



A slide content area with a white background and blue and green borders. The text reads: "Optimizing Your Remote PHA Experience", "Stephanie Smith, PE", "Risk Management Professionals". At the bottom, a smaller version of the conference banner is visible, including the text: "iiar NATURAL REFRIGERATION CONFERENCE & EXPO • MARCH 3-6, 2019 • PHOENIX CONVENTION CENTER".

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Learning Objectives

After attending this activity, participants will be able to...

- Determine what circumstances a remote PHA is effective. What are the pros and cons of a remote PHA?
- Identify some of the software available for remote communications.
- Prepare and plan for a remote PHA session.



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Key Topics

- Importance of a Quality PHA
- PHA History and Regulatory Requirements
- Evolution of Telecollaboration
- Large Capital Project Implementation Changes
- Sensible Remote PHA Applications
- Planning Tips
- Preparation Tips
- Summary
- Questions



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Why is a Quality Process Hazard Analysis Important?



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Tragedies to Avoid

- December 2, 1984
- Bhopal, India disaster
- 3,928 fatalities
- 100,000 estimated permanent injuries
- AIChE initiates CCPS in 1985
- Process safety effectively changes the way business is conducted

Process Safety is
Good Business



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Common PHA Techniques

- Checklist Analysis
- What-If Analysis
- What-If / Checklist Analysis
- Hazard and Operability Study (HAZOP)
- Failure Modes and Effects Analysis (FMEA)
- Fault Tree Analysis (FTA)
- Event Tree Analysis (ETA)
- Cause-Consequence Analysis (CCA)



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HAZOP

- Hazard and Operability
- Commonly combined with other methodology
 - What-If / Checklist
 - LOPA
- “Middle ground” technique
 - Time/resources
 - Depth/detail



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LOPA


- Layers of Protection Analysis
- Relatively new technique (early 2000s)
- Commonly combined with HAZOP
- Evaluates safety features/safeguards
- Simplifies Quantitative Risk Analysis (QRA)
- Becoming more popular for higher consequence/risk events



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Developmental Milestones

1960s	1970s	1980s	1990s	2000s
<ul style="list-style-type: none">• ICI - Kletz & Knowlton HAZOP Formulation	<ul style="list-style-type: none">• 1975 - WASH-1400^[7]	<ul style="list-style-type: none">• 1985 - Sizewell B Diversity Study• 1982 - CCPS Guidelines for Hazard Evaluation Procedures^[3]• 1987 - CCPS Technical Management Guidelines^[2]	<ul style="list-style-type: none">• 1990 - APR RP 750^[8]• 1992 - PSM - 29 CFR 1910.119^[5]• 1996 - RMP - 40 CFR Part 68^[6]	<ul style="list-style-type: none">• 2001 - CCPS LOPA Guidebook^[4]• 2013 - CCPS LOPA EC & CM Guidebook^[9]• 2015 - CCPS LOPA IE & IPL Guidebook^[10]• 2017 - CalOSHA PSM - 8 CCR 5189.1^[11]

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Evolving Technical Platforms and Collaboration Techniques

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Evolving Technical Environment

- In-house servers and remote capabilities more commonly used
- Advanced tools provide real-time access to data
- Team members are generally comfortable with engineering drawings and technology



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Software Highlights

Go To Meeting

- Presenter screen sharing
- Multiple camera accessibility
- 50 Participants
- Ranked 2 on G2crowd.com
- <https://www.gotomeeting.com>

Skype for Business

- Presenter screen sharing
- Multiple camera accessibility
- 250 Participants
- Ranked 3 on G2crowd.com
- <https://www.skype.com/en/business>



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Software Highlights

WebEx

- Presenter screen sharing
- Multiple camera accessibility
- 250 Participants
- Ranked 4 on G2crowd.com
- <https://www.webex.com>

Zoom

- Presenter screen sharing
- Multiple camera accessibility
- 100 Participants
- Ranked 1 on G2crowd.com
- <https://zoom.us>



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The background of the slide is a composite image. The top half shows a desert landscape with several saguaro cacti in the foreground and a range of mountains in the distance under a clear sky. The bottom half shows a city skyline with several tall buildings, including a prominent one with a blue facade. The text 'Changes in Large Capital Project Implementation' is centered in the white space between the two images.

Changes in Large Capital Project Implementation



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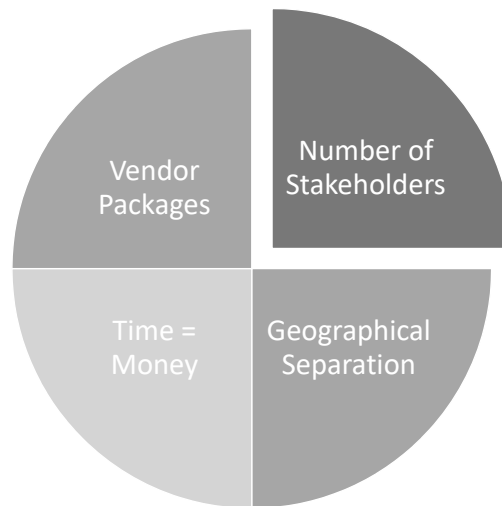
Changes in Capital Project Implementation

- Multi-disciplinary teams
- More stakeholder participation
- Financial pressures to accelerate project schedule
- Use of package vendors to accelerate project schedule and compartmentalize design work
- Increased spreading of financial project risk over many companies
- Financial pressures to avoid re-work and start-up challenges



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Changes Affecting HAZOP Dynamics



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Remote PHA (Large Projects)

- Involvement of large groups of individuals
- Assembling individuals in the same room is cost-prohibitive
- Logistics of getting the right people in the room compromise the usefulness of the PHA
- Additional resources that can't be present are needed (e.g., subject matter experts)
- Casual observers can “listen in”



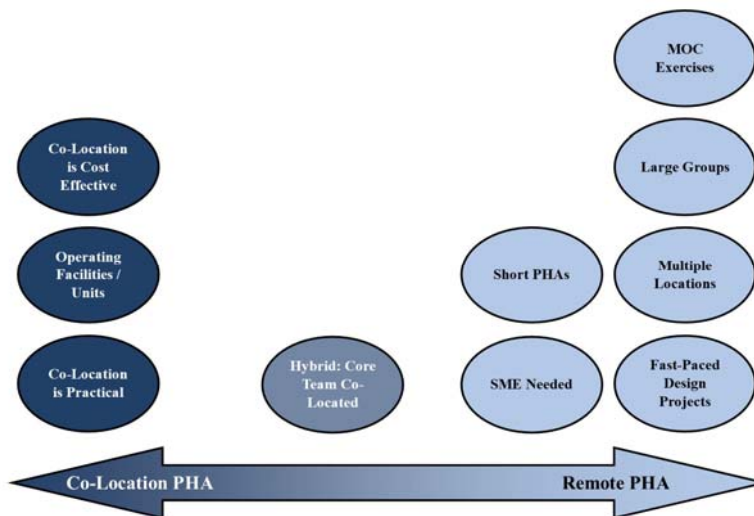
Remote PHA (Small Projects)

- Short PHAs
 - Travel time/costs are significant
 - Scheduling may be difficult
- Management of Change (MOC) Exercises
 - Typically short effort and short turnaround
 - Travel time/costs are significant

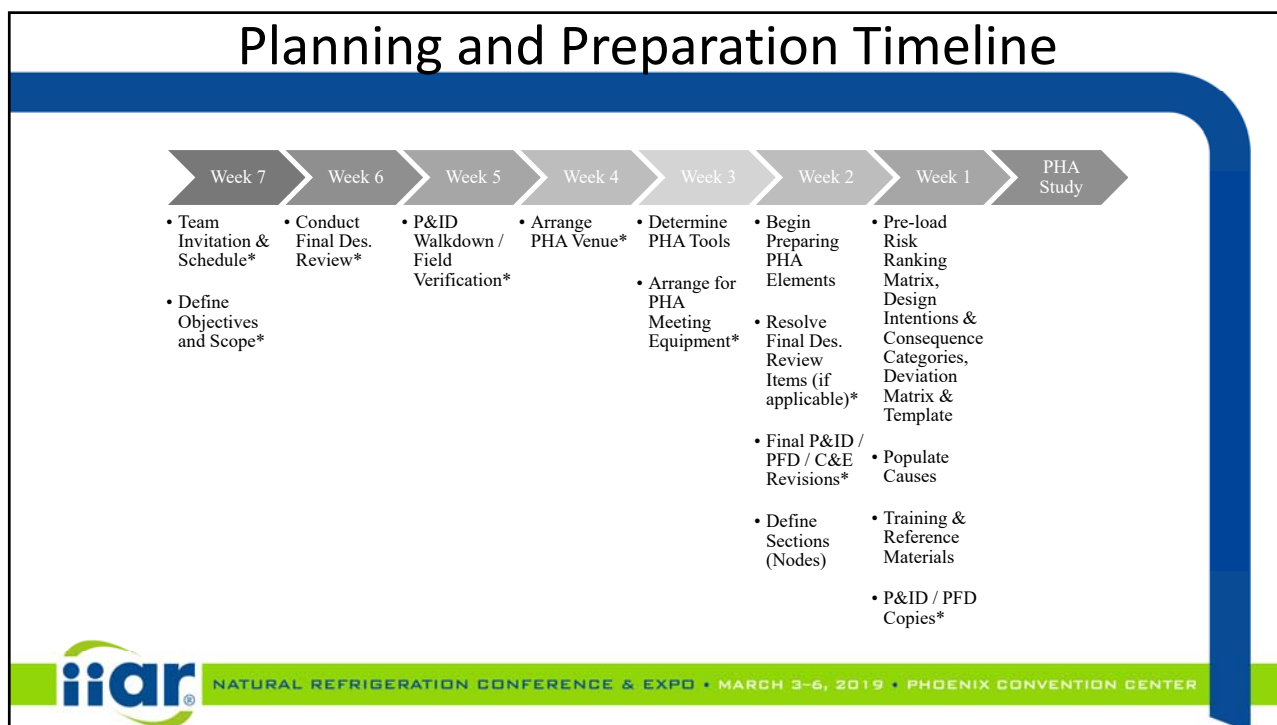


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Example Sensible Applications



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Planning Tips

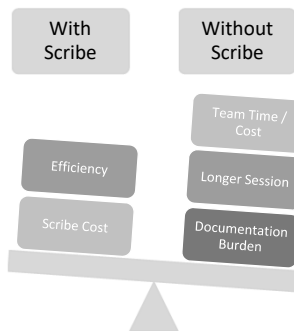
- Process Engineer support for interactive P&ID display
- Multiple screens / split screen or projection
 - Ease of use
 - View P&IDs and PHA worksheets together
- P&ID grid format
- P&ID augmentation
 - Comments are immediate
 - Comments are viewed by the entire team together
 - Electronic transmission may be easier and clearer to a drafter



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Planning Tips

- Quality Scribe Support
 - Familiarity with PHA methodologies used and techniques
 - Familiarity with reading engineering drawings / noding
 - Familiarity with the telecollaboration software
 - Robust understanding of the communications environment
- Scribe Support Cost-Balance



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Planning Tips

- Remote Location “Deputy”
 - Someone to control other rooms in the study
 - Can function as the mediator for the study and keeping schedule / decorum
- Minimize Language Barriers
 - Remote PHAs increase communication challenges
 - May be hard to hear someone farther from the phone / microphone



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Preparation Tips for the Remote PHA



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Preparation Tips

- Appropriate equipment should be used
 - Adequate Computers/Displays
 - Cameras
- Pre-arrange communications access and IT support
- Testing



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Preparation Tips

- Verify room and location
 - Are they accessible to those who need to be there?
 - Additional time needed for a large site or hard-to-find location?
- Check power and communications connections for all computer equipment
 - Verify sufficient communications bandwidth
 - Verify that equipment is contemporary



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Preparation Tips (Technical Preparation)

- Pre-define and communicate causes
 - Completeness
 - Future use
 - Quickly locating equipment on P&ID during session → consider the flow path
 - Grouping causes
- Pre-define and communicate questions



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Summary



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Remote PHAs

- Requires extra planning and preparation
- Remote PHAs can:
 - accelerate the progress of efforts such as capital projects,
 - aid in project control,
 - enhance teamwork, and
 - result in tangible savings to the Owner/Operator.



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Remote PHAs

- Technological advances will continue to facilitate telecollaboration
 - Embrace remote PHAs when its beneficial
 - Encourage the use in appropriate circumstances
- Process safety professionals must continue to adapt and embrace new ways of working together



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Questions?
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