TASK ANALYSIS

The expectations of the Office for Nuclear Regulation (*ONR*) with respect to Human Factors (*HF*) Task Analysis (*TA*) are set out in the Safety Assessment Principles (*SAPs*). In particular SAP EHF.5 must be considered to ensure human tasks are adequately represented in the nuclear safety case.

- **EHF.5**: Proportionate analysis should be carried out on all tasks important to safety and used to justify the effective delivery of the safety functions to which they contribute.

Task Analysis should be conducted to analyse and document the physical and cognitive activities associated with performing tasks assigned to personnel. The analysis should capture skill level, environmental, and temporal factors that may impact the success with which a task can be achieved. Paragraph 449 of the SAPs states:

"*This analysis should be applied to all actions and controls identified under SAPs EHF.3 and EHF.4 so that the safety case demonstrates high confidence in the feasibility of completing these tasks within requisite timescales. In so doing, the analysis should inform the way tasks are designed and supported to achieve reliable and effective task performance.*"

The following HF SAPs are to be considered:

- **EHF.3**: A systematic approach should be taken to identify human actions that can impact safety for all permitted operating modes, and all fault and accident conditions identified in the safety case, including severe accidents.
- **EHF.4**: Administrative controls needed to keep the facility within its operating rules for normal operation or return the facility back to normal operations, should be systematically identified.

Task Analysis needs to capture sufficient detail to be able to describe who, how, where, with what, when and why activities and unique actions are taken. Paragraph 451 of the SAPs states the aim should be that:

"*The analysis should be sufficiently detailed to provide a basis for developing user interfaces, procedures and job aids, as well as helping define operator roles and responsibilities, staffing levels, personnel competence and training needs, communication networks and workspace design. Further principles related to these topics are provided below*."

In addition, EHF.5 states that the workload of personnel should be understood and represented in the Task Analysis. It is important to capture this before the Human Reliability Analysis (*HRA*) because time pressure can lead to an increased likelihood of human error. Paragraph 452 of the SAPs states:

"*The workload of personnel required to undertake these actions and controls should be analysed and demonstrated to be reasonably achievable. Where practicable, this demonstration should form part of the inactive commissioning of the facility. The workload of personnel and its impact on the effective completion of tasks important to safety should be reviewed in periodic safety reviews and as part of emergency demonstration exercises.*"

Useful guidance may be found in Kirwan and Ainsworth's 'A Guide to Task Analysis' and Schraagen, Chipman and Shalin's 'Cognitive Task Analysis'.

Additional Information & Guidance

- ONR, Safety Assessment Principles for Nuclear Facilities, 2014 Edition Revision 1 (January 2020).
- Kirwan, B and Ainsworth, L.K. (1992), A Guide To Task Analysis: The Task Analysis Working Group. Basingstoke, Taylor & Francis.
- Schraagen, J.M., Chipman, S.F. and Shalin, V.L. (2014), Cognitive Task Analysis, Hove, Psychology Press.