
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

APR1400 Design Certification

Korea Electric Power Corporation / Korea Hydro & Nuclear Power Co., LTD

Docket No. 52-046

RAI No.: 374-8481
SRP Section: 18 – Human Factors Engineering
Application Section:
Date of RAI Issue: 01/22/2016

Question No. 18-98

NUREG-0711, Criterion 8.4.3(4) states in part that “the applicant’s style guide(s) should contain procedures for determining where and how HFE guidance will be used in the overall design process.”

The last sentence in the Style Guide, Appendix D, Section 1.9, “Channel Identification,” appears to the staff to be missing because it indicates that some information is to be provided.

Please provide any missing information.

Response

The color-coded nameplates for the safety console channels will be added to Section 1.9 of the Style Guide, as indicated in the attachment associated with this response.

Impact on DCD

There is no impact on the DCD.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

There is no impact on the Technical Specifications.

Impact on Technical/Topical/Environmental Reports

Technical report APR1400-E-I-NR-14012-P/NP, Rev.0, "Style Guide," Section 1.9 will be revised, as indicated in the attachment associated with this response.

- Character Height = $0.004 \times \text{Reading Distance}$ = Minimum Character Height (@ 15 min. of arc)
- Reading Distance = 93.4 cm
- Width = 1.52 cm (Height)
- Stroke Width = 0.42 cm (Height) for dark lettering on light background = 0.31 cm (Height) for light letters on dark background
- Descriptive name
 - Single Component - 0.5 cm (0.2 inch)
 - Group of Components - 1.0 cm (0.4 inch)
 - Panel or Cabinet - 1.27 cm (0.5 inch)
 - Safety Console Section - 2.54 cm (1.0 inch)

1.7 Material

Label plates and mimic lines should be made of low glare material. In areas where the plate may be abused, stronger, less scratchable material is recommended.

1.8 Mimics

A mimic is the use of lines to show the relationship between system and components or to show the direction of fluid flow or electrical distribution. Arrows, whose base is wider than the mimic line, should be used to show the direction of the fluid or electrical flow. Arrows should be used only when the flow is in one direction.

Fluid mimic lines should be black. Electrical mimic lines should conform to the following convention:

- SY-765 kV - Orange
- SY-154 kV - Silver
- MP-22 kV - White
- AP-13.8 kV - Red
- AP-4.16 kV - Blue
- AP-480 V - Yellow

The start and end of each mimic should be identified; and if it connects to another mimic or extends to another panel, this should be indicated. Mimics should be made (cut) from the same 0.16 cm (1/16") thick material as labels.

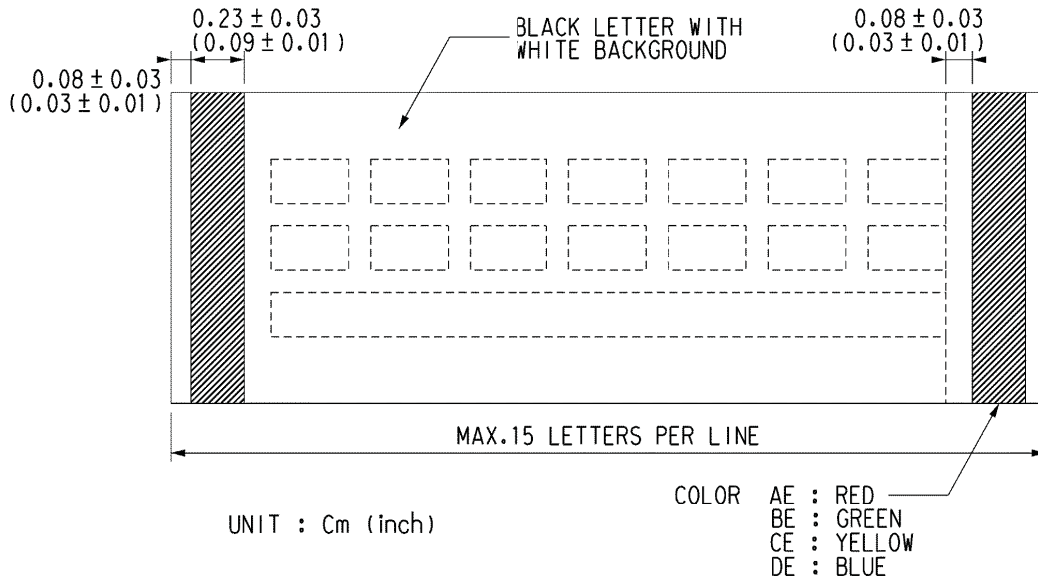
1.9 Channel Identification

Regarding identification of redundant Class 1E components, the following method of identifying separation group channelized controls and indicators on the safety console should be applied. This is in accordance with USNRC Reg. Guide 1.75 and in keeping with KEPCO's color-coding for related plant equipment. Each channel A, B, C, or D device on the safety console should be identified by the following color-coded nameplates.

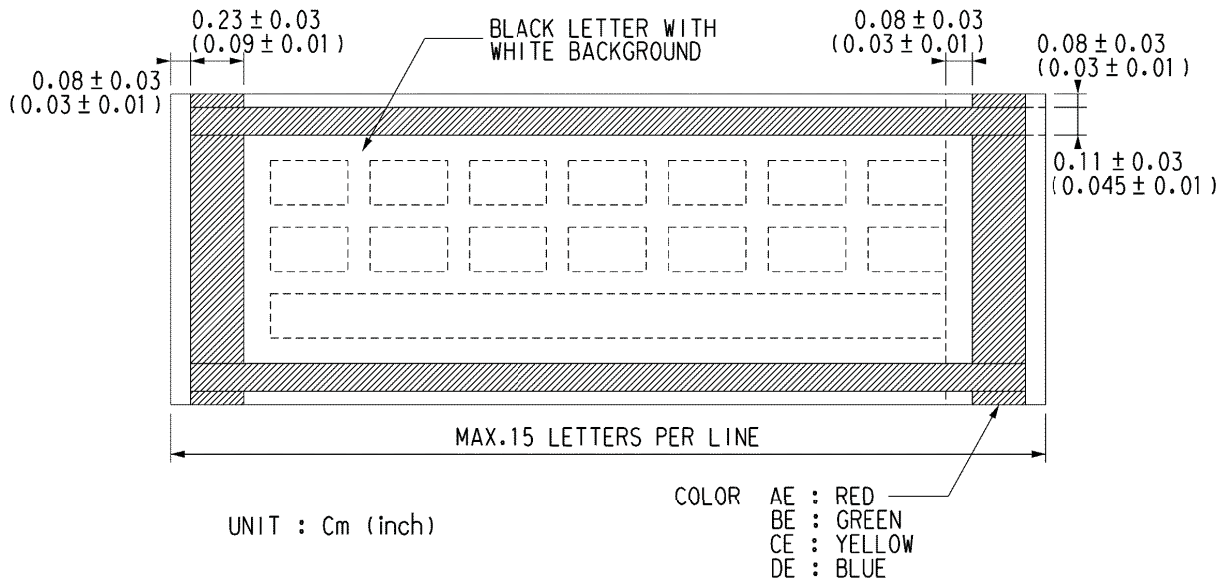


← Insert "A" on following page

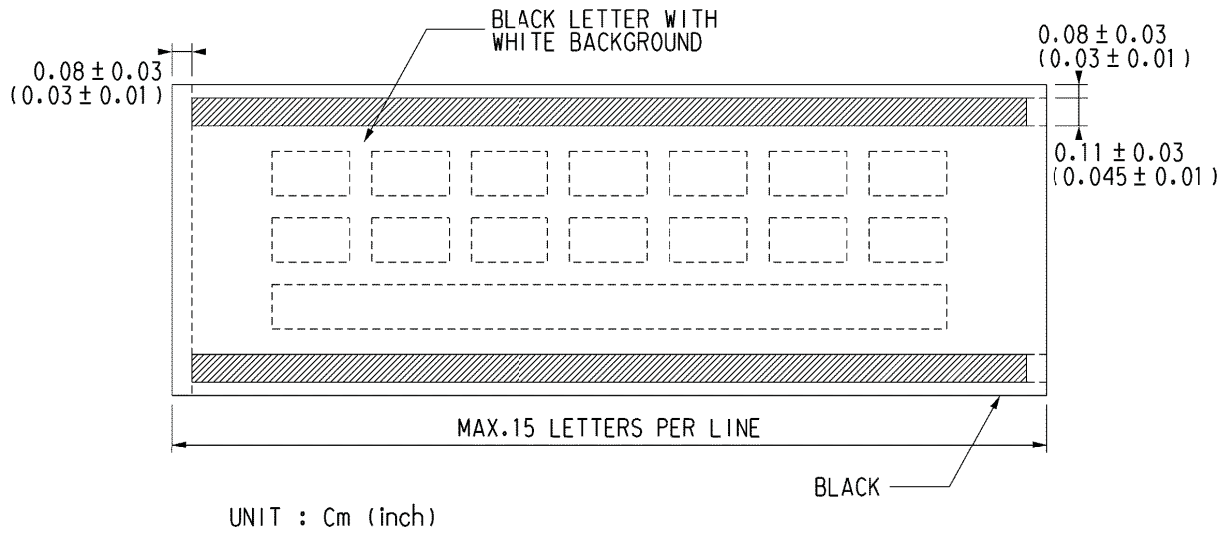
1. Class 1E Nameplate



2. Class 1E + RG 1.97 Nameplate



3. Non-Class 1E + RG 1.97 Nameplate



This scheme gives operators the easiest method of identifying the channelized components.

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RAI No.: 374-8481
SRP Section: 18 – Human Factors Engineering
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Question No. 18-103

APR1400-E-I-NR-14001-P, Rev. 0, “Human Factors Engineering Program Plan” (HFE PP), Section 3, “Methodology Overview,” states, “By reference, these eight IPs are incorporated into the HFEP.” The HFE PP and the eight IPs are listed in Tier 2, Chapter 1, Table 1.6-2, “List of Technical Reports.” However, the Basic HSI TeR and the Style Guide are not included. Since Chapter 18 has been submitted as DAC, the detail in these documents is needed to provide a complete design certification.

Please add these documents to Table 1.6-2.

Response

The Basic Human-System Interface technical report and Style Guide will be listed in Tier 2, Chapter 1, Table 1.6-2, “List of Technical Reports,” as indicated in the attachment associated with this response.

Impact on DCD

APR1400 DCD, Tier 2, Chapter 1, Table 1.6-2 will be revised, as indicated in Attachment to this response.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

There is no impact on the Technical Specifications.

Impact on Technical/Topical/Environmental Reports

There is no impact on any Technical, Topical, or Environmental Report.

APR1400 DCD TIER 2

Table 1.6-2 (1 of 2)

List of Technical Reports

| Report Number ⁽¹⁾ | Title | DCD Tier 2 Section |
|--|--|--------------------------|
| APR1400-E-A-NR-14002-P-SGI | Physical Security Design Features | 13.6.2 |
| APR1400-E-I-NR-14001-P APR1400-E-I-NR-14001-NP | Human Factors Engineering Program Plan | 18.1 |
| APR1400-E-I-NR-14002-P APR1400-E-I-NR-14002-NP | Operating Experience Review Implementation Plan | 18.2 |
| APR1400-E-I-NR-14003-P APR1400-E-I-NR-14003-NP | Functional Requirements Analysis and Function Allocation Implementation Plan | 18.3 |
| APR1400-E-I-NR-14004-P APR1400-E-I-NR-14004-NP | Task Analysis Implementation Plan | 18.4 |
| APR1400-E-I-NR-14006-P APR1400-E-I-NR-14006-NP | Treatment of Important Human Actions Implementation Plan | 18.6 |
| APR1400-E-I-NR-14007-P APR1400-E-I-NR-14007-NP | Human-System Interface Design Implementation Plan | 18.7 |
| APR1400-E-I-NR-14008-P APR1400-E-I-NR-14008-NP | Human Factors Verification and Validation Implementation Plan | 18.10 |
| APR1400-E-N-NR-14001-P APR1400-E-N-NR-14001-NP | Design Features to Address GSI-191 | 6.2.1.1.2.2 6.8.2.2.1 |
| APR1400-E-P-NR-14005-P APR1400-E-P-NR-14005-NP | Evaluations and Design Enhancements to Incorporate Lessons Learned from FUKUSHIMA DAI-CHI Nuclear Accident | 1.9.6, 19.3 |
| APR1400-E-S-NR-14004-P APR1400-E-S-NR-14004-NP | Evaluation of Effects of HRHF Response Spectra on SSCs | 3.7B.1 |
| APR1400-E-S-NR-14005-P APR1400-E-S-NR-14005-NP | Evaluation of Structure-Soil-Structure Interaction (SSSI) Effects | 3.7.2.8 |
| APR1400-E-S-NR-14006-P APR1400-E-S-NR-14006-NP | Stability Check for NI Common Basemat | 3.8.5.4.3 |
| APR1400-F-A-NR-14001-P APR1400-F-A-NR-14001-NP | Small Break LOCA Evaluation Model | 15.6 |
| APR1400-E-I-NR-14011-P APR1400-E-I-NR-14011-NP | Basic Human-System Interface | 18.7 |
| APR1400-E-I-NR-14012-P APR1400-E-I-NR-14012-NP | Style Guide | 18.7 |