Lessons-Learned From Remote PHA and Audit Applications During COVID (February 16, 2021)

HAZOP	
What-If	CHAZOP
Checklist FMECA	Trends Truesta

We still have to get the job done.

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Risk Management Professionals (949) 282-0123 www.RMPCorp.com



The way we were.

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Risk Management Professionals

Key Services

- Process Safety & Risk Management
- Process Hazard Analysis (PHA)
 - What-If? Studies
 - Hazard & Operability (HAZOP) Studies
 - Layer of Protection Analysis (LOPA)
 - Safeguard Protection Analysis (SPA)
 - Safety Integrity Level (SIL) Assessment & Verification
- Process Safety Management (PSM)
- Risk Management Program (RMP)
- California Accidental Release Prevention (CalARP) Program
- Nevada Chemical Accident Prevention Program (CAPP)
- Security Vulnerability Assessment (SVA)
- Inherently Safer Technology (IST), Hierarchy of Hazard Control Analysis (HCA), Safer Technology & Alternatives Analysis (STAA)
- Safety & Environmental Management Systems (SEMS)
- Damage Mechanism Review (DMR)
- Safety Case

Key Services (cont.)

- ERP Development & Emergency
 Preparedness Training (NIMS-Compatible)
- Risk-Graph and Bow-tie Analysis
- QRA Services FTA & ETA

Background

- Services to Process Industries, Utilities, & Government Since 1995
- International w/US Focus

Qualifications

- Extensive Experience
- Two Decades of Risk-Based Applications
- Engineering, Safety, Security, and Emergency Response Backgrounds

Locations

• HQ: Irvine, CA

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Risk Management Professionals

- 41-Year Engineer 37 in Process Safety Consulting Specializing in Hazard Analysis & QRA
- Mechanical Engineering
 - ➢ BS Duke University
 - ➢ MS Carnegie-Mellon University
- Professional Engineer Mechanical & Chemical Engineering
- CCPS Technical Steering Committee mid-1980s
- Past-President Southern CA Society for Risk Analysis
- Landmark Efforts
 - Platform Safety Shutdown System Effectiveness Study
 - Torrance Refinery Safety Advisor for MHF Conversion
- Paper & Book Publications See www.RMPCorp.com



Key Topics

- Importance of a Quality PHA and Compliance Audit
- PHA History and Regulatory Requirements
- Large Capital Project Implementation Changes
- Current Challenges
- Evolving Technical & Telecollaboration Platforms
- Sensible Remote HAZOP/LOPA Applications
- Planning & Preparation Tips for the Remote HAZOP/LOPA
- Implementation Tips
- Summary
- Questions

Polling Question 1

- For you, what percentage of meetings that used to be done inperson (before COVID) are now done remotely?
 - a) Less than 25%
 - b) Approximately half
 - c) Greater than 75%



Why a Quality Process Hazard Analysis and Compliance Audit is Important



Tragedies to Avoid



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Brief History of Key PHA Techniques and Regulatory Requirements



Evolution of SMS Guidelines & Regulations to Performance (Goal) – Based Standards





HAZOP & LOPA are Core Elements of Hazard Evaluation





Changes in Large Capital Project Implementation



The way we were.



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Changes in Large Capital Project Implementation

- 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





Changes Affecting HAZOP/LOPA Dynamics

- Number of Stakeholders
- Geographic Separation
- Time is Money
- Vendor Packages





Current Challenges



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Current Challenges

- CalARP/RMP/PSM Most current challenges pivot on elements that require personal interaction (e.g., PHA, Audits).
- CalARP/RMP/PSM Potential hazards to personnel, the environment, or assets associated with facility operation don't disappear during pandemics.
- CalARP/RMP/PSM Even if local regulators offer delays, other regulators may also have jurisdiction.



Tragedies to Avoid



Current Challenges

- **PHA** Current economic impacts on facility operations may invoke additional MOC needs.
- PHA PHAs have become more complex and quality has to be #1, even if interactions may be more difficult due to the "social distancing" necessary for the health of the PHA Team.
- Audit Interviews are typically one-on-one. In-person interviews with site personnel may not be an option.



Evolving Technical and Telecollaboration Platforms





HAZOP & LOPA Development Milestones



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CalARP/RMP/PSM Compliance Audit Evolution

- Use of Video for Interviews Video can be important for audits, but it can be a distraction for a PHA.
- Most information to be examined for an audit is available electronically.





Evolving Business Collaboration Platforms (February 2021)

Features	MS Teams ^(1,5)	GoToMeeting ⁽²⁾	WebEx ⁽³⁾	Zoom ⁽⁴⁾
Screen Sharing	Y	Y	Y	Y
Presentation Transfer	Y	Y	Y	Y
Video Calls / Multiple Cameras	Y	Y	Y	Y
Instant Messaging	Y	Y	Y	Y
Filesharing	Y	Ν	Y	Y
Whiteboard Feature	Y	Y	Y	Y
Formulation of Subgroups	Y	Ν	Ν	Y
Default Participant Limit	1000	250	1000	500
Participant License Optional	Y	Y	Y	Y
Execution from Operating System	Y	Y	Y	Y
Execution from Internet Browser	Y	Y	Y	Y
Computer Control Option	Y	Ν	Ν	Ν
Record Meeting	Y	Y	Y	Y
Audio Conferencing Phone Option	Y	Y	Y	Y
Live Captioning Capability	Y	Y	Y	N

Notes:

1) Included with MS "Microsoft 365" License – Concurrent communications for dual screen operation in-progress.

2) <u>https://www.gotomeeting.com/</u> - Dual monitor and split screen mode available.

3) https://www.webex.com/

4) https://zoom.us/ - Dual monitor mode available. Participant limit is based on "paid plans."

5) MS Skype is being phased out for MS Teams.



Evolving Business File Sharing Services (February 2021)

Features ⁽³⁾	DropBox ⁽¹⁾	MS OneDrive ⁽²⁾
File Transfer/Sharing	Y	Y
Customizable Permissives	Y	Y
Free Storage (GB)	2	5

Notes:

1) <u>https://www.dropbox.com/</u>

2) Integral with MS Windows Operating System

3) Deletion of files after use is recommended!



Sensible Applications for Remote HAZOP/LOPA





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Remote HAZOP/LOPA Applications

- Large Capital Projects
 - Necessary involvement of multiple companies or large groups of geographicallyseparated individuals without associated cost or potential health impact
 - Critical timeliness of HAZOP/LOPA (maintain regulatory/ project schedules, avoid re-work or start-up challenges)
 - Facilitates involvement of important resources (e.g., vendors or subject matter experts)
 - >Casual observers can "listen in" and not feel that they must actively participate
 - Significant travel-cost reductions



Remote HAZOP/LOPA Applications

- Small Projects
 - ➢ Short PHAs
 - Travel time/costs are a significant fraction of the entire effort
 - ➤ Management of Change (MOC) Exercises
 - Typically short effort and short turnaround
 - Potentially "time-sensitive"
- All Projects
 - The acceleration of remote collaboration application due to current health challenges also energizes their use benefiting PHA effectiveness.
 - In 2021, professionals are practiced in use of telecollaboration platforms, thus minimizing differential benefits of in-person interaction.



Example Sensible Remote-PHA Applications



- **PHA** Time-utilization of a Remote HAZOP/LOPA Session is typically as effective as an in-person session.
- Compliance Audit Effectiveness is only minimally disadvantaged for remote applications.

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Other Remote-PHA Benefits

- Facilitated Access to Part Time Members for Immediate Information to Resolve Issues Quickly Rather than Utilizing the "Parking Lot" – Examples:
 > Outside Engineers/Operators to Address Interconnected Equipment Questions
 > Engage Subject Matter Experts (SMEs) for Guidance
- Team Alignment

➢Whiteboard Feature

- Facilitated Information (Screen) Sharing for All Participants
- Ability for Management to Easily Observe Team Progress
- Immediate sharing of information via chat, scree-sharing, and file-transfers



Planning/Preparation Tips for the Remote HAZOP/LOPA





PHA Facilitator

- Important Skill-set Needs Amplified
 - ➤ Technical Acuity
 - ➤Team Engagement
 - ➢ More Background on Team Member Responsibilities
 - Judging & Facilitating Input
- Importance of Familiarity with Telecollaboration Software for Both Facilitator and Scribe

Practice Before Session Time





PHA Scribe

- Quality Scribe Support is Essential for Remote HAZOP/LOPA
 - Familiarity with HAZOP/LOPA techniques & software
 - Familiarity with reading engineering drawings
 - Familiarity with the telecollaboration software
 - Robust understanding of the communications environment
- Scribe Support Cost-Balance
- Co-Location of Facilitator and Scribe is optimal, but optional.
- If Facilitator and Scribe are not co-located, it is more important that the Facilitator has good general knowledge of the PHA software to guide the Scribe.





Process Engineer

- Separate PFD and P&ID Display
 - Multiple Screen Capabilities via Parallel Communication Channels
 - ≻Noded PFDs
 - ➢P&ID Grid Format
 - ➢P&ID Augmentation
- Access to Other PSI
 - Ability to Quickly Locate Relief Valve Design Bases, Mechanical Information, Piping Specifications, Pump Characteristics
 - Download Key Information In-Advance!
- Practice Screen Sharing



Physical Access & Room Configuration for Remote-PHA

- Verify Room Configuration and Location with Consideration to the Following
 - Background Noise
 - ➢Space
 - > Distractions
- Check Power and Communications Connections for All Computer Equipment
 Verify sufficient communications bandwidth!!!
 Verify that equipment is contemporary and compatible.

Equipment

- Adequate/Reliable/Compatible Computers/Displays/Audio/Software
- Cameras (optional)
- May Need a Professional Microphone or Headset
- Pre-arrange Communications Access and IT Support
- Perform Operating System Updates In-Advance for Latest Drivers & to Avoid Interruptions
- "Fresh" Reboot Before Sessions
- Test Test Test



Technical Preparation

- Pre-define and Communicate Causes
 - ➢ Completeness
 - ➤Team Readiness
 - ➢Future Use
 - Ability to Quickly Locate Equipment on P&ID During Session
 - ➢ Grouping Causes
- Pre-define and Communicate Technical Questions to Support Team Preparedness



Implementation Tips for a Remote HAZOP/LOPA





Remote-PHA Implementation Tips

- Consideration to Company Security Restrictions (e.g., for filesharing, meeting invitations, presentation "rights")
- Determine when Mute makes sense
 - Background noise control (or echoing/feedback if multiple devices are present)
 - > Concerns with participants responding when on mute
- P&ID Redlines during Remote PHAs
 - > All participants should have electronic P&IDs
 - Significant redlines should be made electronically on the shared screen to avoid confusion





Remote-PHA Implementation Tips

- Help participants identify "bandwidth sinks"
- Avoid Ghost Participants
 - Verbally verify attendance after long breaks*
 - Log attendance for remote meetings
 - "Raise Hand" either for "stepping out" or to get the Facilitator's attentionVideo Usage Pros/Cons
- Direct questions to specific participants to facilitate a response.
- Ensure that individuals have paper and electronic copies of P&IDs and PFDs.





Example Configuration

- Scribe Primary Computer with 3 screens Two with PHA Software and one for PSI
- Facilitator Computer with extended monitor and third scribe monitor for PHA worksheet display (to allow "social distancing").





Remote-PHA Example Splash Screen

- The PHA will start with MS Teams to quickly brief participants before joining GoToMeeting.
- Use the mute feature to suppress background noise, when necessary, and un-mute when you wish to be heard.
- Use your computer speakers and microphone, when audio quality permits, but dial the phone number on the MS Teams invitation, and use the Meeting ID, if needed for audio communications.
- If you are using multiple devices (e.g., phone and computer), make sure that all but one is muted to avoid echoing/feedback.
- Block your camera feed if you are having bandwidth limitations.
- If you continue to have bandwidth limitations, consider turning off other devices in your home that may be utilizing communications resources.
- Call XXX-XXX-XXXX if there are communications difficulties.



Remote-PHA Planning Tips (Remote "Deputy" and Language Barriers)

Remote Location "Deputy"

 \succ Someone to control other rooms in the study

Minimize Language Barriers

Remote HAZOP/LOPA increases communication challenges



 \geq Quality of communications equipment may be even more critical





Polling Question 2

- Necessity has required a transition from traditional in-person PHAs to Remote PHAs. Do you foresee continued use of Remote PHAs, post-COVID?
 - a) Yes b) No











PHA/Audit Telecollaboration

- Compliance Audits can easily transition to remote telecollaboration, and effectiveness is only minimally disadvantaged.
- PHA Team Meetings require extra planning and preparation

Equipment Checks, Software Checks, Pre-causing

- Remote HAZOP/LOPA can:
 - > accelerate the progress of efforts such as capital projects,
 - ➤ aid in project control,
 - ➤ enhance teamwork,
 - > provide a safe environment for team members, and
 - ➤ result in tangible savings to the Owner/Operator.



PHA/Audit Telecollaboration

- Telecollaboration should not become the standard for all PHAs, but for many important applications, the advantages outweigh the disadvantages
- Technological advances will continue to make telecollaboration even easier.
- Telecollaboration technologies and applications have already changed how we do business and <u>will continue to be used post-COVID</u>.
- Process Safety Professionals must continue to adapt and embrace new ways of working together.





Questions?

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