

# Workshop Meeting on «*Using Simulator Data to Improve Human Reliability Analysis*»

Halden

14<sup>th</sup> & 15<sup>th</sup> May 2013



# Welcome & Introduction

- Welcome
  - Fridtjov Øwre, Project leader OECD Halden Reactor Project
- Workshop chair
  - Vinh Dang, Paul Scherrer Institute
- Workshop facilitators
  - Andreas Bye, OECD HRP
  - Claire Taylor, OECD HRP
  - Salvatore Massaiu, OECD HRP
  - Michael Hildebrandt, OECD HRP



# Agenda – Day 1

Time	Item	Lead(s)
08:30 – 08:45	Welcome & Introduction	Fridtjov, Vinh Andreas
08:45 – 09:30	A generic HRA framework model (Presentation & discussion)	Claire
09:30 – 11:00	Considerations for developing a Halden HRA / Human Performance knowledge base	Salvatore, Michael
11:00 – 11:15	Overview of use cases	Claire
11:15 – 12:00	Use case discussions & group work	Claire
12:00 – 13:00	<i>Lunch</i>	
13:00 – 17:00	Use case discussions & group work (contd.)	Claire
19:00	<i>Workshop dinner</i>	

Coffee breaks at approx. 10:00 and 15:00



# Agenda – Day 2

Time	Item	Lead(s)
08:30 – 10:30	Use case discussions & group work (contd.)	Claire
11:00 – 12:00	A proposed study approach (Presentation & discussion – continues after lunch)	Claire Salvatore
12:00 – 13:00	<i>Lunch</i>	
13:00 – 14:00	A proposed study approach (Presentation & discussion – continued from before lunch)	Claire Salvatore
14:00 – 14:45	Round-table summary & way forward	Vinh Andreas
14:45 – 15:00	AOB & meeting close	Vinh Andreas

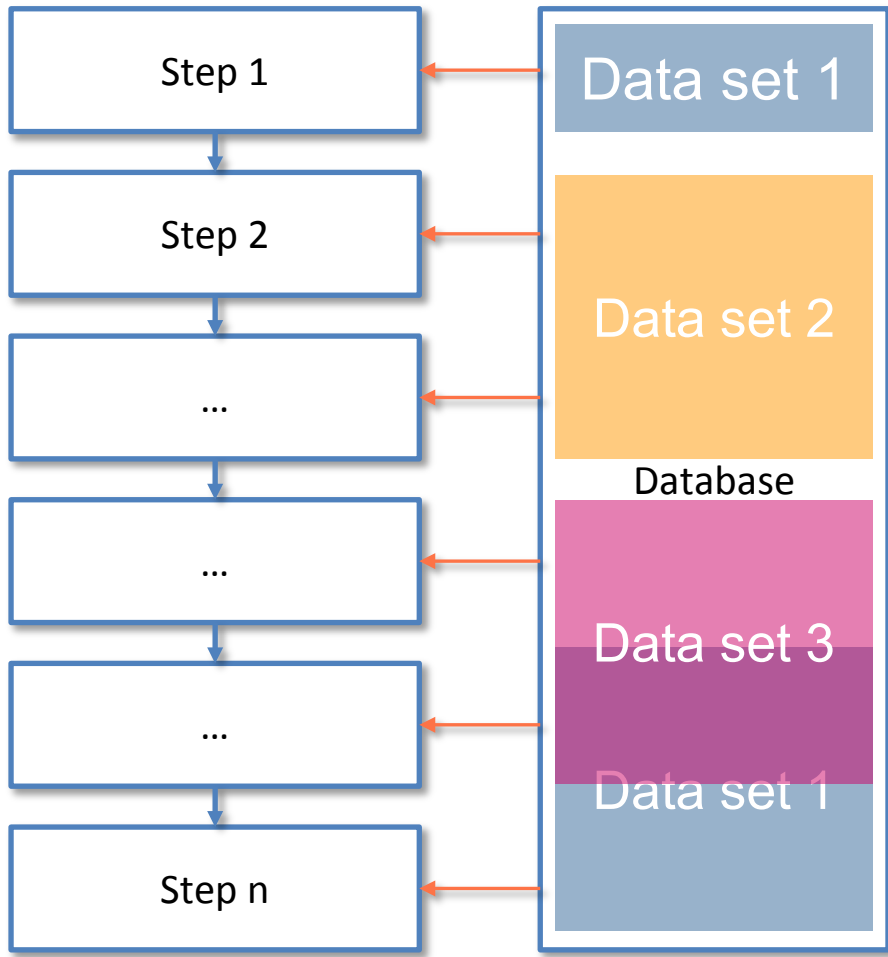
Coffee break at approx. 10:00



# A GENERIC HRA FRAMEWORK MODEL

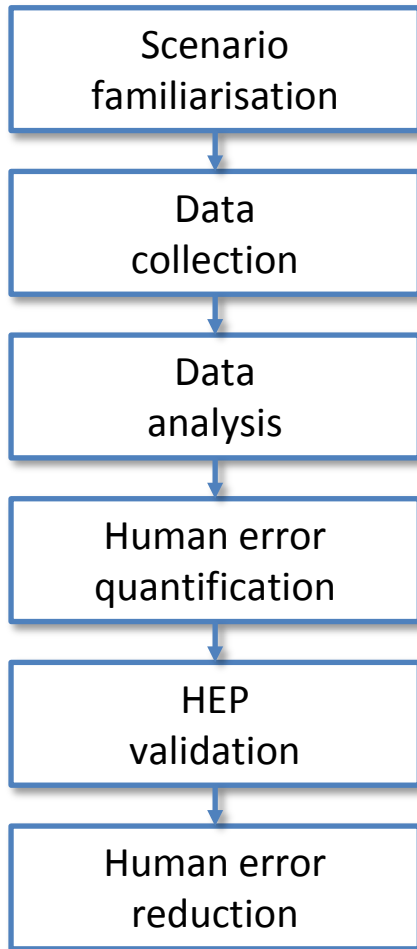


# A Generic Framework



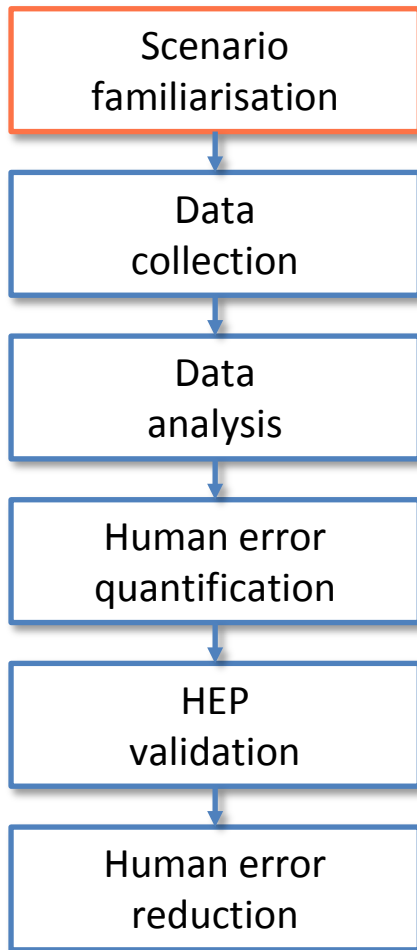
- HRA is a process, a series of steps of which quantification is just one
- How could a database support the different steps in the overall HRA process?
  - What kind of data should be included in the database, and which steps would this data input to?
  - Could there be different data sets/sources for the different steps? Could these overlap?

# Overview of the Generic Framework



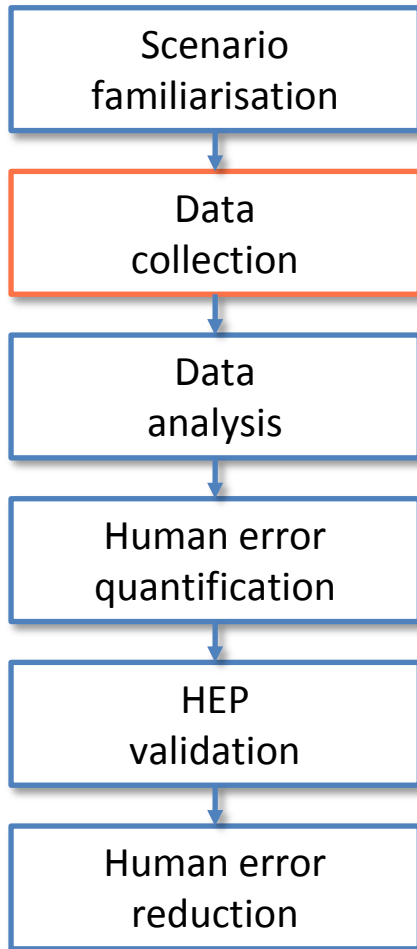
- Describes the typical main steps of a generic approach to HRA
- Sets the framework for this workshop
- Based on experience from UK nuclear industry & the approach described in the Energy Institute's «*Guidance on Quantified Human Reliability Analysis (QHRA)*»

# Generic framework - I



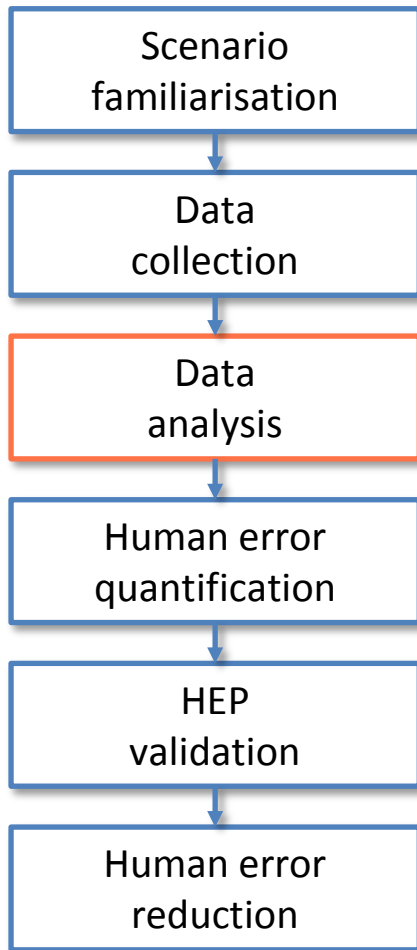
- Preparation for the analysis
  - Defining the scenario and the scope and purpose of the analysis
  - Gathering basic information about the scenario to inform and prepare for the data collection step
- May include:
  - Discussion with PRA expert
  - Review of scenario description or Operating Experience (operator stories)
  - Review of plant documentation (e.g. operating procedures, P&ID drawings, system descriptions, etc.)

# Generic framework – II



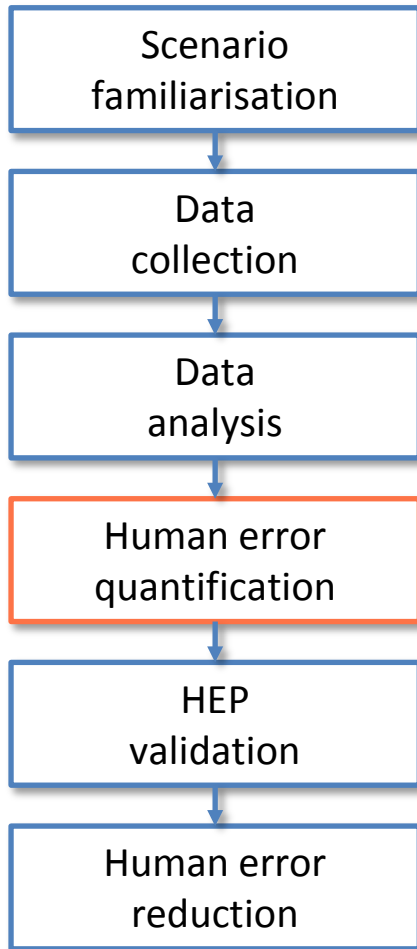
- Collecting information about the scenario
  - Usually qualitative data, but may also be able to collect quantitative (e.g. from simulator)
- May include:
  - Scenario walk-through and/or talk-through in the simulator and/or on plant
  - Task observations
  - Interviews with operators, process experts, engineers, simulator trainers, etc.
  - Review of local event reports and additional plant documentation (checklists, job aids, etc.)

# Generic framework – III



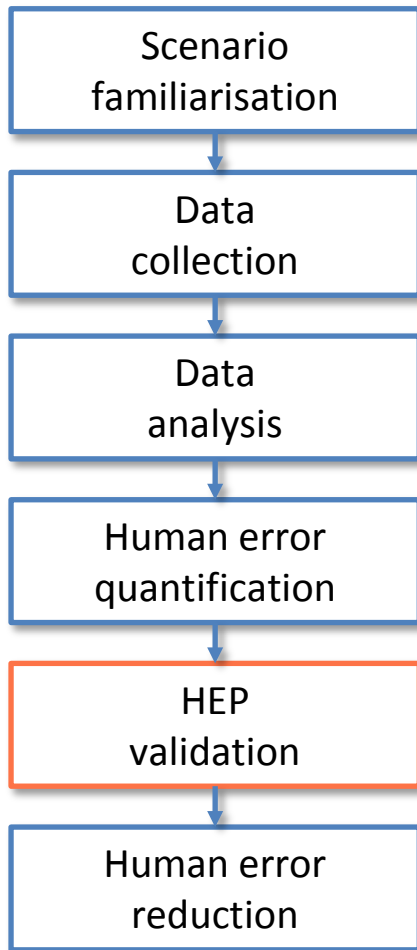
- Description and representation of how tasks in this scenario are performed
  - Based on the information gathered from the data collection step
  - Usually includes human error identification
  - Also provides an opportunity to check for knowledge gaps
- May include:
  - Task and error analysis
  - Human failure modeling (fault/event tree, timeline analysis, link analysis, etc.)
  - Dependency analysis

# Generic framework – IV



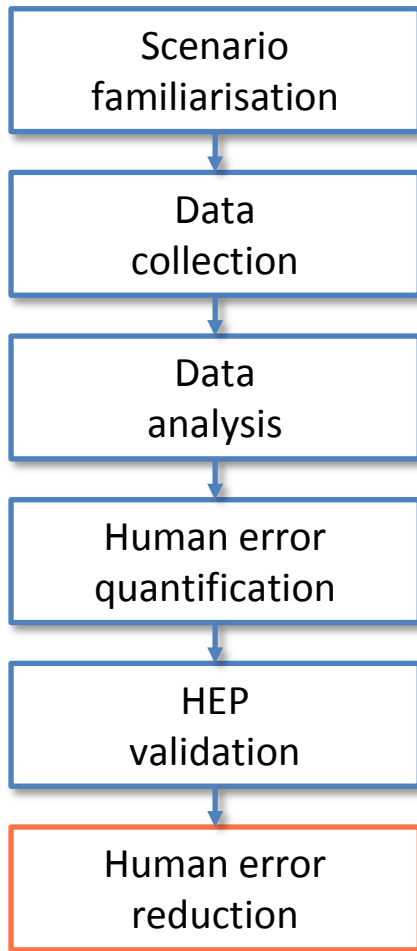
- Quantification of the individual human failures that have been identified by the data analysis
  - Using a chosen quantification method
  - Calculates the probability of failure of a human action/task
- Techniques used will depend on the quantification method

# Generic framework – V



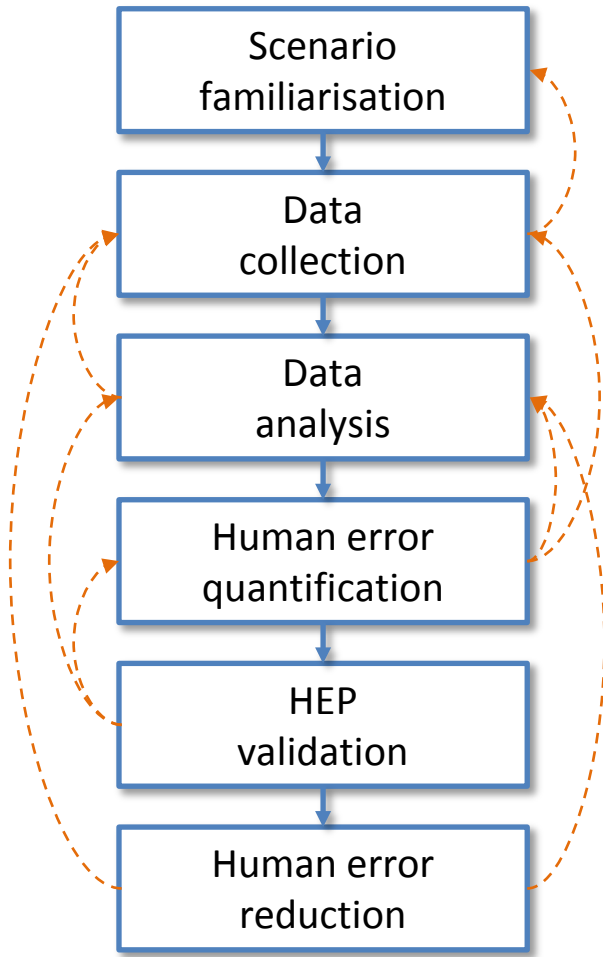
- Reasonableness check of the calculated Human Error Probability
  - To determine whether the calculated HEP accurately reflects the qualitative data analysis
  - To confirm that the HEP has been adequately substantiated (& substantiation is transparent!)
- May include:
  - Self-check
  - Peer review (verification) by another HRA practitioner or expert (e.g. PRA)
  - Comparison with previous HRAs of similar scenarios

# Generic framework – VI



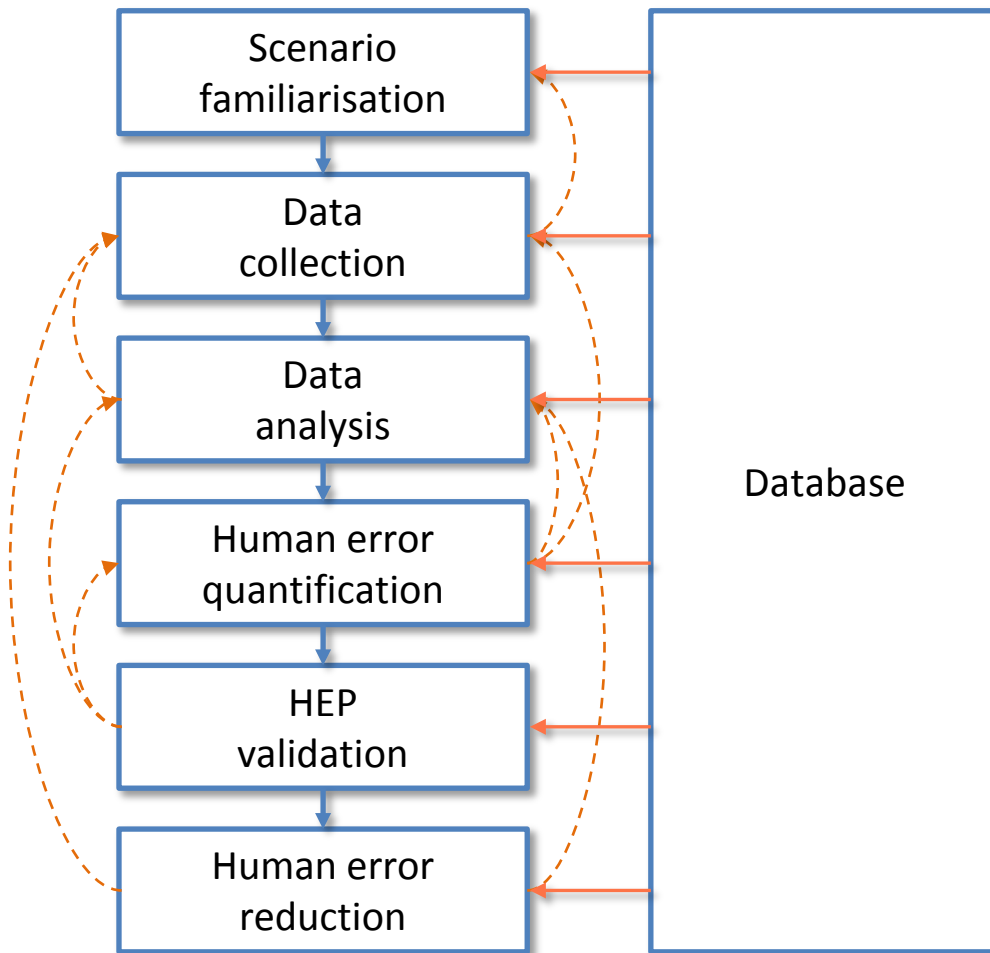
- Impact assessment to determine whether improvements should be made to reduce the likelihood of human error
  - May be driven by the effect of the calculated HEP on the overall risk assessment
  - May be driven by the qualitative assessment & good human factors practice

# Generic framework – VII



- HRA is not a linear process
- There are often several iterations between steps, or even within steps

# Discussion



- Is this approach representative of your experience of performing an HRA?
- Are there any missing or alternative steps?
- Are there any quantification method-specific differences?
- Are you happy to use this approach as a framework for this workshop?

# CONSIDERATIONS FOR DEVELOPING A HALDEN KNOWLEDGE BASE



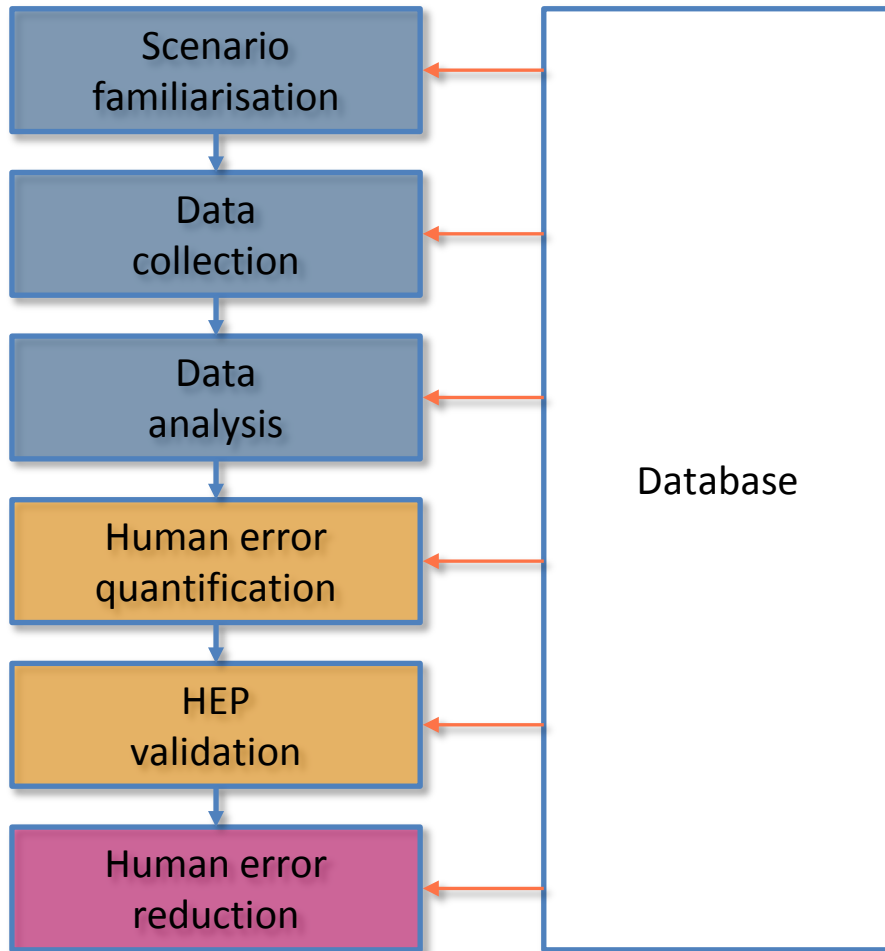
- Presentations by Michael & Salvatore



# OVERVIEW OF USE CASES



# Proposal: 3 use cases for this study



- Use Case 1 – Scenario familiarisation & data collection (& data analysis)
- Use Case 2 – Human error quantification & HEP validation
- Use Case 3 – Human error reduction

# USE CASE DISCUSSIONS & GROUP WORK



# Use cases: group work

Divide into 3 groups, one per use case

For your use case, discuss and develop:

- A summary of good practices / critical actions for an HRA analyst
- A proposal of what kind of data an HRA analyst would want to use
- A user story about how the data would be used in an analysis, for example:
  - How much time would an analyst spend using a database that could provide this data?
  - How would the analyst go about finding relevant data?
  - How would the analyst evaluate the relevance / accuracy of the data (establishing trust)?
  - How would the analyst resolve inconsistency within the data or between the data and the analyst's knowledge?
  - The potential for cognitive biases, misinterpretations, and how to avoid them?
  - ... Anything else?



# PROPOSED STUDY APPROACH



# Discussion

- Consider:
  - Who is the target audience for this study?
  - What is the goal of the study?
  - What is the timeframe of the study?
- Discuss & agree an approach...

