



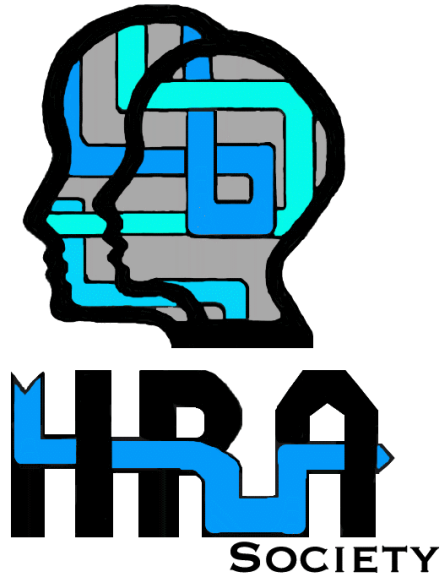
JENSEN HUGHES

Advancing the Science of Safety

HRA DATA COLLECTION WORKSHOP INSIGHTS

2020 US NRC HRA Data Workshop, Virtual Meeting

JEFFREY JULIUS | MARCH 2020



(HRA Society Overview)

HRA SOCIETY OVERVIEW

A young professional society to promote the sharing of research, methods and data.

Members are regulator, research labs, consultants & utility staff.

Short history:

- + Initial meeting in Seattle at PSAM'11 conference (2010)
- + Follow-up meeting in Honolulu at PSAM'12 (2012)
- + HRA Master Class in Paris (2015)
 - Largest meeting, ~50 participants from 8 countries
 - Surveyed recent activities
 - Voted on new leadership
- + *HRA Special Session at PSAM'13 (Seoul, 2016)*
- + *PSAM HRA Topical Meeting (Munich, 2017)* →
- + *PSAM HRA Workshop (Los Angeles, 2018)*



PSAM topical conference on
**Human Reliability, Quantitative Human Factors
and Risk Management**
organized by IAPSAM and the HRA Society

When: June 7 - 9, 2017
Where: Munich, Germany
What: Small, focused conference on advances in human reliability and human factors in the frame of probabilistic safety assessment and management
Who: Dr. Marina Röwekamp, GRS, Germany (General Chair)
Dr. Vinh N. Dang, PSI, Switzerland (Technical Chair)

HRA SOCIETY VISION

- **3 Elements to HRA:**
 - Error Identification, after understanding interactions humans have with a plant or facility.
 - Error Assessment, qualitative and quantitative
 - Error Reduction, applying insights to reduce or prevent human errors
- **Each element includes Research, Modeling, & Applications**
 - Human Reliability Analysis as part of PRA for Decision-Making
 - Human Factors
 - Human Error reduction programs
- **Improve Technical Bases**
 - Relationship between Human Factors and HRA
 - HRA methods, models, data & guidance
 - HRA for Digital Control systems
 - HRA for increased PRA Scope such as External Hazards; Level 2 & 3

HRA SOCIETY BOARD MEMBERS

Name	Organization	Country
Cilla Andersson	Ringhals AB	Sweden
Andreas Bye	IFE-OECD Halden Reactor Project	Norway
Salvatore Massaiu		
Ronald Boring	Idaho National Laboratory	USA
Vinh N. Dang	Paul Scherrer Institute	Switzerland
Xuhong He	Lloyds Register Consulting	Sweden
Stacey Marie Hendrickson	Sandia National Laboratories	USA
Jeff Julius	JENSEN HUGHES	USA
Michael Montecalvo	U.S Nuclear Regulatory Commission	USA
Ali Mosleh	University of California, Los Angeles	USA
Jinkyun Park	Korea Atomic Energy Research Institute	Republic of Korea
Luca Podofillini	Paul Scherrer Institute	Switzerland
Andrew Wright	Corporate Risk Associates	United Kingdom

HRA DATA COLLECTION WORKSHOP CONCLUSIONS (1 OF 2)

- **Data Collection**

- Trending up. Data collected in several countries from a variety of sources, and different levels
 - Simulator data at the task level (Korea, Czech Republic) and the training objective level (USA); both more than 20,000 data points
 - MicroTasks and MicroWorlds
 - End-user, plant data such as FLEX and MCRA
- Did not discuss Operating Experience as a data source
 - EPRI Pre-Initiator and ICDE CCF Data is 30-50% HRA

- **Data Analysis**

- Also trending up
- Would benefit from coordinating theoretical framework and definitions
- Still a question about Link to Context or de-couple, benefits to each
- Improving the ability to correlate PSFs/PIFs
- Finding new failure modes

HRA DATA COLLECTION WORKSHOP CONCLUSIONS (2 OF 2)

- **Data Exchange and Mining**

- Trend - improvements through workshops and conferences
- Would benefit from a project or mechanism such as NEA
- Could promote via HRA Society as well as regional research centers
- Applicability to other countries, creating a Rosetta stone to help understand differences in data
- Feedback to plant operations, training; also regulators, and vendors
- Issues related to sharing data and intellectual property – needs to establish a framework for sharing

- **Application and Communication of Data**

- Are end-user needs being addressed?
- Consider:
 - Supporting plant design and design alternatives beyond Digital Controls (e.g. SMR multiple cores)
 - Changes in state-of-the-art models (HF, HRA, PRA)

- **Next Steps**

- Publish definitions, taxonomy and guidelines relating different types of data and different levels
- Need champions/sponsor to host the data storage, perhaps distributed

Questions?



(i)

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