

**KNOWLEDGE AND ABILITIES
CATALOG REVISION PLAN**

December 2008

PURPOSE:

The Knowledge and Abilities (K/A) Catalogs for Nuclear Power Plant Operators (NUREG-1122 and NUREG 1123) provide the content basis for development of licensing examinations for reactor operators (RO's) and senior reactor operators (SRO's). These catalogs were established in 1985 and last updated in 2007.

Construction of the following types of nuclear power plants is being considered:

- ABWR
- US-APWR
- AP1000
- ESBWR
- EPR

The existing K/A Catalogs may not comprehensively reflect the knowledge and abilities that operators will need to operate the nuclear power plants listed above. The purpose of this project is to revise the NRC K/A Catalogs to enable utilities and the NRC to develop valid operator licensing examinations for new nuclear power plants. Revising the K/A catalogs for existing plants is not a purpose of this project.

Utility and vendor members of the NEI New Plant Licensed Operator Task Force will propose two new K/A Catalogs for the passive (AP1000 and ESBWR) nuclear power plants and recommend updates to the existing K/A catalogs for the advanced/evolutionary (ABWR, US-APWR, EPR) nuclear power plants. Updates to the existing K/A Catalogs for evolutionary new plants (US-APWR, ABWR, EPR) will be completed as addendums to ensure K/A Catalogs for existing PWRs and BWRs are not altered by this project. The two new K/A Catalogs for passive design plants, and the revised existing K/A Catalogs for PWR and BWR designs will be submitted to the NRC for approval in time to support development of licensed operator examinations for new nuclear power plants in 2012.

BACKGROUND:

The NRC established the first K/A Catalog (Revision 0) in 1985 to better align the knowledge and abilities required for an operator license and to achieve a content-valid examination process. The K/A catalog project drew extensively upon the INPO generic K/A's that had been developed from the generic Job and Task Analysis (JTA) bibliography as the basis for the K/A catalog. These INPO generic JTA K/A's were subsequently modified and ranked by an expert panel of industry RO's and SRO's on the basis of importance-to-safety. This effort was one of the first voluntary collaborative efforts between the NRC and industry and represented a snapshot of the nuclear industry's understanding of what operators should master in order to safely operate a nuclear power plant.¹

Approximately ten years after the original K/A Catalog was completed, the NRC commissioned a project to update the catalog as a result of changes that had occurred in the industry since 1985. Revision 1 to the PWR K/A Catalog modified the form and content of the original catalog. The K/As

¹ Point Paper: The Case to Update the Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Pressurized Water Reactors (NUREG-1122), Brian Haagensen, 2003

were linked to their applicable 10 CFR 55 item numbers. SRO level K/A's were identified by 10 CFR 55.43 item numbers. The plant-wide generic and system generic K/A's were combined in one section. Systems were organized into nine safety functions and the emergency and abnormal evolutions were reorganized and expanded. In 1998, Revision 2 was issued to incorporate corrections to the Rev. 1 catalog that were identified during a pilot testing program associated with revision of 10 CFR 55 and implementation of NUREG-1021, Interim Rev. 8, "Operator Licensing Examination Standards for Power Reactors."²

Since December 2006, an industry task force facilitated by the Nuclear Energy Institute (NEI), has reviewed the needs of licensing operators for the new nuclear plants in comparison to the current operator licensing regulations and processes denoted in Reg. Guide 1.8, ANSI 3.1, 10CFR 50.120, 10CFR 55, RG 1.149 and NUREG-1021. This review determined that the new nuclear power plant designs may result in new knowledge and ability requirements for operators and that some knowledge and ability requirements in existing K/A Catalogs may no longer be applicable. Additionally, the new passive nuclear plant designs may require significant changes in the importance ratings of many of the existing K/As. Therefore, an effort is necessary to review and modify the existing K/As to ensure that they support the licensing of operators of new nuclear power plant types.

PLAN:

This plan describes the process for the revision of existing K/A Catalogs and development of new K/A catalogs for the new nuclear plant designs. Key stakeholders, including utility, vendor, NRC, and INPO representatives will participate in the project. For each new nuclear power plant type, an analysis of the applicability of existing K/As for new nuclear power plant types will be performed, and deletions, additions, or revisions identified.

Significant K/A revision project activities include the following:

- Develop Project Scope
- Develop Project Milestones
- Develop Methodology for Gap Analysis
- Gain NRC Concurrence of Plan
- Perform Gap Analysis
- Determine Importance Ratings
- Update NRC on Gap Analysis and Importance Ratings
- Draft revised and new K/A Catalogs
- Submit proposed catalogs to the NRC
- Review and Comment on proposed catalogs by NRC
- Incorporate NRC Comments
- NUREG Issued by NRC

² NUREG-1122, Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Pressurized Water Reactors, Abstract. NRC, June 1998

PLAN DETAILS:

Project Scope

Utility and vendor members of the NEI New Plant Licensed Operator Task Force will propose two new K/A Catalogs for the passive (AP1000 and ESBWR) nuclear power plants and recommend updates to the existing K/A catalogs for the advanced/evolutionary (ABWR, US-APWR, EPR) nuclear power plants.

Project Milestones

- Write Problem Statement October 2008
- Develop Project Milestones October 2008
- Develop Methodology for Gap Analysis December 2008
- Gain NRC Concurrence of Plan January 2009
- Perform Gap Analysis Design Specific
- Determine Importance Ratings Design Specific
- Update NRC on Gap Analysis and Importance Ratings Design Specific
- Draft the New and Revised K/A Catalogs (NUREGS) Design Specific
- Submit to NRC for Review and Comment January 2011
- NRC Review and Comment on Catalogs March 2011
- Incorporate NRC Comments June 2011
- NUREG Issued by NRC January 2012(ABWR)
January 2012(ESBWR)
November 2012(US-APWR/EPR)
January 2012(AP1000)

Gap Analysis Methodology:

1. Review the existing K/A's.
2. Review new nuclear plant design and operating information (as available)
 - a. System Descriptions
 - b. Operating Guidelines
 - c. Design Control Document
 - d. Human Factors Engineering Inputs
 - e. Task List
 - f. Task Analysis Data
3. Identify current K/A's that apply to new technology.
 - a. Exactly the Same
 - b. Some Modification Required
 - c. Not Applicable
 - d. Identify areas of Common Scope
4. Identify new K/A's associated with new technology.
 - a. New System
 - b. New Component
 - c. New Procedure
 - d. Human System Interface(HSI)
5. Format for NUREG revisions
 - a. Create two new NUREG's for Passive designs
 - b. Revise existing NUREG's for advanced and evolutionary designs
 - c. Consistent as Possible

NRC Concurrence

Conduct meeting with NRC and gain concurrence on plan.

Perform Gap Analysis

Each utility/vendor group performs the gap analysis as information is available and in time to support operator licensing needs.

Determine Importance Ratings

Subject-matter experts (design engineers, licensed operators, previously licensed operators, or experienced international operators) will use the current importance to safety definitions to determine the importance rating for new or revised K/As. The K/As will be assigned the 10 CFR 55 designators as appropriate (RO, SRO, and simulator).

Update NRC

Task force members will brief NRC on the proposed K/As and importance ratings.

Draft the New and Revised K/A Catalogs

- New Plant Licensed Operator Task Force will Oversee the Plan
- Use of Common Template
- Four Task Force Subcommittees comprised of vendors and utilities will ensure the work is completed
- Plan update meeting with the NRC staff separately for the four task subcommittees

Brief the NEI sponsored Licensed Operator Focus Group (LOFG) on the proposed changes from this project

Proposed changes will be presented to the LOFG to ensure changes do not impact current operating reactors.

Submit to NRC for Review and Comment

The NRC will have the opportunity to comment on the specific K/A's submitted by each task force subcommittee.

Incorporate NRC Comments

Comments will be addressed by the task force subcommittee.

K/A NUREG Issued by NRC

NRC implements the NUREG approval process.