

**OPERATING CREW  
PERFORMANCE DURING  
EXTREME SCENARIOS**

Lessons From User Perspective  
**South Texas Project**  
**Ron Gibbs**

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**Extreme Scenarios – Lessons from STP perspective**

**South Texas Project Participation**

- > 2010 – 4 Crews (6/crew)onsite at STP simulator
- > 2011 – 3 Crews (5/crew) in Halden
- > 2014 – 2 Crews (4/crew) in Halden

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**Extreme Scenarios – Lessons from STP perspective**

**2010 / 2011 Study**

Initiating Events requiring operator action:

- Turbine trips/ runbacks
- RCP malfunctions
- Condensate Pump Trips

Followed by Multiple Event Casualites

- Multiple SGTR's
- Loss of all feedwater, with induced SGTR
- LOCA outside Containment

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**Extreme Scenarios – Lessons from STP perspective**

**2010 / 2011 Study**

What we learned:

- During these extreme events, our performance suffered when we encountered:
  - conflicting data
  - conflicting/ ambiguous procedure steps
  - little or no procedure guidance
- Why?
  - Our knowledge of procedure bases/ mitigating strategies was not as strong as we thought
  - Our desire to maintain strict procedure compliance over rode our decision making when challenged by opposing influences. (Desire to stay in rule based versus knowledge based)

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**Extreme Scenarios – Lessons from STP perspective**

**2010 / 2011 Study**

What we changed/ incorporated into our training:

- We incorporated multiple event scenarios into our Operator Training program
  - ✓ Reinforce importance of understanding procedure bases/ mitigating strategy
  - ✓ Recognize & resolve opposing influences to correctly respond to extreme scenarios

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**Extreme Scenarios – Lessons from STP perspective**

**2014 Crew Performance Evaluation**

- After the first hour, we observed a decline in Crew Performance in the areas of:
  - Decision making
  - Prioritization
  - Communications
- STA independence challenged
  - Became involved in 'SRO discussions'
  - Helping crews 'be efficient' working through EOP's

Why? - Crews must need more training.

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**Extreme Scenarios – Lessons from STP perspective**

**2014 Halden Project – Resilient Procedure Use**

4 extreme scenarios

- Multiple SGTR
- LOCA ORC (interconnected system)
- Loss of all Feedwater & leaking Pressurizer PORV
- H.B. Robinson Fire

Conduct of the Study

- 4 man crews
- With/ without tools
- With/ without STA

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**Extreme Scenarios – Lessons from STP perspective**



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**Extreme Scenarios – Lessons from STP perspective**

**2014 Halden Project – Resilient Procedure Use**

Evidence of fatigue as early as 45 minutes into scenarios, this affects:

- Teamwork
- Communications
- Problem Solving

Effectiveness of STA correlates to the degree of independence

- In CR, prone to 'Become one of the crew' & lose independence

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Extreme Scenarios – Lessons from STP perspective

2014 Halden Project – Resilient Procedure Use

Tool Usage

- Respond to Critical Safety Functions rather than anticipate/ try to mitigate
- Procedure use tool - not available at STP

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Extreme Scenarios – Lessons from STP perspective

2014 Halden Project – Resilient Procedure Use

My take-aways:

- Crew performance in extended scenarios (CPE & e-plan) could be caused by fatigue rather than inadequate knowledge
- True STA independence/ improved performance was observed.
- Cases of responding to the situation rather than anticipating, mitigating, or preventing
- Procedure use tool
  - could be key to helping maintain STA independence

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Extreme Scenarios – Lessons from STP perspective

Halden Project Participation Benefits

- + Helped us to identify some training/expectation issues
- + Helped us to identify some unique training solutions
- + Helped us to identify real cause of performance
- + Helped us to see what true STA independence looks like and how effective it can be
- + Over-reliance on tools

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**Extreme Scenarios – Lessons from STP perspective**

**Halden Project Participation**

Crews enjoy participating

- Gauge their own skills & knowledge
- Enjoy the challenge

Management/ Observer Involvement

- Key to getting all learnings from participation

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