



# Applying Human Performance Improvement Principles to the Hanford Emergency Response Organization

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# Human Performance Improvement (HPI)

- ❑ Program developed by Institute of Nuclear Power Operations (INPO)
  - ❑ DOE site offices and prime contractors embracing HPI principles
  - ❑ Looks at processes/procedures, work environment and behaviors that impact the way we perform work
  - ❑ Recognizes and accepts that we will make mistakes
  - ❑ Provides tools to identify and eliminate error-likely situations
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# Principles of HPI

- ❑ People are fallible – even the best make mistakes
  - ❑ Error-likely situations are predictable, manageable, and preventable
  - ❑ Individual behavior is influenced by organization processes and values
  - ❑ High level of performance is often based on encouragement and reinforcement from leaders, peers, and subordinates
  - ❑ Events can be avoided by understanding why mistakes occur, and applying lessons learned from past events
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# *The Four Key Questions At The Pre-Job Briefing*

- 1. What are the critical steps or phases of this task?*
    - (Important parts of the task that must go right)
  - 2. How can we make a mistake at that point?*
    - (Use error precursors card)
  - 3. What is the worst thing that can go wrong?*
    - (A review of potential consequences and contingencies)
  - 4. What barriers or defenses are needed?*
    - (Peer check, 3-way communication, place keeping, flagging)
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# Training Approach

- Introduce Emergency Management Program (EMP) staff to HPI
    - Family Feud game to develop new attitudes and behaviors and promote peer-to-peer interaction
  - Provide HPI principles to Emergency Response Organization staff
    - Identify critical tasks
    - Error precursors
    - Barriers needed
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# Family Feud

- Emergency Management Program leadership team identified critical tasks
    - Responding to emergencies
    - Conducting drills and exercises
    - Annual review of EPHAs
  - Leadership team and staff then identified top five error precursors for each critical task
    - Issues that affect human performance
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# Common Error Precursors

Task Demands	Individual Capabilities
- Time pressure (in a hurry)	- Unfamiliarity with task (first time)
- High workload (memory requirements)	- Lack of knowledge (mental model)
- Simultaneous, multiple tasks	- New technique not used before
- Repetitive actions, monotonous	- Imprecise communication habits
- Irrecoverable acts	- Lack of proficiency/inexperience
- Interpretation requirement	- Indistinct problem-solving skills
- Unclear goals, roles, and responsibilities	- "Hazardous" attitude for critical task
- Lack of, or unclear standards	- Illness/fatigue
Work Environment	Human Nature
- Distractions/interruptions	- Stress (limits attention)
- Changes/departures from routine	- Habit patterns
- Confusing displays or controls	- Assumptions (inaccurate mental picture)
- Workarounds/OOS instruments	- Complacency/overconfidence
- Hidden system response	- Mindset ("tuned" to see)
- Unexpected equipment conditions	- Inaccurate risk perception (Pollyanna)
- Lack of alternative indication	- Mental shortcuts (biases)
- Personality conflicts	- Limited short-term memory







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# Family Feud

- Survey results were summarized and top five error precursors for each critical task identified
  - EMP staff were separated into teams
  - Teams took turns identifying error precursors associated with critical tasks
    - Points were awarded for correct answers
    - Prizes and bragging rights for winning team
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# Family Feud

## □ Conclusion

- Provided awareness training on EMP's critical tasks
  - Management and staff aware of error precursors affecting critical tasks
  - Provided management a tool to anticipate, reduce, or prevent errors based on employee feedback
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# Emergency Response Organization Training

- Provided to over 300 personnel assigned to the Emergency Operations Center (EOC) during annual refresher training
  - Introduce EOC staff to human performance improvement principles
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# Exercise #1

- Review position-specific procedure
  - Identify top three critical tasks
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# Critical Tasks

## RL/ORP Emergency Manager

- Keep Policy Team members informed of event status
  - Approve changes to event classification and offsite protective action recommendations
  - Approve emergency termination
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# Errors

- ❑ People do not make mistakes intentionally
  - ❑ Errors are a behavior done without malice or forethought
  - ❑ We all make about five to ten mistakes every hour
  - ❑ Conditions embedded in the job site that create mismatches between a task and the individual are called error precursors
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# Exercise #2

- How can we make a mistake?
    - Determine error precursors
  - Most common:
    - Time pressure (in a hurry)
    - Distractions/interruptions
    - Simultaneous/multiple tasks
    - Assumptions (inaccurate mental picture)
    - Stress
    - Imprecise communication habits
    - Unfamiliarity with task
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## Exercise #3

- What barriers or defenses are needed?
    - Unified Dose Assessment Center holds quarterly sessions to review software used in consequence assessment
    - Procedures being streamlined to remove unnecessary wording and tasks
    - EOC Open Door Policy
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# Process Improvements

- Provided additional risk communication training
  - Developing quarterly tabletop sessions or information bulletins to provide more information and practice opportunities for our staff
  - Identifying critical tasks within each position procedure
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