Subject Matter Expert or your Branch Chief: <ol style="list-style-type: none">1. Review the references to meet the evaluation criteria.2. Register for P-203 in TMS. There may be prerequisite course work necessary to register for P-203 such as P-105 or P-111. Consult TMS for more information.3. Complete the course by successfully passing comprehensive written examination.4. Discuss the Evaluation Criteria with a Subject Matter Expert in the area of risk assessment or with your Branch Chief.

T-7: Rulemaking at the NRC

TOPIC:	T-7: Rulemaking at the NRC (Training in TMS)
PURPOSE:	The purpose of this activity is to familiarize staff with the rulemaking process at the NRC.
COMPETENCY AREAS:	PC: DEMONSTRATES TECHNICAL KNOWLEDGE <ul style="list-style-type: none">• Human factors engineering• Rulemaking PC: ORGANIZATIONAL AWARENESS
LEVEL OF EFFORT:	2 Days
REFERENCES:	Course materials will be provided by the PDC.
EVALUATION CRITERIA:	<ol style="list-style-type: none">1. At the end of this activity, you should have a passing score for the final exam.2. You should also be aware of any current human factors related rulemaking activities and be prepared to apply the skills you learned to future assignments.
TASKS:	<ol style="list-style-type: none">1. Register for Rulemaking at the NRC in TMS.2. Attend the class and get a passing grade on the exam.3. Discuss recent and current rulemaking activities related to human factors with a subject matter expert.4. Discuss with your supervisor if additional training in this area is necessary based on expected workload.

T-8: Human Factors Introduction/Overview Course

TOPIC:	T-8: Human Factors Introduction/Overview Course (University of Michigan Short Course on Human Factors)
PURPOSE:	The purpose of this course is to learn about methods, techniques, theories, and data derived for human factors professionals that can be applied to system, human interface, and product design. Understanding the past, present, and future application of these techniques will provide the Human Performance reviewer insights on how they can be applied to review control rooms in current and new nuclear power reactors.
COMPETENCY AREAS:	PC: DEMONSTRATES TECHNICAL KNOWLEDGE <ul style="list-style-type: none">• Human factors engineering
LEVEL OF EFFORT:	2 weeks
REFERENCES:	<ol style="list-style-type: none">1. University of Michigan Short Course on Human Factors website2. Course material is provided by the university.
EVALUATION CRITERIA:	At the end of this activity, you should have completed the relevant sections of the short course as determined by your supervisor.
TASKS:	<ol style="list-style-type: none">1. Register for the Training and make arrangements for travel.2. Attend the training.3. Discuss what you learned with your supervisor. What did you learn about the field of human factors? How is the work done at the University of Michigan different than what is done at the NRC? Did you learn any new methods, practices, or standards that might be appropriate to adapt to the nuclear domain? Why or why not.

T-9: Technical Reviewer Training at the PDC

TOPIC:	T-9: Technical Reviewer Training at the PDC
PURPOSE:	To ensure that staff are familiar with NRC practices used to conduct technical reviews and to begin familiarizing human factors staff with applying these practices to human factors reviews.
COMPETENCY AREAS:	PC: DEMONSTRATES TECHNICAL KNOWLEDGE PC: ORGANIZATIONAL AWARENESS PC: COMMUNICATION PC: ANALYSIS AND REASONING
LEVEL OF EFFORT:	<ul style="list-style-type: none">• 5.5 Hours for G-120-A• 22 Hours for G-120-C
REFERENCES:	<ol style="list-style-type: none">1. Course Materials from G-120-A “Fundamentals of Operating Reactor Licensing – Evolution of Operating Reactor Licensing”2. Course Materials from G-120-C “Information Needs and Safety Evaluations”3. ADM-504 “Qualification Program” (ML14321A881) & “Appendix A Reactor Technical Reviewer Position-Specific Qualification Requirements” (ML13136A033)
EVALUATION CRITERIA:	By the end of this activity, you should have completed both the G-120-A and G-120-C course at the PDC.
TASKS:	<ol style="list-style-type: none">1. Enroll in G-120-A and G-120-C in TMS. These courses are foundational, you may want to take them at the earliest time practical.2. Attend and pass both courses.3. Discuss how what you learned applies to human factors reviews with your supervisor.

Individual Study Activities

ISA-1: Regulatory Requirements Related to Human Performance

TOPIC:	ISA-1: Regulatory Requirements Related to Human Performance
PURPOSE:	The purpose of this activity is to become familiar with the regulations that licensees, applicants, and/or vendors must meet to demonstrate adequate safety and are the basis for staff safety decisions in terms of human performance.
COMPETENCY AREAS:	PC: DEMONSTRATES TECHNICAL KNOWLEDGE <ul style="list-style-type: none">• Human factors engineering
LEVEL OF EFFORT:	12 Hours
REFERENCES:	<ol style="list-style-type: none">1. 10 CFR 26, "Fitness for Duty Programs"2. 10 CFR 50.34(f), "Additional TMI-Related Requirements"3. 10 CFR 50.54, "Conditions of Licenses" (Paragraphs j-m)4. 10 CFR 50.59, "Changes, Tests, and Experiments"5. 10 CFR 50.120, "Training and Qualification of Nuclear Power Plant Personnel"6. 10 CFR 52, "Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Plants"7. 10 CFR 55, "Operators' Licenses"8. Any new or draft regulations related human factors included in 10 CFR Part 53. Additional detail regarding these regulations can be found in supporting Interim Staff Guides.
EVALUATION CRITERIA:	At the completion of this activity, you should be able to: <ol style="list-style-type: none">1. Know the appropriate regulatory requirements when performing human performance reviews and documenting a safety decision and describe how this is different between plants licensed under 10 CFR 50, 52, and 53.2. Describe the major provisions of Part 26, Subpart I, "Fatigue Management."3. Describe the minimum on-site staffing requirements for licensed personnel at nuclear power plants and understand the differences about how this is treated in 10 CFR 50, 52, and 53. (Hint look at 10 CFR 50.54(m), NUREG-1791, and the ISG amending NUREG-1791 for advanced reactors).
TASKS:	<ol style="list-style-type: none">1. Review the references listed above.2. Discuss the Evaluation Criteria with a subject matter expert or with your supervisor.

ISA-2: Human Factors Reviews for Operating Reactors Using Chapter 18 and Key Regulatory Guidance

TOPIC:	ISA-2: Human Factors Program Reviews and Main Control Room Reviews Using Chapter 18 and Key Regulatory Guidance
PURPOSE:	The purpose of this activity to build associations with the regulations described in ISA-1 “Regulatory Requirements Related to Human Factors,” Chapter 18 of the Standard Review Plan, and the associated regulatory guidance and standards used to support those regulations.
COMPETENCY AREAS:	PC: DEMONSTRATES TECHNICAL KNOWLEDGE <ul style="list-style-type: none">• Human factors engineering PC: ORGANIZATIONAL AWARENESS <ul style="list-style-type: none">• Understanding the roles of other organizations PC: ANALYSIS AND REASONING <ul style="list-style-type: none">• Understanding advanced human factors topics
LEVEL OF EFFORT:	24 Hours
REFERENCES:	REVIEW SUPPORT TOOLS <ul style="list-style-type: none">• The Human and Organizational Performance Professionals’ Exchange Resource (The HOPPER)• George’s Desk Guides (The HOPPER)¹ MAIN CONTROL ROOM REVIEWS & HUMAN FACTORS PROGRAM REVIEW GUIDANCE <ul style="list-style-type: none">• NUREG-0800, Chapter 18, “Human Factors Engineering”• NUREG-0711, “Human Factors Engineering Program Review Model”• NUREG-0700, “Human-System Interface Review Guidelines” OPERATOR ACTION REVIEWS <ul style="list-style-type: none">• NUREG-1764, “Guidance for the Review of Changes to Human Actions”• NUREG-1852, “Demonstrating the Feasibility and Reliability of Operator Manual Actions in Response to Fire”• IN 97-78, “Crediting of Operator Actions in Place of Automatic Actions and Modification of Operator Actions, Including Response Times”• ANSI/ANS 58.8-199.4, “Time Response Design Criteria for Safety- Related Operator Actions”• Comprehensive Overview of Operator Actions Report (See SLS Human Factors for more information).

¹ George’s Desk Guides are informal knowledge management documents that can be accessed in the HOPPER. If you have difficulty locating them, please speak to your supervisor.

CONTROL ROOM MODERNIZATION

- [ISG-06](#), “Digital Instrumentation and Controls Licensing Process”
- IEEE Standard 2411-2021, “IEEE Guide for Human Factors Engineering for the Validation of System Designs and Integrated Systems Operations at Nuclear Facilities”
- Multi-Stage Validation of Nuclear Power Plant Control Room Designs and modifications (NEA Report No. 7466). Organisation for Economic Co-Operation and Development.

POWER UPRATES

- RS-001, Matrix 11, “Review Standard for Extended Power Uprates, Human Performance”
- RIS-2002-03, “Guidance on the Content of Measurement Uncertainty Recapture Power Uprate Applications”

EVALUATION CRITERIA:

By the end of this activity, you should be able to describe how various NRC guidance documents and tools are used to write of safety evaluations for different kinds of reviews.

TASKS:

1. Ask your supervisor for examples of recent safety evaluations that were written to support operating plants including control room modifications, operator manual action reviews, and other examples related to Chapter 18 of the SRP.
2. Skim the safety evaluations provided by your supervisor. Focus on understanding why particular NUREGs, Reg. Guidance, standards and other guidance documents were applied to each review.
3. Skim the guidance documents listed above, especially any executive summaries of guidance. Understand the scope of the document and the context in which it will be used.
4. Familiarize yourself with the Review Support Tools.
5. Discuss your findings with a subject matter expert.
 - a. Why were the particular guidance documents used for each safety evaluation?
 - b. How did the reviewer document the review? Is the document similar or different to the standards taught in activity T-9? (Note: standards for documenting reviews change over time so past precedent may or may not be consistent with current standards).
 - c. How can the Review Support Tools be used to inform your reviews?

ISA-3: Human Factors Program Reviews and Main Control Room Reviews for New LLWRs Using Chapter 18, and Key Regulatory Guidance

TOPIC:	ISA-3: Human Factors Program Reviews and Main Control Room Reviews for New LLWRs Using Chapter 18 and Key Regulatory Guidance
PURPOSE:	The purpose of this activity to build associations with the regulations described in ISA-1 “Regulatory Requirements Related to Human Factors,” Chapter 18 of the Standard Review Plan, and the associated regulatory guidance and standards used to support those regulations.
COMPETENCY AREAS:	PC: DEMONSTRATES TECHNICAL KNOWLEDGE <ul style="list-style-type: none">• Human factors engineering PC: ORGANIZATIONAL AWARENESS <ul style="list-style-type: none">• Understanding the roles of other organizations PC: ANALYSIS AND REASONING <ul style="list-style-type: none">• Understanding advanced human factors topics
LEVEL OF EFFORT:	16 Hours
REFERENCES:	REVIEW SUPPORT TOOLS <ul style="list-style-type: none">• The Human and Organizational Performance Professionals’ Exchange Resource (The HOPPER)• NUREG-7190, “Workload, Situation Awareness, and Teamwork (NUREG/CR-7190)” [Hint- be sure to look at both the pdf and the excel files] MAIN CONTROL ROOM REVIEWS & HUMAN FACTORS PROGRAM REVIEW GUIDANCE <ul style="list-style-type: none">• NUREG-0800, Chapter 18, “Human Factors Engineering”• NUREG-0711, “Human Factors Engineering Program Review Model”• NUREG-0700, “Human-System Interface Review Guidelines”• NUREG-1791, “Guidance for Assessing Exemption Requests from the Nuclear Power Plant Licensed Operator Staffing Requirements Specified in 10 CFR 50.54(m)”• SECY-92-0053 “Use of Design Acceptance Criteria During 10 CFR Part 52 Design Certification Reviews”• SECY 21-0039, “Elimination of the Shift Technical Advisor for the NuScale Design”• NUREG/CR-7202, “NRC Reviewer Aid for Evaluating the Human-Performance Aspects Related to the Design and Operation of Small Modular Reactors” NUREG/CR-7126, “Human-Performance Issues Related to the Design and Operation of Small Modular Reactors”

**EVALUATION
CRITERIA:**

By the end of this activity, you should be able to describe how various NRC guidance documents and tools are used to write of safety evaluations for different kinds of reviews.

TASKS:

1. Ask your supervisor for examples of safety evaluation reports that were written for Part 52 plants (AP1000 and NuScale are good examples) Focus on understanding why particular NUREGs, Reg. Guides, standards and other guidance documents were applied to each review. For instance, make sure you understand how Chapter 18, NUREG-0711, and NUREG-0700 were used for AP1000. Similarly, understand the importance of Chapter 18, NUREG-1791, and SECY 21-0039 to the NuScale review.
2. Skim the guidance documents listed above, especially any executive summaries of guidance. Understand the scope of the document and the context in which it will be used.
3. Familiarize yourself with the Review Support Tools.
4. Discuss your findings with a subject matter expert.
 - a. Why were the particular guidance documents used for each safety evaluation?
 - b. How did the reviewer document the review? Is the document similar or different to the standards taught in T-9? (Note: standards for documenting reviews change over time so past precedent may or may not be consistent with current standards).
 - c. How can the Review Support Tools be used to inform your reviews?

ISA-4: Human Factors Reviews For Advanced Reactors Using TICAP/ARCAP, Part 53 and Key Supporting Regulatory Guidance

TOPIC: **ISA-4: Human Factors Reviews for Advanced Reactors Using TICAP/ARCAP, Part 53, and Key Supporting Regulatory Guidance**

PURPOSE: The purpose of this activity to build associations with the regulations described in ISA-1 “Regulatory Requirements Related to Human Factors.” This includes 10 CFR 53, TICAP/ARCAP, and Key Supporting Guidance documents used to support those regulations. *This process is evolving, so additional resources may be available that are not listed here.

COMPETENCY AREAS:

PC: DEMONSTRATES TECHNICAL KNOWLEDGE

- Human factors engineering

PC: ORGANIZATIONAL AWARENESS

- Understanding the roles of other organizations

PC: ANALYSIS AND REASONING

- Understanding advanced human factors topics

LEVEL OF EFFORT: 16 Hours

REFERENCES:

REVIEW SUPPORT TOOLS

- The Human and Organizational Performance Professionals’ Exchange Resource ([The HOPPER](#))
- [HFE Standards and Guidelines Tool](#)
- NUREG-7190, “[Workload, Situation Awareness, and Teamwork \(NUREG/CR-7190\)](#)” [Hint- be sure to look at both the pdf and the excel files]

MAIN CONTROL ROOM REVIEWS & HUMAN FACTORS PROGRAM REVIEW GUIDANCE

- NUREG-0711, “Human Factors Engineering Program Review Model”
- NUREG-0700, “Human-System Interface Review Guidelines”
- IEEE 1023-2020 “IEEE Recommended Practice for the Application of Human Factors Engineering to Systems, Equipment, and Facilities of Nuclear Power Generating Stations and Other Nuclear Facilities”
- Shine Chapter 7 Safety Evaluation “INSTRUMENTATION AND CONTROL SYSTEMS” (ML22316A054)
- SECY 21-0039, “Elimination of the Shift Technical Advisor for the NuScale Design”

ADVANCED REACTOR REVIEWS

- RG 1.232, “Guidance for Developing Criteria for Non-Light

- Water Reactors”
- NUREG/CR-7202, “NRC Reviewer Aid for Evaluating the Human-Performance Aspects Related to the Design and Operation of Small Modular Reactors”
 - NUREG/CR-7126, “Human-Performance Issues Related to the Design and Operation of Small Modular Reactors”
 - NRC Website: [Advanced Reactors Contents of Applications \(ARCAP\)](#)
 - NRC Website: [Draft Rule for Part 53](#)

**EVALUATION
CRITERIA:**

By the end of this activity, you should be able to describe how various NRC guidance documents and tools are used to write of safety evaluations for different kinds of reviews.

TASKS:

1. Ask your supervisor for examples of recent safety evaluation, white papers, and other products related to this activity. Focus on understanding why particular NUREGs, Reg. Guides, standards and other guidance documents were applied to each product.
2. Skim the guidance documents listed above, especially any executive summaries of guidance. Understand the scope of the document and the context in which it will be used.
3. Familiarize yourself with the Review Support Tools.
4. Discuss your findings with a subject matter expert.
 - a. Why were the particular guidance documents used for each safety evaluation?
 - b. How did the reviewer document the review? Is the document similar or different to the standards taught in T-9? (Note: standards for documenting reviews change over time so past precedent may or may not be consistent with current standards).
 - c. How can the Review Support Tools be used to inform your reviews?
 - d. How does the review of advanced reactors differ from the review of LLWRs? What is the outcome? Why is this justifiable?

ISA-5: Human Factors Reviews Using Chapter 13 and Key Regulatory Guidance

TOPIC:	ISA-5: Human Factors Reviews Using Chapter 13 and Key Regulatory Guidance
PURPOSE:	The purpose of this activity to build associations with the regulations described in ISA-1 “Regulatory Requirements Related to Human Factors,” Chapter 13 of the Standard Review Plan, and the associated regulatory guidance and standards used to support those regulations.
COMPETENCY AREAS:	PC: DEMONSTRATES TECHNICAL KNOWLEDGE <ul style="list-style-type: none">• Human factors engineering PC: ORGANIZATIONAL AWARENESS <ul style="list-style-type: none">• Understanding the roles of other organizations PC: ANALYSIS AND REASONING <ul style="list-style-type: none">• Understanding advanced human factors topics
LEVEL OF EFFORT:	8 Hours
REFERENCES:	ORGANIZATION REVIEWS <ul style="list-style-type: none">• NUREG-0800, Chapter 13.5.2.1, “Operating and Emergency Operating Procedures”• NUREG-0800, Chapter 13.1.1, “Management and Technical Support Organization”• NUREG-0800, Chapter 13.2.1, “Reactor Operator Training”• NUREG-0800, Chapter 13.2.2, “Training for Non-Licensed Plant Staff”• NUREG-0800, Chapter 13.1.2-13.1.3, “Operating Organization” STAFFING <ul style="list-style-type: none">• IN 91-77, “Shift Staffing at Nuclear Power Plants”• NUREG-1791, “Guidance for Assessing Exemption Requests from Nuclear Power Plant Licensed Operator Staffing Requirements Specified in IU CFR 50.54(m) - Final Report”• GL 83-14, “Definition of “Key Maintenance Personnel” (Clarification of Generic Letter 82-12)”• ANSI/ANS 3.1-1993, “Selection, Qualification, and Training of Personnel for Nuclear Power Plants”• SECY 21-0039, “Elimination of the Shift Technical Advisor for the NuScale Design” TRAINING <ul style="list-style-type: none">• RG 1.8 (rev. 3), “Qualification and Training of Personnel for Nuclear Power Plants”

- ANSI/ANS3.5-1998, “Nuclear Power Plant Simulators for Use in Operator Training and Examination

**EVALUATION
CRITERIA:**

By the end of this activity, you should be able to describe how various NRC guidance documents are used to write different types of safety evaluations.

TASKS:

1. Ask your supervisor for examples of recent safety evaluations that were written using Chapter 13.
2. Review the guidance documents listed above, especially any executive summaries of guidance. Understand the scope of the document and the context in which it will be used.
3. Ask your supervisor for examples of recent safety evaluations that were written using Chapter 13.
4. Discuss the relationship between the guidance documents and the safety evaluations with your supervisor.

ISA-6: Additional Human Factors Team Activities and Resources -

TOPIC: **ISA-6: Additional Human Factors Team Activities and Resources**

PURPOSE: To ensure that you are familiar with guidance documents, standards and other resources that are used during human factors reviews associated with non-power reactors, fuel cycle facilities, and other topics relevant to the team.

COMPETENCY AREAS:

PC: DEMONSTRATES TECHNICAL KNOWLEDGE

- Human factors engineering

PC: ORGANIZATIONAL AWARENESS

- Understanding the roles of other organizations

PC: ANALYSIS AND REASONING

- Understanding advanced human factors topics

LEVEL OF EFFORT: 4 Hours

REFERENCES:

OTHER FACILITY REVIEWS

- NUREG-1537, "Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors"
- NUREG-1520, "Standard Review Plan for Fuel Cycle Facilities License Applications"

OTHER GUIDANCE RELATED TO HUMAN FACTORS REVIEWS

- RG 1.187, "Guidance for Implementation of 10 CFR 50.59"
- RG 1.114, "Guidance to Operators at the Controls and the Senior Operators in the Control Room of a Nuclear Power Plant."
- RIS 2005-018, "Guidance for Establishing and Maintaining a Safety Conscious Work Environment"
- NUREG/CR-6775, "Human Performance Characterization in the Reactor Oversight Process"
- NUREG-0654, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants"
- NUREG/CR-6751, "The Human Performance Evaluation Process: A Resource for Reviewing the Identification and Resolution of Human Performance Problems"

EVALUATION CRITERIA: By the end of this activity, you should be familiar with key supporting documents.

TASKS:

- Ask your supervisor for recent examples of safety evaluations, and other work products associated with this activity. Familiarize yourself with that material.
- Skim through the references above. Familiarize yourself with the contents of each.

- Understand when and how the key documents are expected to be used.
- Discuss how to appropriately apply the guidance documents above to various types of reviews with your supervisor. Also discuss which NRC organizations are responsible for associated review activities.

Draft

ISA-7: Attend a Human Factors Conference

TOPIC:	ISA-7: Attend a Human Factors Conference
PURPOSE:	The purpose of this activity is present the employee with exposure to state-of-the-art human factors principles, techniques, and methods. This knowledge is important to ensuring that NRC staff are qualified to make assessments about the state-of-the art of the field as required in 10CFR50.34(f)(2)(iii) and other regulations.
COMPETENCY AREAS:	PC: DEMONSTRATES TECHNICAL KNOWLEDGE <ul style="list-style-type: none">• Human factors engineering
LEVEL OF EFFORT:	~1 week
REFERENCES:	<ol style="list-style-type: none">1. Human Factors and Ergonomics Society Website2. American Nuclear Society NPIC & HMIT Website
EVALUATION CRITERIA:	By the end of this activity, you should have a good understanding of the state-of-the-art human factors principles, methods, and techniques and be able to discuss these topics with others.
TASKS:	<ol style="list-style-type: none">1. Register for the either the Human Factors and Ergonomics Society (HFES) annual meeting or an upcoming American Nuclear Society (ANS) Nuclear Plant Instrumentation & Control and Human Machine Interface Technologies (NPIC/HMIT) conference and make arrangements for travel. If these particular conferences are not available, your supervisor can consider if an alternate conference such as the Applied Human Factors and Ergonomics conference would be appropriate.2. Review the agenda for the conference before attending to find technical sessions that may be relevant to NRC activities.3. Develop a strategy for attendance that allows you to learn about nuclear human factors as well as other domains.4. Attend the conference.5. Discuss what you learned with your supervisor. Describe how the principles of NUREG-0711 and other guidance are related to what you learned. Were there new methods or practices presented that advance the state-of-the-art of human factors (see 10 CFR 50.34(f)(2)(iii))? Are there other lessons that can be learned from other industries/research?6. Share what you learned with others on the Human Factors Team or elsewhere in the agency. This can be done by briefing the team during a meeting, conducting, a Lunch & Learn, or by creating a knowledge management tool.

ISA-8: Interactions with the Office of Nuclear Regulatory Research

TOPIC:	ISA-8: Interactions with the Office of Nuclear Regulatory Research
PURPOSE:	The purpose of this activity is to develop a working knowledge of the human factors resources and capabilities of the Office of Regulatory Research (RES) and how the NRR staff requests research and technical support for RES to support NRR initiatives concerning human performance.
COMPETENCY AREAS:	PC: ORGANIZATIONAL AWARENESS <ul style="list-style-type: none">• Provides support for update of rules, standards and guidance.
LEVEL OF EFFORT:	Determined by the Supervisor
REFERENCES:	<ul style="list-style-type: none">• The most recent approved Five-Year Plan & the current year draft revision to the Five-Year Plan.• Active User Need Requests• COM-100 “NRR Interfaces with RES,” or the RES Office Instruction on new work requests, PRM-001, “Process for New Work Requests.”
EVALUATION CRITERIA:	At the completion of this activity, you should be able to: <ol style="list-style-type: none">1. Identify NRR needs for human factors research or technical support that should be directed to RES human factors staff.2. Work with RES staff to write a request for RES human factors research or technical support that clearly defines NRR’s needs and interact with RES human factors staff to develop statement of work that clearly defines the scope of work required, deliverables, and schedule for implementation.3. Make periodic updates to the Five-Year Plan when a need for a new research project is identified and when significant project milestones are met.
TASKS:	<ol style="list-style-type: none">1. Review the current User Need Requests.2. Review the Five-Year Plan. Take note of the process for updating the review plan as new research needs are identified. Also gain an understanding of the projects that are currently in progress.3. Discuss these projects and the process for defining work with the office of Research with your supervisor.

ISA-9: Work Hour Controls and Fatigue Management

TOPIC:	ISA-9: Work Hour Controls and Fatigue Management
PURPOSE:	The purpose of this activity is to become familiar with NRC's requirements and technical positions concerning the management of worker fatigue at nuclear power plants including relevant guidelines and technical references.
COMPETENCY AREAS:	PC: DEMONSTRATES TECHNICAL KNOWLEDGE <ul style="list-style-type: none">• Basic human factors knowledge relating to fatigue and applicable regulations. PC: ORGANIZATIONAL AWARENESS <ul style="list-style-type: none">• Knowledge of roles of various organizations
LEVEL OF EFFORT:	16 Hours
REFERENCES:	<ol style="list-style-type: none">1. 10 CFR 26, "Fitness for Duty Programs"2. Order 03-038, "Issuance of Order for Compensatory Measures Related to Fitness-for-Duty Enhancements Applicable to Nuclear Facility Security Personnel" April 29, 2003 (ADAMS ML030940198) & the relaxation of this order (ADAMS ML019060582)3. Memorandum from Roy Zimmerman, Director, Office of Nuclear Security and Incident Response to James Dyer, Director, Office of Nuclear Reactor Regulation, "Reply to Licensee's Supplemental Responses to Order EA-03-038 Imposing Compensatory Measures Related to Fitness-for-Duty Enhancements Applicable to Nuclear Facility Security Personnel, October 23, 2003 (ML032960006)4. GL 82-12, "Nuclear Power Plant Staff Working Hours"5. GL 83-14, "Definition of "Key Maintenance Personnel" (Clarification of Generic Letter 82-12)"6. IN 91-36, "Nuclear Plant Staff Working Hours"7. SECY-01-0113, "Fatigue of Workers at Nuclear Power Plants"8. RIS 2002-07, "Clarifications of NRC Requirements Applicable to Worker Fatigue and Self-Declarations of Fitness-For-Duty"9. EPRI-NP-6748, "Control Room Operator Alertness and Performance in Nuclear Power Plant" February 199010. IN 93-81, "Implementation of Engineering Expertise on Shift" DG-5078, "Fatigue Management for Nuclear Power Plant Personnel at Commercial Nuclear Plants Licensed Under 10 CFR Part 53" (ML22264A109)
EVALUATION CRITERIA:	At the completion of this activity, you should be able to:

1. Name the sources of NRC's requirements applicable to worker fatigue, describe the scope of personnel to whom they apply, and describe the major provisions of the requirements.
2. Describe NRC's major findings and conclusions concerning fatigue management in the nuclear power industry as documented in SECY- 01-0113.
3. Name at least three effects of fatigue on human performance, describe at least two effective fatigue mitigation strategies, describe at least two characteristics of shift schedules that are important to fatigue management, and describe in general terms how and why alertness changes as a function of time of day.
4. Describe NRC's requirements applicable to self-declaration of worker fatigue and be able to determine whether a worker's actions related to his or her self-declaration is a protected activity.

TASKS:

1. Review the references to meet the evaluation criteria.
2. Discuss the Evaluation Criteria with a subject matter expert or with your supervisor. Be sure to discuss organizational roles and responsibilities for Part 26 activities at NRC.
3. Review recent examples of exemption request related to fitness for duty. If possible, support the review of an exemption request.

ISA-10: Safety Culture

TOPIC:	ISA-10: Safety Culture
PURPOSE:	The purpose of this activity is to learn NRC's expectations for safety culture at nuclear power plants and how the Reactor Oversight Process (ROP) addresses safety culture.
COMPETENCY AREAS:	PC: DEMONSTRATES TECHNICAL KNOWLEDGE <ul style="list-style-type: none">• Basic knowledge of organizational factors affecting human performance PC: ORGANIZATIONAL AWARENESS <ul style="list-style-type: none">• Basic knowledge of organizations and processes used to address safety culture.
LEVEL OF EFFORT:	8 Hours
REFERENCES:	<ol style="list-style-type: none">1. Safety culture overview2. Safety Culture ROP in TMS (http://grape/readygo/nrr/readandsign/scwe/index.htm).3. RIS 2006-13, "Information on the Changes Made to the Reactor Oversight Process to More Fully Address Safety Culture" (ADAMS ML061880341).4. RIS 2005-018, "Guidance for Establishing and Maintaining a Safety Conscious Work Environment" (ADAMS ML052220239).5. SECY-06-122, "Safety Culture Initiative Activities to Enhance the Reactor Oversight Process and Outcomes of the Initiatives" (ADAMS ML061320282).6. IMC 1245 C-12 Safety Culture Assessor Qualification Journal
EVALUATION CRITERIA:	At the completion of this activity, you should be able to: <ol style="list-style-type: none">1. Define safety culture and safety conscious work environment (SCWE) and discuss why they are important.2. Discuss the treatment of safety culture components by the ROP.3. Discuss the agency's graded approach to dealing with potential safety culture issues as licensee performance declines.
TASKS:	The activities listed below shall be performed under the guidance of a Subject Matter Expert or your Branch Chief: <ol style="list-style-type: none">1. Review the references to meet the evaluation criteria.2. Complete the Safety culture ROP computer-based training.3. Discuss the evaluation criteria with a Subject Matter Expert or with your Branch Chief.4. Review the IMC 1245 C-12 Safety Culture Assessor Qualification Journal and determine if you would like to be eligible to be a Safety Culture Assessor. If so, discuss training and/or

developmental activities you should take to meet the eligibility guidance with your Branch Chief.

Draft

On-the-Job Training

OJT-1: Advanced Human Factors Discussion Sessions

TOPIC:	OJT-1: Advanced Human Factors Discussion Sessions [Under Development]
PURPOSE:	The purpose of this activity is to discuss recent human factors research, regulatory experience, and other contemporary topics. This will provide continuing education opportunities for human factors staff and help develop knowledge management tools.
COMPETENCY AREAS:	PC: DEMONSTRATES TECHNICAL KNOWLEDGE <ul style="list-style-type: none">• Human factors engineering PC: ORGANIZATIONAL AWARENESS <ul style="list-style-type: none">• Understanding the roles of other organizations PC: COMMUNICATION <ul style="list-style-type: none">• Producing knowledge management tools for all staff PC: ANALYSIS AND REASONING <ul style="list-style-type: none">• Understanding advanced human factors topics
LEVEL OF EFFORT:	Will vary based on the scope of the knowledge management tool being developed. Work with your supervisor to ensure a reasonable product commensurate with the time available.
REFERENCES:	1. {create a database of past activities and link to it}
EVALUATION CRITERIA:	At the completion of this activity, you should have published {X} knowledge management tools that have been reviewed and approved by your supervisor.
TASKS:	<ol style="list-style-type: none">1. Attend at least one of Advanced Human Factors Discussion Sessions or another meeting approved by your supervisor (see staff for a schedule).2. Develop a draft knowledge management tool based on the content of each session. This may include Nuclepedia pages, NUREGs, videos, or other materials that can be used to document the discussion and make it accessible to other staff in the future.3. Perform quality control by adding additional content, such as additional technical perspectives from other experts and reference material.4. Have your supervisor review and approve of your product.5. Once it is approved, publish your product in the appropriate repository (such as Nuclepedia).

OJT-2: Attend a Pre-Application License Amendment Meeting with Senior Human Performance Staff

TOPIC:	OJT-2: Attend a Pre-Application License Amendment Meeting with Senior Human Performance Staff
PURPOSE:	To familiarize staff with purpose, practices, and conduct of pre-application meetings with licensees and applicants with a specific focus on human factors issues that arise.
COMPETENCY AREAS:	PC: DEMONSTRATES TECHNICAL KNOWLEDGE PC: ORGANIZATIONAL AWARENESS PC: COMMUNICATION PC: ANALYSIS AND REASONING
LEVEL OF EFFORT:	4 Hours
REFERENCES:	<ul style="list-style-type: none">• Chapter 18 and supporting guidance OR Any Applicable guidance related to Part 53
EVALUATION CRITERIA:	At the end of this activity, you should have completed all of the tasks associated with pre-application process for an upcoming licensing action. In addition, you should be able to describe the pre-application process and appropriate staff conduct during the process with your supervisor.
TASKS:	<ol style="list-style-type: none">1. Review the reference material.2. Speak with a project manager about the limitations that staff have when conducting pre-application public meetings.3. Observe a pre-application meeting with a licensee or potential applicant for a human factors license review. A qualified human factors review should attend with you.4. While you are at the meeting take note of practices that the licensee/applicant proposes that may be inconsistent with applicable guidance. The goal is to help ensure that the applicant/licensee does not submit an application that cannot be accepted. Consider factors like implementation plans/results summary reports and scope/breadth of information (see NUREG-0711).5. Communicate any concerns you have with the qualified human factors reviewer at an appropriate time.6. Participate in any post-meeting debriefs and provide input to the project manager if requested.

OJT-3: Perform an HFE Acceptance Review for Licensing Actions

TOPIC:	OJT-3: an HFE Acceptance Review for Licensing Actions
PURPOSE:	To familiarize staff with procedures and types of human factors issues that are likely to be encountered while conducting an acceptance review.
COMPETENCY AREAS:	PC: DEMONSTRATES TECHNICAL KNOWLEDGE PC: ORGANIZATIONAL AWARENESS PC: COMMUNICATION PC: ANALYSIS AND REASONING
LEVEL OF EFFORT:	The amount of time varies based on the assignment. Typically, acceptance reviews are estimated to take no more than 10% of the time allocated for a licensing action.
REFERENCES:	<ol style="list-style-type: none">1. LIC-109, "Acceptance Review Procedures for Licensing Basis Changes"2. Licensing documents submitted with an application under acceptance review as assigned by your supervisor.3. Examples of recent acceptance reviews. Be sure to find an example of at least one acceptance review where the staff did not accept the application.
EVALUATION CRITERIA:	By the end of this activity, you should have completed the acceptance review process for one licensing action including making a recommendation to your supervisor to accept, not-accept, not-accept with opportunity to supplement.
TASKS:	<ol style="list-style-type: none">1. Attend pre-submittal meetings with a qualified staff member. Provide appropriate guidance to the applicant/licensee to help ensure that they create an application that can be accepted.2. Review the license application using LIC-109 as guidance. Assess the scope of the technical information (breadth and depth) and assess the resources needed to conduct a technical review.3. Keep records of any potential deficiencies in the application and discuss them with a qualified technical reviewer.4. Make a recommendation, in writing, to your supervisor regarding whether or not the application should be accepted for technical review. Be sure to address the guidance in LIC-109.5. Participate in any meetings with project managers and continue to advise them until a final decision is made.

6. Discuss your experience with the process with a qualified staff member. Consider how the process would have been different if a different decision regarding the acceptability of the application were made. Be sure to discuss the options and process used when an application is not accepted.

Draft

OJT-4: Human Factors Inspections/Audits

TOPIC:	OJT-4: Inspections and Audits
PURPOSE:	To familiarize staff with the practices and procedures used to conduct inspections and regulatory audits supporting human factors licensing activities and ITAAC.
COMPETENCY AREAS:	PC: DEMONSTRATES TECHNICAL KNOWLEDGE <ul style="list-style-type: none">• Human factors engineering PC: ORGANIZATIONAL AWARENESS <ul style="list-style-type: none">• Understanding the roles of other organizations PC: COMMUNICATION <ul style="list-style-type: none">• Producing knowledge management tools for all staff PC: ANALYSIS AND REASONING <ul style="list-style-type: none">• Understanding advanced human factors topics
LEVEL OF EFFORT:	Varies depending on available opportunities to conduct an inspection/audit. The review of reference material may take around 8 hours. The time to conduct the inspection/audit may range from 20 hours to more than 100 hours depending on the project.
REFERENCES:	<ol style="list-style-type: none">1. IP 65001.23 “Inspection of Human Factors Engineering Verification and Validation ITAAC”2. IP 65001.24 “AP1000 Human Factor Engineering (HFE) Task Support Verification”3. IP 65001.25 “Inspection of Human Factors Engineering Design Verification Acceptance Criteria (DAC) – Related ITAAC”4. IP 65001.26 “Inspection of Human Engineering Discrepancy (HED) Resolution Verification”5. IP 52003 “Digital Instrumentation and Control Modification Inspection”6. Examples of recent ITAAC Closure Documents7. Materials used in NRC inspection training such as G-105, or G-205 in TMS.8. Examples of regulatory audit/inspection plans and reports
EVALUATION CRITERIA:	By the end of this activity, you should have: <ul style="list-style-type: none">• Completed any training related to inspections/audits as determined by your supervisor.• Reviewed the reference materials and had a discussion with your supervisor about how human factors inspections and audits are conducted.

- If your supervisor determines that it is practical, you should support a human factors audit or inspection.

TASKS:

1. Take any training related to inspections/audits as assigned by your supervisor.
2. Review the reference material with a focus on understanding how human factors audits and inspections are conducted. Be sure to review some examples of recent audit/inspection plans as well as the subsequent audit/inspection report.
3. Meet with a subject matter expert and discuss how these documents are used in practice.
4. Speak to your supervisor to see if there are any upcoming audits/inspections that you can support. If so, help plan, conduct, and document a human factors inspection or audit.

Draft

OJT-5: Prepare a Human Factors Draft Safety Evaluation Report with Requests for Additional Information

TOPIC:	OJT-5: Prepare a Human Factors Draft Safety Evaluation Report with Requests for Additional Information
PURPOSE:	To provide staff with experience conducting human factors technical reviews and documenting the results in a draft safety evaluation report (SER) as well as to practice writing high-quality requests for additional information (RAIs).
COMPETENCY AREAS:	PC: DEMONSTRATES TECHNICAL KNOWLEDGE PC: ORGANIZATIONAL AWARENESS PC: COMMUNICATION PC: ANALYSIS AND REASONING
LEVEL OF EFFORT:	Depends on the scope of the license amendment.
REFERENCES:	<ul style="list-style-type: none">• Chapter 18 and any associated guidance pertinent to your review• RAI Checklist/website/resources• Check the TR card for appropriate references or cross reference to that document.• George's desk guides²/1764 cheat sheet- HOPPER• LIC-115, "Processing Requests for Additional Information," Revision 1
EVALUATION CRITERIA:	By the end of this activity, you should have completed a draft safety evaluation with open items and issued requests for additional information for each open item to the licensee/applicant. In addition, you should be able to describe the process with your supervisor.
TASKS:	<ol style="list-style-type: none">1. Speak with your supervisor to get an assignment for a project that is likely to need RAIs.2. Speak to the project manager and/or other staff to see if an appropriate precedent review has a template SER.3. Conduct the technical review in accordance with applicable guidance.4. Create a draft safety evaluation based on the template SER noting any technical deficiencies or gaps where the application does not meet the applicable acceptance criteria. Brief your

² George's Desk Guides are informal knowledge management documents that can be accessed in the HOPPER. If you have difficulty locating them, please speak to your supervisor.

supervisor on your findings. Be sure to describe the connection of any RAIs you are proposing and be able to tie back to specific gaps in the guidance. Also explain the limitations of how non-docketed audit information can be used to support SE findings and where docketed RAI/RCI responses must be used instead?

5. Draft an RAI for each deficiency identified above, making sure to use the appropriate RAI quality checklist and other resources to ensure high quality RAIs. Discuss your draft RAIs with a qualified reviewer or your supervisor and make revisions, if necessary, then put them through the RAI review process. Be sure to update the project management software (RPS).
6. Work with the project manager to issue the RAIs, this will usually involve a clarification call with the licensee/applicant.
7. Discuss your observations of the process writing your draft SER and RAIs with a qualified technical reviewer. Discuss any challenges you had and any tools that you found helpful. Consider any ways that can be more efficient during your next review. Be sure to discuss the differences between issuing RAIs and audit questions.

OJT-6: Finalize an HFE Safety Evaluation Input

TOPIC:	OJT-6: Finalize an HFE Safety Evaluation Input
PURPOSE:	To provide staff with experience conducting human factors technical reviews and documenting the final results in a safety evaluation report (SER) as well as to practice resolving outstanding requests for additional information (RAIs) responses.
COMPETENCY AREAS:	PC: DEMONSTRATES TECHNICAL KNOWLEDGE PC: ORGANIZATIONAL AWARENESS PC: COMMUNICATION PC: ANALYSIS AND REASONING
LEVEL OF EFFORT:	The level of effort varies based on the scope of the assigned project.
REFERENCES:	<ul style="list-style-type: none">• Technical Reviewer Qualification Card in ADM-504• The HOPPER and other resources in OJT-6• A precedent draft SER & associated RAIs and RAI responses
EVALUATION CRITERIA:	By the end of this activity, you should have completed a final safety evaluation input. During this process you should have reviewed licensee/applicant RAI responses and updated the draft accordingly. In addition, you should be able to describe the process with your supervisor.
TASKS:	<ol style="list-style-type: none">1. Review the draft safety evaluation, the RAIs, and the RAI responses. Assess if the RAI responses adequately resolve discussed in the RAI. If not, additional RAIs may be necessary. You should speak with your supervisor and project manager to align on a path forward.2. If the RAI responses are sufficient to address the issues in the RAI, you should inform the project manager and update the draft SER accordingly.3. Finalize your SER and submit it to your supervisor for review. Make any changes requested. Then coordinate with the project manager to deliver the final product. Update the project management software accordingly.4. Some safety evaluations get extra scrutiny from various parties such as upper management, the Commission, the Advisory Committee for Reactor Safeguards (ACRS), Office of General Counsel, and others. Consider the factors that might impact the levels of review and discuss this with a qualified human factors reviewer or the project manager. Discuss with your supervisor how you would go about preparing for these levels

of oversight. (Note: Some of these parties may ask about topics that you chose to not include in your SER. How would you prepare for this interaction? Are there work practices you can adopt to prepare you for these kinds of interactions?)

Draft

OJT-7: Communications – Briefing Others Outside the Human Factors Discipline

TOPIC:	OJT-7: Communications – Briefing Others Outside the Human Factors Discipline
PURPOSE:	To provide staff an opportunity to prepare for, and conduct, a formal briefing to stakeholders and to gain experience verbally communicating human factors principles to audiences that have limited exposure to the field of human factors.
COMPETENCY AREAS:	PC: COMMUNICATION
LEVEL OF EFFORT:	2-4 Hours
REFERENCES:	TMS has a number of resources available to help you prepare briefings and presentations.
EVALUATION CRITERIA:	By the end of this activity, you should have successfully completed a formal briefing to senior managers, ACRS, or another party of your supervisor's choosing and completed any takeaway requests that come out of the meeting.
TASKS:	<ol style="list-style-type: none">1. Discuss appropriate opportunities to conduct a briefing with your supervisor.2. Schedule the briefing with appropriate parties.3. Prepare materials such as a one-pager, brief-on-a-sheet, slides, or other material appropriate for the brief.4. Conduct the briefing.5. Complete any follow-up actions.6. Discuss the meeting with your supervisor. Discuss if there anything that you can improve for the next briefing.

OJT-8: Control Room Observations

TOPIC:	OJT-8: Control Room Observations
PURPOSE:	To provide staff an opportunity to see how operators and inspectors behave while in a nuclear power plant control room/simulator. This is essential to understanding the conduct of operations at nuclear facilities and to understanding the role of NRC staff while on site.
COMPETENCY AREAS:	PC: DEMONSTRATES TECHNICAL KNOWLEDGE <ul style="list-style-type: none">• Human factors engineering, conduct of operations. PC: ORGANIZATIONAL AWARENESS <ul style="list-style-type: none">• Understanding the roles of NRC inspectors
LEVEL OF EFFORT:	24-36 Hours
REFERENCES:	Site access documents as provided by the facility.
EVALUATION CRITERIA:	By the end of this activity, you should have an understanding of how operators conduct normal operations as well as abnormal/emergency operations (if conditions allow). In addition, you should have a general understanding of the role of resident inspectors at the facility. You should also understand expectations for behavior when observing activities in the control room or plant simulator.
TASKS:	<ol style="list-style-type: none">1. Discuss opportunities to conduct a plant observation with your supervisor. Your supervisor should work with project managers to identify appropriate sites for observation that will be unobtrusive to site activities. Ideally your observations should try to observe both normal and abnormal operations in the main control room and simulator. For instance, you may be able to spend a few hours with the resident observing normal operations in the main control room, then move to the simulator to watch training scenarios where the plant is tripped. Operator licensing exams may present excellent opportunities to see a wide variety of operator actions in the control room and in the plant. This will also provide an understanding of what operator licensing staff do.2. Make sure your Site Access training (H-100S) is complete and current in TMS and ensure that your name is on the "Site Access List."³

³After completing site access training, in order to be added to the agencywide "Site Access List," staff should fill out a [site access request form](#) that is linked on the curriculum description page in TMS and on the agency internal homepage. This training must be completed every 5 years.

3. Make travel arrangements.
4. Discuss expectations for your observations with your supervisor based on the activities on site. Write down a few goals that you hope to see so that you can share this in advance with the resident inspector.
5. Visit the site. Be sure to coordinate with resident inspectors so that you know how to access the site. Understand any special rules and/or access limitations before arriving.
6. Follow all safety rules and instructions given by the resident and/or facility staff.
7. Upon your return, debrief your supervisor. Discuss what you saw, and how you expect to use this knowledge while conducting technical reviews.