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Considerations for the Treatment of Computerized Procedures in Human Reliability Analysis

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CONSIDERATIONS FOR THE TREATMENT OF COMPUTERIZED PROCEDURES IN HUMAN RELIABILITY ANALYSIS

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ABSTRACT

Computerized procedures (CPs) are an emerging technology within nuclear power plant control rooms. While CPs have been implemented internationally in advanced control rooms, to date no US nuclear power plant has implemented CPs in its main control room. Yet, CPs are a reality of new plant builds and are an area of considerable interest to existing plants, which see advantages in terms of easier records management by omitting the need for updating hardcopy procedures. The overall intent of this paper is to provide a characterization of human reliability analysis (HRA) issues for computerized procedures. It is beyond the scope of this document to propose a new HRA approach or to recommend specific methods or refinements to those methods. Rather, this paper serves as a review of current HRA as it may be used for the analysis and review of computerized procedures.

Key Words: human reliability analysis, computerized procedures, methods

1 INTRODUCTION

Computerized procedures (CPs) introduce new technology to the main control room of nuclear power plants. The change in technology from paper-based to computerized procedures is analogous to other control room modernization efforts in which analog systems are replaced by digital systems. The Institute of Electrical and Electronics Engineers (IEEE) Standard 1786 [1] and the Electric Power Research Institute (EPRI) 1015313 standard [2] divide CPs into three types based on the amount of automated support provided by the CP system. A like-for-like replacement of paper-based procedures (PBPs) with CPs (i.e., essentially electronic copies of the PBPs) generally results in a Type 1 CP, in which the basic functionality and mode of operation is maintained across the two technologies. Types 2 and 3 CPs add functionality that was not possible with PBPs. Type 2 CPs embed relevant plant indications directly into the CP system display or linked secondary display, thereby eliminating the need for operators to search for relevant plant readings on control boards. Type 3 CPs embed soft controls in CPs, whereby the operator can control plant functions via software at a local workstation rather than manually control plant functions at the control room panels. Note that this distinction not only applies to upgrades of existing main control rooms but also to new plant designs, which may represent the implementation of newer technologies relative to the existing control rooms in the operating fleet of nuclear power plants.

Despite clear advantages for ease of use, there remain regulatory concerns over the implementation and use of CPs. CPs introduce a new technology into the control room, one that potentially interfaces with the plant computer. The opportunity for the CP hardware or software to fail introduces new failure modes in the control room that are not part of existing plant risk profiles. Moreover, the operator interface with CPs is different than the interaction with existing PBPs, and there is the opportunity for different types of human error in procedure use. Insights on the human factors issues associated with CPs have been captured [3], but there has been no categorization of these insights in terms of human reliability. A central goal for phasing in newer technologies is to ensure that a new system is at least as reliable as the system it is replacing. In terms of human reliability analysis (HRA), the goal is to ensure that operator performance using the newer technology is at least as reliable as performance using the older technology. Such a comparison may be made by estimating the human error probabilities (HEPs) of various human activities, including human failure events (HFEs).

The challenge of new technology is that it, in many cases, is newer than the tools used to evaluate it. Such is clearly the case with CPs and HRA. NUREG-1842, *Evaluation of Human Reliability Analysis Methods Against Good Practices* [4], outlines a variety of HRA methods. Commonly used HRA methods currently in use in the US nuclear industry include THERP, ASEP, SPAR-H, and ATHEANA developed by or for the United States Nuclear Regulatory Commission (US NRC) and HCR/ORE, CBDT, and the EPRI HRA Calculator (which is actually a collection of methods rather than a single method), developed by the Electrical Power Research Institute (EPRI). These methods will be discussed at greater length later in this paper. It is important to note that none of these HRA methods was explicitly designed to deal with CPs. At the present time, these HRA methods have also not provided supplemental guidance to explain how to use these methods to evaluate operator performance with digital systems, including CPs.

Outside the US, there have been two documented efforts to develop HRA methods that support CPs. The first, MERMOS (Méthode d'Evaluation de la Réalisation des Missions Opérateur pour la Sûreté) [5], is a method developed by Electricité de France (EDF) to address HRA in support of the CPs used in the N4 class of reactors. Originally, EDF used ASEP to model operator performance on pre-initiator events and THERP on post-initiator events. However, it was determined that these approaches were very driven by a serial, procedural unfolding of events. The N4 CP system diagnosed situations dynamically, resulting in a less serial event progression. As such, the N4 CPs may be viewed as state-based rather than the more traditional event based or symptom oriented procedures. In order to define HFEs that were more dynamic, the MERMOS approach was developed. The MERMOS method uses CICAs (Caractéristiques Importantes de la Conduite Accidentelle/Key Characteristics for Accident Management)—rules that the operators and CPs follow and that can be reconfigured as required, such as when there is a change to plant state requiring a new response. The primary difference between MERMOS and other methods is its heavy emphasis on the dynamic response of the operator, which is triggered by the rapid reconfiguration of the CPs when the plant state changes. The second approach to HRA for CPs is still under development by the Korea Advanced Institute of Science and Technology (KAIST) [6] and does not yet provide a complete method for review. Since MERMOS is not currently used in the US for nuclear licensing applications and since the KAIST method is still under development, it is important to review primarily the current generation of US HRA methods and consider their suitability for CPs.

CPs represent a combination of factors related to traditional PBPs as well as factors associated with advanced HSIs. Figure 1 provides a representation of the problem space within HRA—CPs feature human error and success opportunities unique to CPs but also overlap to a certain degree with PBPs and with advanced human system interfaces (HSIs). For example, as with PBPs, it may still be possible to omit steps within CPs, but the likelihood is lower with most CP designs. CPs may feature additional checking of step completion, which has the potential to lower the frequency of skipped steps. However, the system is not without tradeoffs. Because in CPs the procedures are part of a software system, there is the opportunity for hardware or software failure, which represents a new failure mode not even possible in PBPs. Additionally, performance issues known to occur in advanced HSIs, such as loss of operator vigilance during automated actions, may also occur in Types 2 and 3 CPs.

In many ways, computerized procedures are a specialized case of advanced HSIs. As such, many of the hardware system and human-system failure modes can be expected to be similar. That said, it is incumbent on the human reliability analyst reviewing scenarios involving operator interaction with CPs to include in their review the human performance features for the advanced control room environment of which the CPs are an integral part.

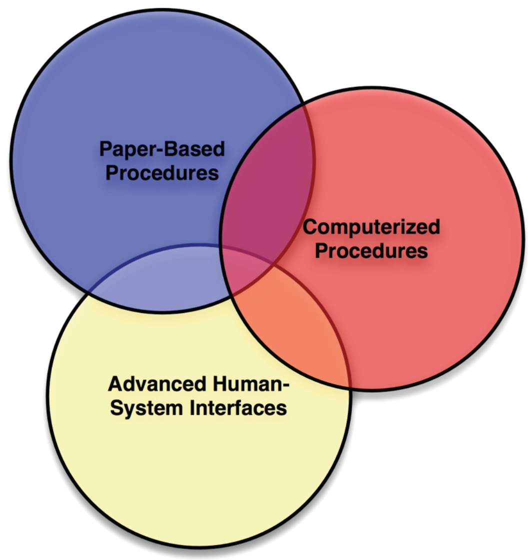

Figure 1. The Relationship Between Computerized Procedures, Paper-Based Procedures, and Advanced Human-System Interfaces in Human Reliability Analysis.

2 HUMAN RELIABILITY ANALYSIS METHODS

2.1 Coverage

In this paper, we briefly review HRA methods commonly used by EPRI and the US NRC, and how these methods treat both paper-based and computerized procedures. The methods discussed include CBDT developed for EPRI and THERP, ASEP, SPAR-H, and ATHEANA developed for the US NRC. Note that these methods closely overlap those methods covered in the EPRI HRA Calculator, with two exceptions:

- HCR/ORE [7], which is found in the EPRI HRA Calculator, is not included at any depth in this discussion because it is strictly used for time-reliability calculations. The extent to which time plays a differential role in the use of paper-based vs. computerized procedures is not currently known. To the extent time margins are known, this method may be applied with equal validity to either paper-based or computerized procedures.
- ATHEANA [8] is discussed here, which is not found in the EPRI HRA Calculator. ATHEANA is a second-generation HRA method that does not feature a narrowly defined taxonomy and therefore provides flexibility suitable for addressing computerized procedures.

Currently, every HRA method in use in the US predates the advent of computerized procedures. As such, the selection of a particular method must follow based on the suitability of that method to the particular computerized procedure issue under analysis. In addition, the analyst may wish to consult NUREG-1842, *Evaluation of Human Reliability Analysis Methods Against Good Practices* [4], which provides a comprehensive set of criteria that are useful in evaluating particular HRA methods outside the context of computerized procedures. In NUREG-1842, a general framework for evaluating and using a particular HRA method is provided. To augment the guidance in NUREG-1842 with respect to HRA for computerized procedures, two considerations are important:

- For a qualitative analysis, it is important that the method allow consideration of the types of HFEs and PSFs that affect operator performance in using computerized procedures.
- For quantitative analysis, it is important that the method adequately address insights specific to computerized procedures derived from the qualitative analysis.

2.2 NRC Backed HRA Methods

2.2.1 THERP

Beginning with the earliest HRA method, the Technique for Human Error Rate Prediction (THERP) [9], HRA methods have to varying degrees addressed procedures. THERP uses procedures in the determination of the nominal HEP. For example, in the screening phase depicted in THERP Table 20-2, procedures are the primary determiner of the HEP. The "failure to perform rule-based actions correctly when written procedures are available and used" is given an HEP of 0.05 per critical step without recovery factors and 0.025 with recovery factors. However, if written procedures are not available or used, the screening HEP goes up to 1.0. In other words, in a conservative screening analysis using THERP, no credit is given for operator performance in rule-based actions by control room personnel after diagnosis of an abnormal event *when* procedures are unavailable or aren't used. Procedures also figure prominently in the detailed (non-screening) analysis of THERP. For example:

- Table 20-5, "Estimated HEP per item (or perceptual unit) in preparation of written material"—omitting a step from a procedure or writing an item incorrectly per a procedure, which is clarified to mean errors in the preparation of written procedures.
- Table 20-6, "Estimated HEP related to failure of administrative control"—use of written procedures during normal vs. abnormal operating conditions or use of calibration and maintenance procedures.
- Table 20-7, "Estimated probabilities of errors of omission per item of instruction when use of written procedures is specified"—essentially the entire table is related to the use of written procedures.

THERP also considers procedures as a modifier (essentially, a performance shaping factor or PSF). For example, the differential effects of procedures on stress for skilled and novice operators are accounted for in THERP Table 20-16. Having routine, procedurally guided tasks results in lower overall multipliers applied to the nominal HEP than does performing tasks without procedures.

THERP is the predecessor of modern HRA methods. With a fifty-year history, THERP predates emerging control room technologies and digital systems. As discussed in Chapter 10 of NUREG/CR-1278, THERP features explicit coverage of procedures, in part in response to the need to develop symptom-based procedures following the Three Mile Island incident in the US. While THERP's treatment of procedures is adequate for paper-based procedures, there is no bridge within the documentation to newer technologies and, of course, no treatment of computerized procedures.

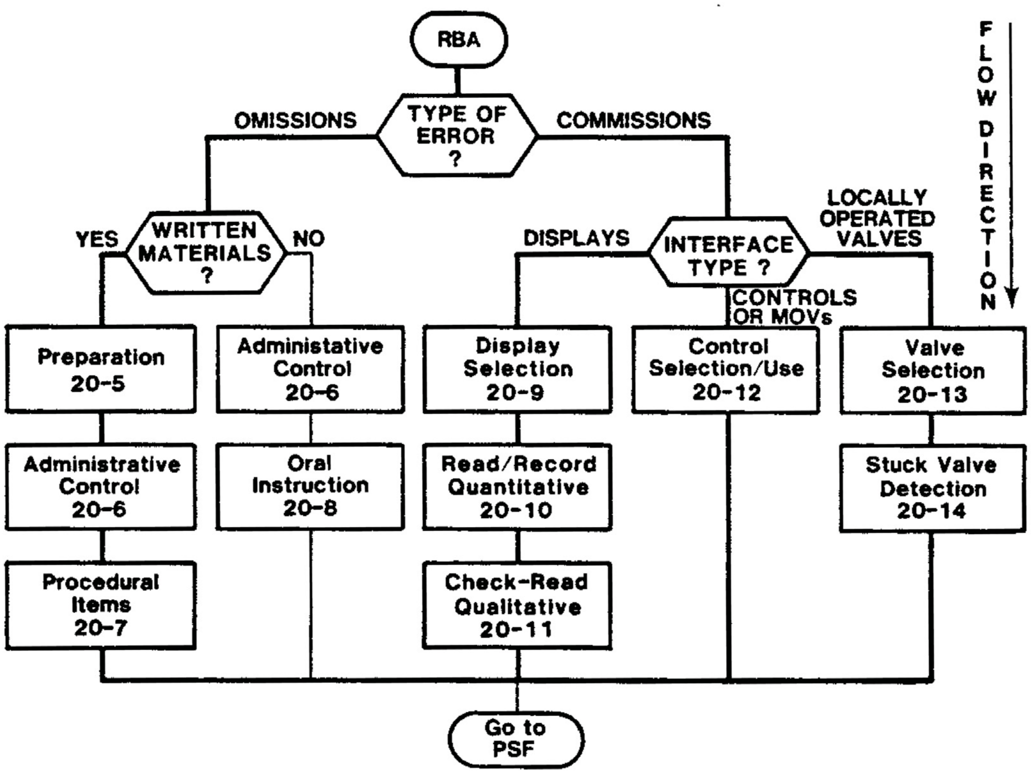

Figure 2. THERP Table 20-1 Showing Coverage of Method (From NUREG/CR-1278).

Figure 2 above shows the different areas covered by THERP in NUREG/CR-1278 and the accompanying summary table numbers from the document. As can be seen, THERP treats procedural errors (called "Written Materials" on the left side of the flow diagram) as errors of omission. This precludes errors of commission that are possible with embedded controls in computerized procedures. Such errors might, however, be successfully mapped to "Displays" under errors of commission.

The most likely candidate tables in THERP for computerized procedure applications are:

- Table 20-7, "Procedural Items"—e.g., skipping a step in a procedure
- Table 20-9, "Display Selection"—e.g., selecting the wrong display to accompany a procedure or selecting the wrong procedure
- Table 20-12, "Control Selection or Use"—e.g., selecting the wrong control or selecting the wrong setting

Note that these tables were published in 1983 and should not be considered as reflecting state-of-the-art digital displays found in current or future plants. The HEPs provided with the tables have not been validated against modern control room technologies. Note also that these tables do not take into consideration performance shaping factors like Communications or Situation Awareness, which can be significant contributors to human performance deficiencies in working with computerized procedures.

2.2.2 ASEP

The Accident Sequence Evaluation Program (ASEP) HRA method (NUREG/CR-4772) [10] was developed as a simplification of THERP suitable for use in post-accident analyses performed at the US NRC. The method includes screening and nominal HEPs for pre and post initiators (called pre-accident and post-accident tasks within the method). The values of these HEPs are meant to help analysts determine if an event is risk significant and to provide a first-order approximation of the HEP without a detailed THERP analysis. As a simplification of THERP, ASEP features many of the same limitations as are found in THERP.

ASEP provides the following coverage of written checklists, which are essentially procedures for maintenance tasks as pre initiators. ASEP Tables 4-2 (Screening HEP) and 5-2(2) (Nominal HEP) provide, among other things, procedure considerations for *basic* plant conditions:

- Item 3: …the verification does not require use of a written checkoff list.
- Item 4: Shiftly or daily checks of component status (in or outside of the control room) are done without using a written checkoff list, or are not done at all.

In contrast, ASEP Tables 4-3 (Screening HEP) and 5-2(3) (Nominal HEP) consider *optimum* plant conditions for pre initiators:

- Item 3: …No credit is given for either check unless a written test is used during a test.
- Item 4: There is a requirement for a shiftly or daily check of component status (in or outside the control room), using a written list.

ASEP provides the following coverage of procedures for post initiators in Tables 7-3 (Screening HEP) and 8-5 (Nominal HEP):

- Item 3: Perform a critical procedural action correctly under moderately high stress.
- Item 4: Perform a critical procedural action correctly under extremely high stress.
- Item 5: Perform a post-diagnosis immediate emergency action for the reactor vessel/containment critical parameters, when (a) it can be judged to have been committed to memory, (b) it can be classified as skill-based action per Table 2-1, and (c) there is a backup written procedure.

While these items account for the failure to use procedures correctly pre and post initiator, they do not adequately address procedure quality nor elements of the interface that might prove relevant to computerized procedure implementation. In addition, ASEP offers no treatment of PSFs and does not cover the PSFs relevant to computerized procedures. As such, ASEP's applicability for computerized procedures is judged to be quite limited.

2.2.3 SPAR-H

The Standard Plant Analysis Risk-Human Reliability Analysis (SPAR-H; NUREG/CR-6883) [11] method was developed as a further simplification of THERP, specifically to address the need to develop HRAs to support the Standard Plant Analysis Risk (SPAR) generic PRA models used by the US NRC. Whereas THERP and, to a lesser extent, ASEP were developed around a set of predefined task types to which analyzed HFEs were mapped, SPAR-H provides only two categories of activities—*diagnosis* and *action*. These two activity types feature nominal HEPs, which are then modified by weights assigned to different levels of eight PSFs. An initial version of SPAR-H was released in 1994, with two subsequent refinements, culminating in NUREG/CR-6883 in 2005. The latest version of SPAR-H adds to earlier versions a new PSF for Ergonomics and Human-Machine Interfaces, thus allowing the method to encompass a variety of interface technologies.

Of its eight PSFs, SPAR-H features four PSFs that are particularly relevant to computerized procedures, as listed below:

- "Procedures" refers to the existence and use of formal operating procedures.
- "Ergonomics and Human-Machine Interface (HMI)" refer to displays and controls, layout, and quality of information available from the instrumentation and controls.
- "Complexity" refers to how difficult the task is to perform in a given context.
- "Work Processes" refer to aspects of doing work, including communication.

Table I. Procedure-Relevant Performance Shaping Factors in SPAR-H.

PSFs	Definition	PSF Levels	At Power	
			Multiplier for Diagnosis	Multiplier for Action
Complexity	refers to how difficult the task is to perform in the given context	Highly complex	5	5
		Moderately complex	2	2
		Nominal	1	1
		Obvious diagnosis	0.1	N/A
		Insufficient Information	1	1
Procedures	refers to the existence and use of formal operating procedures or best practices for the tasks under consideration	Not available	50	50
		Incomplete	20	20
		Available, but poor	5	5
		Nominal	1	1
		Diagnostic/symptom oriented	0.5	N/A
		Insufficient Information	1	1
Ergonomics / HMI	refers to the equipment, displays and controls, layout, quality and quantity of information available from instrumentation, and the interaction of the operator with the equipment to carry out tasks	Missing/Misleading	50	50
		Poor	10	10
		Nominal	1	1
		Good	0.5	0.5
		Insufficient Information	1	1
Work Processes	refer to aspects of doing work, including inter-organizational, safety culture, work planning, communication, and management support and policies	Poor	2	5
		Nominal	1	1
		Good	0.8	0.5
		Insufficient Information	1	1

These PSFs give SPAR-H good coverage of the factors noted to influence operator performance in the use of computerized procedures.

The multipliers for each of these PSFs for Diagnosis and Action at full power is found in Table I. As can be seen, the multipliers for Procedures and Ergonomics/HMI can be as high as 50, meaning a nominal HEP of 1E-3 could increase to as high as 5E-2 for either PSF alone. In practice, assignment of the PSFs to levels with these high multipliers is extremely rare but serves to highlight the importance of these two PSFs as drivers on operator performance.

The use of PSFs in SPAR-H affords the method considerable generalizability beyond that found with task types in THERP and ASEP. Despite this generalizability, the basis for quantification of these PSFs is grounded in THERP, and caution should be exercised before generalizing too broadly. As with THERP, quantification in SPAR-H has not been validated against newer technology applications.

2.2.4 ATHEANA

Second-generation HRA methods like A Technique for Human Error Analysis (ATHEANA) [8, 12] were developed out of a need to accommodate event scenarios and activity types that were not readily accounted for with methods like THERP. Thus, early work on ATHEANA featured a significant emphasis on low power and shutdown applications. Additional analyses showed the flexibility of the method to be used in analyses for unusual yet plausible events. The ATHEANA method includes a search strategy to help analysts identify contexts in which operators might deviate from the expected path or course of action. ATHEANA does not include a formal list of activity types nor PSFs, and it uses expert estimation to generate HEPs. In practice, this approach has required considerable expertise and may be subject to greater inter-analyst variability than first-generation HRA methods like THERP [4]. Nonetheless, the considerable flexibility of ATHEANA makes it an ideal candidate for use in new technology domains like computerized procedures. Given the considerable expertise required for an ATHEANA analysis, the application of the method to computerized procedures should not be undertaken casually, and additional guidance will be required for its use. For example, ATHEANA was recently adapted for use in scoping analyses for fire HRA events [13]. Such explicit guidance helps to guide the ATHEANA analyst in a reasonable analysis process for fire applications, but comparable guidance does not currently exist for the application of ATHEANA to computerized procedures.

Table II. Characteristics of Poor Procedures in ATHEANA (From NUREG-1880).

- ambiguous, unclear, or non-detailed steps for the desired actions in the context of the sequence of interest
- situations where the operators are likely to have trouble identifying a way to proceed forward through the procedure
- requirements to rely on considerable memory
- situations in which operators must perform calculations or make other manual adjustments (especially time-sensitive situations)
- situations for which there is no procedure, or the procedure is likely not to be available, especially when taking local actions "in the heat of the scenario" and when it cannot be argued that the desired task is simple and a "skill of the craft" or it is an automatic or memorized activity on which the crew is trained and has routine experience
- the procedures contain "double negatives" (these should be evaluated to determine whether certain circumstances could make the procedures particularly confusing)

Although ATHEANA is an open method, it features guidance for existing applications, including procedure following. Section 9.5.4 in NUREG-1624, Rev. 1 [8], offers guidance for evaluation of formal rules and emergency operating procedures. Of particular value is a series of tables explicating areas in emergency operating procedures that may be error prone in certain contexts. To the extent that computerized procedures follow the same procedure logic and content found in existing paper-based procedures, these tables are invaluable in aiding the analyst in considering the operators' potential problem areas in procedure following. Further, although ATHEANA does not offer a formal or prescribed list of PSFs, there is detailed discussion of a number of common PSFs, including "Suitability of Relevant Procedures and Administrative Controls." Table II lists some of the characteristics of poor procedures as described in NUREG-1880 [12]. Such characteristics serve as relevant guidance across procedures, whether paper-based or computerized.

2.3 EPRI Backed HRA Methods

2.3.1 HCR/ORE

As noted in the introduction to this section, Human Cognitive Reliability/Operator Reliability Experiments (HCR/ORE; EPRI TR-100259) [7] is a time-reliability method. There is anecdotal evidence to suggest that computerized procedures may decrease the time for operators to perform tasks. There is, however, no technical basis for assuming that time will be a significant factor in computerized procedure use nor that it will have a different impact of the HRA compared with a similar analysis for paper-based procedures. As such, HCR/ORE is judged not to cover unique factors for computerized procedures.

2.3.2 CBDT

EPRI's Cause-Based Decision Tree (CBDT) [Appendix in 7] method was released in 1992 as a simplified framework for quantifying the cognitive or diagnostic portion of an HFE. The method was developed as a complement to HCR/ORE, specifically to handle situations where time is not a limiting factor. CBDT looks at two high-level failure modes:

- Operator-information interface failure, and
- Operator-procedure interface failure.

Each of these failure modes has four failure mechanisms, represented by a binary decision tree with three or four corresponding branching points. Thus, in total, the method has eight decision trees that the analyst considers independently to arrive at the failure paths. The nomenclature for each tree is p_c (short for cause path), with a further letter designator, a – g, to designate each tree. The key questions for the eight decision trees are represented in Table III.

Because CBDT considers elements of the HSI and procedures in the two failure modes, CBDT is ideally suited for addressing most issues pertaining to procedure use. However, the delineation of the HSI and procedures precludes an important area for CPs—the overlap of the HSI with procedures. Certain phenomena—notably CP issues identified by Seung et al. [6] are not easy to map to the decision trees found in CBDT. The extent to which these issues may be subsumed by existing failures identified in CBDT remains open.

Table III. Key Questions Asked for Each CBDT Tree.

Operator-Information Interface Failure	
$p_c a$—Data Not Available • Is the required indication available in the control room? • Are the indications accurate? • Is a warning or a note directing alternate information sources provided in the procedures? • Has the crew received training on interpreting and obtaining the required information in similar scenarios?	**$p_c b$—Data Not Attended To** • Do cues occur at a time of high workload or distraction? • Is the operator required to check once or monitor indicators? • Is the indicator on the front panels or back panels? • Is the cue alarmed?
$p_c c$—data misread or miscommunicated • Is the required indicator easy to locate? • Is the indicator easy to read or does it have human factors deficiencies? • Are parameters and accompanying values communicated?	**$p_c d$—information misleading** • Are the cues stated in the procedure? • Does the procedure provide a warning that cues may not be as stated? • Has the crew received training on cues that would allow them to recognize incorrect cue information?
Operator-Procedure Interface Failure	
$p_c e$—relevant step in procedure missed • Is the instruction a procedural step? • Is the procedure reader using more than on procedure? • Is the procedural step graphically distinct? • Are placekeeping aids used by all crews?	**$p_c f$—misinterpret instruction** • Does the step include standard, unambiguous wording? • Dose the step provide all required information? • Has the crew received training on the correct interpretation of this step?
$p_c g$—error in interpreting logic • Does the step contain the word *not*? • Does the step contain *and* or *or* logic? • Does the step contain both *and* and *or* logic? • Has the crew practiced executing this step on a simulator?	**$p_c h$—deliberate violation** • Does the crew believe in the adequacy of the instructions? • Will literal compliance produce adverse consequences? • Are there reasonable alternatives that will accomplish the step without adverse consequences? • Does the utility enforce verbatim compliance with the EOPs?

3 DISCUSSION

The preceding brief discussion of specific HRA methods and their applicability is summarized in Table IV. While no current HRA method adequately envelops all considerations necessary for computerized procedures in nuclear power plants, these methods offer a good starting point to the analyst. For example, the SPAR-H method provides a list of PSFs that are well-suited for computerized procedures; CBDT offers a series of decision trees for HSI and procedures that bridges many of the factors relevant for computerized procedures; ATHEANA offers extensive guidance on errors in using paper-based procedures while being extensible to computerized procedures.

The use of any single HRA method for computerized procedures represents a tradeoff. The suitability of a particular method to evaluating computerized procedure use is dependent on the specific features of the computerized procedures that are likely to influence operator performance and on the ability of the analyst to extrapolate the method to the domain of computerized procedures. Care should be taken not to overgeneralize the method nor to overlook unique characteristics of computerized procedures that are not adequately addressed in current methods.

Table IV. Strengths and Weaknesses of HRA Methods for Computerized Procedures.

Method	Strengths	Weaknesses
THERP	Considers errors related to procedural use, display selection, and control selection, which comprise human performance issues relevant to CPs.	Fails to address modern interfaces found in computerized procedures. HEPs provided by method have not been validated to operator use of contemporary technologies. Limited coverage of CP-specific PSFs.
ASEP	Covers failure to use written procedures for pre and post initiators. Suitable for simplified analysis.	Fails to consider interface issues relevant to computerized procedures. No coverage of CP-specific PSFs.
SPAR-H	Includes PSFs relevant to CPs. Suitable for simplified analysis.	May potentially overgeneralize PSFs beyond their technical basis.
ATHEANA	Flexibly accommodates a variety of applications and can be extended to new domains and technologies. Provides extensive existing guidance on factors affecting procedure following.	Offers no CP-specific guidance. Requires extensive analyst expertise, which may lead to inconsistent results across analysts.
HCR/ORE	Provides basis for evaluating operator performance for given time windows.	Does not cover factors beyond time, which may not prove to be a significant differentiator between PBPs and CPs.
CBDT	Thoroughly covers HSI and procedural issues through two general failure modes and eight accompanying decision trees.	Lacks specific consideration of overlap of HSI and procedures and limited ability to address CP-specific performance deficiencies. No coverage of CP-specific PSFs.

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