

## Safety Corner

### What is THERP?

The Technique for Human Error Rate Prediction (THERP) is the first total approach used in the field of Human reliability Assessment (HRA) for nuclear power plants.

Following the assumption that Human Error Probabilities (HEP) can be used the same way as component failure rates in conventional risk assessment, THERP developers and users spent considerable efforts on establishing large HEP databases for nuclear power plant operations through extensive studies in training simulators, analysing and refining empirical accident data, proposing specific cognitive models, and developing computer models of human operators.

THERP assumes that human errors for each task can be broken down into the following categories:

- Errors of Omission – leaving out a step of the task or the whole task itself
- Error of Commission – this involves several different types of error:
  - Errors of Selection – error in use of controls or in issuing of commands
  - Errors of Sequence – required action is carried out in the wrong order
  - Errors of Timing – task is executed before or after when required
  - Errors of Quantity – inadequate amount or in excess

THERP also applies performance shaping factors (PSFs) that may influence the HEP for plant-specific actions so that the HEP can be specialised to a particular plant operations the same way as component failure rates. THERP is often referred to as a decomposition approach in that it requires a higher degree of resolution than many other techniques in task descriptions and it puts a larger degree of emphasis on error recovery. The key steps in using THERP are:

- Decompose operator tasks into elements
- List and analyse the related human operations
- Identify human errors that can occur and the relevant human error recovery modes
- Assign nominal HEPs to each element
- Determine of effects of PSF on each element
- Calculate effects of dependence between tasks
- Model human actions in an HRA risk model; e.g., an event tree analysis
- Quantify the total task HEP

Although THERP was originally designed for the vnuclear industry, it is a generic HRA tool that is widely used in a range of applications in other industries.

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